



Newfoundland and Labrador Conservation and Demand Management Potential Study: 2015

Commercial Sector Final Report

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Executive Summary

Background and Objectives

Since the initial launch of takeCHARGE, NL's Conservation and Demand Management (CDM) market has changed both naturally and as a result of the Utilities' planned interventions. Since the last CDM Potential Study, energy efficient technologies have evolved and the takeCHARGE programs have impacted the province's awareness and adoption of CDM measures. In addition, new codes & standards have been drafted or come into effect.

Experience throughout many North American jurisdictions has demonstrated that energy efficiency and conservation have a significant potential to reduce energy consumption, energy costs and emissions.

The objective of this CDM Potential Study, referenced as *CDM Potential Study 2015*, is to identify the achievable, cost-effective electric energy efficiency and demand management potential in the province. Similar to the 2007 Study, the information in this report will be critical to developing the next generation of takeCHARGE programs that are equally responsive to customer expectations, support efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service. The *CDM Potential Study 2015*, provides a resource for the Utilities to develop a comprehensive vision of the province's future energy service needs.

Scope

The scope of this study is summarized below:

- Sector Coverage: This study addresses three sectors: residential households (Residential sector), commercial and institutional buildings (Commercial sector), and small, medium, and large industry (Industrial sector).
- Geographical Coverage: The study addresses all regions of NL that are served by the Utilities. Customers served by both the hydroelectric grid and the stand-alone diesel grids are included. The study results are estimated for three distinct regions: Newfoundland, Labrador, and Isolated Diesel.
- Study Period: This study addresses a 15 year period. The Base Year for the study is the calendar year 2014. The Base Year of 2014 was calibrated to the 2014 actual sales data. The study milestone years will be 2017, 2020, 2023, 2026 and 2029.

It is recognized that the weather conditions in 2014 were not typical. The CDM Potential Study 2015 follows the same assumptions as in the Utilities' Load Forecast.

 Technologies: This study addresses a range of electricity conservation and demand management (CDM) measures and includes all electrical efficiency technologies or measures that are expected to be commercially viable by the year 2029 as well as peak load reduction technologies.

CDM Potential Study 2015 has been organized into two analysis areas and the results are presented in three reports, as show in Exhibit ES 1, below.



Exhibit ES 1 Overview of CDM POTENTIAL STUDY 2015 Organization – Analysis Areas and Reports

This report presents the results of both Analysis Area 1: Energy-efficiency Technologies and Behaviours and Analysis Area 2: Demand Measures, for Commercial sector customers. This report addresses all commercially available electric energy-efficiency and peak load reduction measures that are applicable to NL's Commercial sector. It includes the potential for electrical efficiency and peak load reduction technologies expected to be commercially viable by the year 2029; residential customer behaviour measures and commercial and industrial operation and maintenance (O&M) practices are also addressed.

Approach

The detailed end-use analysis of electrical efficiency opportunities in the Commercial sector employed two linked modelling platforms: CEEAM (<u>C</u>ommercial <u>E</u>lectricity and <u>E</u>missions <u>A</u>nalysis <u>Model</u>), an in-house, simulation model developed in conjunction with Natural Resources Canada (NRCan) for modelling electricity use in commercial/institutional building stock and CSEEM (<u>C</u>ommercial <u>Sector Energy End-use Model</u>), which is also an ICF in-house spreadsheet-based macro model.



Exhibit ES 2 CDM POTENTIAL STUDY 2015: Main Analytic Steps

The major steps involved in the analysis are shown in Exhibit ES 2 and are discussed in greater detail in Section 2 of this report. As illustrated in Exhibit ES 2, the results of *CDM Potential Study 2015*, and in particular the estimation of Achievable Potential,¹ support on-going conservation and demand management (CDM) work; however, it should be emphasized that the estimation of Achievable Potential is not synonymous with either the setting of specific CDM targets or with program design.

Overall Commercial Study Findings

As in any study of this type, the results presented in this report are based on a number of important assumptions. Assumptions such as those related to the current penetration of efficient technologies and the rate of future growth in the building stock are particularly influential. Wherever possible, the assumptions used in this study are consistent with those used by the NL utilities. However, the reader is referred to a number of caveats throughout the main text of the report. Given these assumptions, the CDM Potential Study 2015 findings confirm the existence of significant potential cost-effective opportunities for electricity consumption and peak load savings in NL's commercial sector.

¹ The proportion of savings identified that could realistically be achieved within the study period.

Efficiency improvements would provide between 209 and 640 GWh/yr. of electricity consumption savings by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. The most significant Achievable Potential savings opportunities were in actions that addressed the HVAC end uses, specifically space heating. Besides space heating, there are significant savings to be found in lighting and refrigeration, as well as smaller opportunities in many of the other end uses, such as domestic hot water (DHW), food service and plug loads.

The electricity consumption savings would provide associated peak load reductions of approximately 32 to 118 MW during NL's winter peak period by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. Demand reduction measures would provide further peak load reductions of approximately 1.2 to 4.2 MW by 2029 in, respectively, the Lower and Upper Achievable Potential scenarios. All told, this amounts to peak load reduction potential of between 6% and 20% with respect to the Reference Case commercial peak load. Demand reductions do not include demand curtailment; rather, existing and future demand curtailment is included in the industrial sector report.

Summary of Electric Energy Savings in the Commercial Sector

A summary of the levels of annual electricity consumption contained in each of the forecasts addressed by CDM Potential Study 2015 is presented in Exhibit ES 3 and Exhibit ES 4, by milestone year.

	Economic Scen	Potential ario	Upper A Potentia	chievable I Scenario	Lower Achievable Potential Scenario		
Year	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	
2017	744	31%	56	2.3%	8	0.3%	
2020	789	32%	149	6.0%	32	1.3%	
2023	834	32%	280	11%	73	2.8%	
2026	892	34%	456	17%	137	5.2%	
2029	936	35%	640	24%	209	7.8%	

Exhibit ES 3 Electricity Savings by Milestone Year for Three Scenarios (GWh/yr.)





Base Year Electricity Use

In the Base Year of 2014, NL's Commercial sector consumed about 2,360 GWh/yr. Exhibit ES 5 shows that space heating accounts for about 27% of total commercial electricity use. Lighting accounts for the second largest percentage, at 17%. These are followed by HVAC Fans and Pumps at 12%, miscellaneous equipment at 9%, refrigeration at 8%, secondary lighting at 5%, and domestic hot water (DHW) at 5%. Other end uses account for 4% or less of the total. Indeed, some end uses are extremely small. Block heaters are assumed to be used only in Labrador. The same exhibit also presents the Reference Case consumption by end use in 2029, at the end of the study period, for comparison. Overall, NL's Commercial sector is forecast to rise to about 2,700 GWh/yr. by 2029 in the absence of new utility CDM initiatives.

Exhibit ES 6 shows the distribution of Base Year electricity consumption by sub sector. As illustrated, large offices account for the largest share (12%) of Commercial sector Base Year electricity use. The same exhibit also presents the Reference Case consumption by sub sector in 2029, at the end of the study period, for comparison.

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Reference Case – Electric Energy





Exhibit ES 6 Electricity Use by Sub sector, Commercial Sector, 2014 and 2029

Economic Potential Forecast – Electric Energy

Under the conditions of the Economic Potential scenario,² the study estimated that electricity consumption in the commercial sector would decrease to approximately 1,758 GWh/yr. by 2029. Savings relative to the Reference case would be approximately 936 GWh/yr. or about 35%. The Economic Potential savings in the intermediate milestone years are 1,660 GWh/yr. in 2017, 1,711 GWh/yr. in 2020, 1,743 GWh/yr. in 2023, and 1,739 GWh/yr. in 2026. In each case, the savings amount to approximately 31-35% of the Reference case consumption. The Economic Potential savings are dominated by measures that are cost-effective based on their full cost (versus the "donothing" option), and therefore within the definitions of the scenario they would be adopted immediately and provide savings starting in the first milestone period.

Achievable Potential – Electric Energy

The Achievable Potential is the portion of the Economic Potential savings that could realistically be achieved within the study period.³ In the commercial sector, the Achievable Potential for electricity savings was estimated to be 209 and 640 GWh/yr., respectively, in the Lower and Upper Achievable Potential scenarios. The savings in the intervening milestone years show a more realistic ramp-up pattern than that observed in the Economic Potential scenario.

The most significant Achievable Potential savings opportunities were in actions that addressed HVAC. In fact, savings in the HVAC end uses account for 57% of the opportunities in 2029. Of this, the ductless mini-split heating systems and building recommissioning measures offer the largest savings potential in the commercial sector. Besides HVAC, there are significant savings to be found in lighting and refrigeration as well as smaller opportunities in many of the other end uses.⁴

² The Economic Potential Electricity Forecast is the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold value, which has been set at different prices per kWh for the different regions. (One kWh from the Labrador hydroelectric grid is much less expensive than one kWh from an isolated diesel grid.)

 ³ The Achievable Potential recognizes that it is difficult to induce customers to purchase and install all the electrical efficiency technologies that meet the criteria defined by the Economic Potential Forecast. The results are presented as a range, defined as lower and upper.
 ⁴ It should be noted that measures are applied separately for each combination of region, sub sector, and milestone

⁴ It should be noted that measures are applied separately for each combination of region, sub sector, and milestone year. Some of the parameters that are used to assess measures in each circumstance can vary. For example, the potential savings or cost for a measure in one sub sector or region may be different from the savings or cost in another sub sector or region. In addition, the economic threshold value that is used to assess cost-effectiveness varies for each of the milestones. As such, measures that are marginally cost-effective, such as multi-split heat pumps, are only cost-effective in a subset of the regions, sub sectors, and milestone years being considered.

Summary of Peak Load Reductions

Based on discussions with utility personnel, the following peak period definition was used for this study:

Peak Period – The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.⁵

Exhibit ES 7 and Exhibit ES 8 show the peak load reductions from both the energy efficiency measures and from measures targeted specifically at load management. More details on peak load reduction opportunities are provided in the main body of the report. Highlights of the findings include the following:

- Electricity savings offered by the Lower and Upper Achievable Potential scenarios would provide peak load reductions of approximately 32 to 118 MW by 2029, a decrease of between 5% and 20% relative to the reference case.
- Demand reduction measures under the Lower and Upper Achievable Potential scenarios would provide peak load reductions of an additional 1.2 to 4.2 MW by 2029, a decrease of up to a further 1%.
- Demand reduction potential is dominated by the reductions associated with energy efficiency measures in both of the achievable potential scenarios.

	Economic	Potential	Upper Ac	hievable	Lower Achievable		
Year	Potential Reductions (MW)	% Reduction Relative to Reference Case	Potential Reductions (MW)	% Reduction Relative to Reference Case	Potential Reductions (MW)	% Reduction Relative to Reference Case	
2017	3.5	0.6%	0.0	0.0%	0.0	0.0%	
2020	41.1	7.4%	0.8	0.1%	0.2	0.0%	
2023	41.8	7.3%	1.7	0.3%	0.4	0.1%	
2026	41.8	7.1%	2.9	0.5%	0.7	0.1%	
2029	41.7	6.9%	4.2	0.7%	1.2	0.2%	

Exhibit ES 7 Peak Demand Reductions by Milestone Year for Three Scenarios (MW)

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Exhibit ES 8 Peak Demand of Reference Case, Lower Achievable Potential and Upper Achievable Potential in Commercial Sector (MW)

Base Year Demand

In the Base Year of 2014, NL's Commercial sector demand was approximately 522 MW, averaged over the 36-hour peak period. This may be compared against the overall average commercial demand for the year, which is:

2,360 GWh / 8760 hours * 1000 MW/GW = 269 MW

Exhibit ES 9 shows that space heating accounts for nearly 40% of total commercial sector demand. General lighting accounts for the second largest percentage, at 14%. These are followed by HVAC Fans and Pumps and domestic hot water each at 8%, food service equipment and miscellaneous equipment each at 7% and refrigeration and secondary lighting at 4% each. Other end uses account for 3% or less of the total. The same exhibit also presents the Reference Case demand by end use in 2029, at the end of the study period, for comparison. Overall, NL's Commercial sector is forecast to rise to about 602 MW by 2029 in the absence of new utility CDM initiatives, an increase of approximately 13%.

Exhibit ES 10 shows the distribution of Base Year electric peak demand by sub sector. As illustrated, large offices account for the largest share (12%) of Commercial sector Base Year electricity use. The same exhibit also presents the Reference Case consumption by sub sector type in 2029, at the end of the study period, for comparison.

Reference Case – Electric Peak Demand



Exhibit ES 9 Electric Peak Demand by End Use, Commercial Sector, 2014 and 2029



Exhibit ES 10 Electric Peak Demand by Sub Sector, Commercial Sector, 2014 and 2029

Economic Potential Forecast – Electric Peak Demand

Under the conditions of the Economic Potential scenario,⁶ the study estimated that electric peak demand in the commercial sector would decrease to approximately 449 MW by 2029. Reductions relative to the Reference case would be approximately 153 MW or about 25%. The Economic Potential reductions in the intermediate milestone years are 134 MW in 2017, 137 MW in 2020, 142 MW in 2023, and 148 MW in 2026. In each case, the reductions amount to approximately 25% of the Reference case peak demand. The Economic Potential reductions are dominated by measures that are cost-effective relative to the Utilities' cost of new capacity based on their full cost (versus the "donothing" option), and therefore within the definitions of the scenario they would be adopted immediately and provide reductions starting in the first milestone period.

Achievable Potential – Electric Peak Demand

The Achievable Potential is the portion of the Economic Potential reductions that could realistically be achieved within the study period. In the commercial sector, electricity savings offered by the Lower and Upper Achievable Potential scenarios would provide peak load reductions of approximately 32 to 118 MW by 2029, a decrease of between 5% and 20% relative to the reference case. Demand reduction measures under the Lower and Upper Achievable Potential scenarios would provide peak load reductions of an additional 1.2 to 4.2 MW by 2029, a decrease of up to a further 1%. Thus, demand reduction potential is dominated by the reductions associated with energy efficiency measures in both of the achievable potential scenarios. The savings in the intervening milestone years show a more realistic ramp-up pattern than that observed in the Economic Potential scenario.

Among the demand reduction measures the most significant Achievable Potential savings opportunities were in actions that addressed HVAC measures. In fact, HVAC reductions account for 64-74% of the opportunities in 2029. Of this, the HVAC demand controls measure offers the largest demand reduction potential in the commercial sector, aside from the demand reduction associated with energy efficiency measures. Besides the HVAC savings, there are also potential demand savings from demand measures related to DHW, lighting, and refrigeration.

⁶ The Economic Potential Electric Peak Load Forecast is the expected electric peak load that would occur in the defined peak period if demand is reduced by the reductions associated with the energy efficiency measures in the Economic Potential Electricity Efficiency Forecast, and all peak load reduction measures that are cost effective against the future avoided cost of new capacity in NL were also fully implemented.

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1 Introduction

Newfoundland Power Inc. and Newfoundland and Labrador Hydro have been successfully delivering electricity conservation programs to their customers since 2009 under the joint brand, takeCHARGE.

Since the initial launch of takeCHARGE, NL's CDM market has changed both naturally and as a result of the Utilities' planned interventions. Since the last CDM Potential Study, energy efficient technologies have evolved and the takeCHARGE programs have impacted the province's awareness and adoption of CDM measures. In addition, new codes & standards have been drafted or come into effect.

Experience throughout many North American jurisdictions has demonstrated that energy efficiency and conservation have a significant potential to reduce energy consumption, energy costs and emissions.

The objective of this CDM Potential Study, referenced as *CDM Potential Study 2015*, is to identify the achievable, cost-effective electric energy efficiency and demand management potential in province. Similar to the 2008 Study, the information in this report will be critical to developing the next generation of takeCHARGE programs that are equally responsive to customer expectations, support efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service. The *CDM Potential Study 2015*, provides a resource for the Utilities to develop a comprehensive vision of the province's future energy service needs.

1.1 Study Scope

The scope of this study is summarized below:

- Sector Coverage: This study addresses three sectors: residential households (Residential sector), commercial and institutional buildings (Commercial sector), and small, medium, and large industry (Industrial sector).
- Geographical Coverage: The study addresses all regions of NL that are served by the Utilities. Customers served by both the hydroelectric grid and the stand-alone diesel grids are included. The study results are estimated for three distinct regions: Newfoundland, Labrador, and Isolated Diesel.
- Study Period: This study addresses a 15 year period. The Base Year for the study is the calendar year 2014. The Base Year of 2014 was calibrated to the 2014 actual sales data. The study milestone years will be 2017, 2020, 2023, 2026 and 2029.

It is recognized that the weather conditions in 2014 were not typical. The CDM Potential Study 2015 follows the same assumptions as in the Utilities' Load Forecast.

 Technologies: This study addresses a range of conservation and demand management (CDM) measures and includes all electrical efficiency technologies or measures that are expected to be commercially viable by the year 2029 as well as peak load reduction technologies.

1.1.1 Data Caveat

As in any study of this type, the results presented in this report are based on a large number of important assumptions. Assumptions such as those related to the current penetration of energy-efficient technologies, the rate of future growth in the stock of commercial buildings and customer willingness to implement new energy-efficiency measures are particularly influential. Wherever possible, the assumptions used in this study are consistent with those used by the Utilities and the Government of Newfoundland and are based on best available information, which in many cases includes the professional judgment of the consultant team, client personnel and local experts. The reader should, therefore, use the results presented in this report as best available estimates; major assumptions, information sources and caveats are noted throughout the report.

1.2 Study Organization

Exhibit 1 presents an overview of the study's organization; as illustrated, the study has been organized into two analysis areas and four individual reports.

A brief description of each analysis area and its report content is provided below.



Exhibit 1 Overview of CDM Potential Study 2015 Organization – Analysis Areas and Reports

1.2.1 Analysis Area 1 – Conservation Measures

This area of the CDM Potential Study 2015 assesses electric energy⁷ reduction opportunities that could be provided by electrical efficiency technologies that are expected to be commercially viable by the year 2029; residential customer behaviour measures and commercial and industrial operation and maintenance (O&M) practices are also addressed. The results of Analysis Area 1 are presented in three individual sector reports.

1.2.2 Analysis Area 2 – Demand Measures

This area of the CDM Potential Study 2015 assesses peak load reduction opportunities that could be provided by peak load reduction technologies that are expected to be commercially viable by the year 2029. The results of Analysis Area 2 are presented in three individual sector reports.

1.3 **Report Organization**

This report presents the Commercial sector results. It is organized and presented as follows:

- Section 2 presents an overview of the study methodology, including a definition of key terms and an outline of the major analytic steps involved.
- Section 3 presents a profile of Commercial sector Base Year electricity use in NL.
- Section 4 presents a profile of Commercial sector Base Year electric peak load, including the definition of peak periods that are included in this study.

⁷ The term "electric energy" is used in this report to distinguish electricity consumption (in units of kWh or MWh) from electricity demand during a specific period (in units of MW).

- Section 5 presents the Reference Case, which provides a detailed estimate of electricity use in NL's Commercial sector over the study period 2014 to 2029, in the absence of new utility CDM program initiatives.
- Section 6 presents the Reference Case electric peak loads, which provide a detailed estimate of peak load requirements in NL's Commercial sector over the study period 2014 to 2029, in the absence of new utility CDM program initiatives.
- Section 7 identifies and assesses the economic attractiveness of the selected energy-efficiency technology measures for the Commercial sector.
- Section 8 presents the Commercial sector Economic Potential Electricity Forecast for the study period 2014 to 2029, including the potential for both energy efficiency measures and capacityonly peak load reduction measures.
- Section 9 presents the estimated upper and lower Achievable Potential for electric energy savings for the study period 2014 to 2029, including the potential for both energy efficiency measures and capacity-only peak load reduction measures.
- Section 10 lists sources and references.
- Section 11 is the Glossary.

1.4 Results Presentation

The preparation of CDM Potential Studies involves the compilation and analysis of an enormous amount of market and technology data and a nearly infinite number of ways of organizing and presenting the results. It is recognized that readers will have differing levels of needs with respect to the level of detail provided. Consequently, the results of this CDM Potential Studies are presented at three levels of detail.

- Main report body: The main body of the report provides a relatively high-level reporting of the main steps involved in undertaking each stage of the study together with a concise summary of results, including comments and interpretation of key findings. It is assumed that the content and level of detail in the main report body is suitable for the majority of readers who wish to gain an understanding of the potential contribution of CDM options to NL's long-term electricity requirements.
- Appendices: A separate appendix accompanies each major section of the main report. Each appendix provides more detailed information on the methodology employed, including major assumptions or sample calculations as applicable, together with additional levels of results. It is assumed that this presentation is better suited to CDM analysts and managers wishing a more thorough understanding of the study results.
- Software: All of the data generated by the study is provided in two custom-designed Excel models: Data Manager and the measure TRM (technical resource manual) Workbook.
 - Data Manager is a custom-designed Excel workbook with query protocols that enable the user to search and report the study results in a virtually infinite number of combinations. Data Manager is intended to support the most detailed level of CDM activity such as program design, preparation of regulatory submissions, etc.

• The Measure TRM Workbook is a custom-designed model that provides comprehensive profiles of the CDM measures assessed within the study. Because the information is provided in software form, any changes to economic, financial or performance data inputs can be easily accommodated and revised results generated automatically.

2 Study Methodology

This section provides an overview of the methodology employed for this study. More specifically, it addresses:

- Definition of terms
- Major analytic steps
- Analytic models

2.1 Definition of Terms

This study uses numerous terms that are unique to analyses such as this one and consequently it is important to ensure that readers have a clear understanding of what each term means when applied to this study.

A brief description of some of the most important terms and their application within this study is included below.

Base Year Electricity Use	The Base Year is the starting point for the analysis. It provides a detailed description of where and how electrical energy is currently used in the existing building stock. Building electricity use simulations were undertaken for the major sub sector types and calibrated to actual utility customer billing data for the Base Year. As noted previously, the Base Year for this study is the calendar year 2014.
Base Year Electric Peak Load Profile	Electric peak load profiles refer to one specific time period throughout the year when NL's generation, transmission and distribution system experiences particularly high levels of electricity demand. This period is of particular interest to system planners; improved management of electricity demand during this peak period may enable deferral of costly system expansion. This study addresses one specific peak periods, as outlined in the main text.
Reference Case Electricity Use (includes "natural" conservation)	The Reference Case electricity use estimates the expected level of electrical energy consumption that would occur over the study period in the absence of new (post-2014) utility-based CDM initiatives. It provides the point of comparison for the subsequent calculation of Economic and Achievable electricity savings potentials. Creation of the Reference Case required the development of profiles for new buildings in each of the sub sectors, estimation of the expected growth in building stock, and finally an estimation of "natural" changes affecting electricity consumption over the study period. The Reference Case is calibrated to the Utilities most recent load forecast, minus the impacts of new, future CDM initiatives.
Reference Case Electric Peak Load Profile	The Reference Case peak load profile estimates the expected electric peak loads in the defined peak period over the study period in the absence of new utility CDM program initiatives. It provides the point of comparison for the subsequent calculation of Economic and Achievable Potentials for peak load reduction.

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Conservation and Demand Management (CDM) Measures	CDM measures can include energy efficiency (use more efficiently), energy conservation (use less), demand management (use less during peak periods), fuel switching (use a different fuel to provide the energy service) and customer-side generation (displace load off of grid). Customer –side generation and fuel switching are not included in this study.
The Cost of Conserved Energy (CCE)	The CCE is calculated for each energy-efficiency technology measure. The CCE is the annualized incremental capital and O&M cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs. The CCE represents the cost of conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity.
The Cost of Electric Peak Reduction (CEPR)	The CEPR for a peak load reduction measure is defined as the annualized incremental capital and O&M cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs. The CEPR represents the cost of reducing one kW of electricity during a peak period; it can be compared to the cost of supplying one new kW of electric capacity during the same period.
Electric Capacity-Only Peak Load Reduction Measures	Capacity-only measures are technologies or activities that result in the shifting of certain electrical loads from periods of peak system demand to periods of lower system demand.
Economic Potential Electricity Forecast	The Economic Potential Electricity Forecast is the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold value ⁸ , which has been set at different prices per kWh for the different supply system types. All the energy-efficiency upgrades included in the technology assessment that had a CCE equal to, or less than, the economic threshold value for a given supply system were incorporated into the Economic Potential Forecast.
Economic Potential Electric Peak Load Forecast	The Economic Potential Electric Peak Load Forecast is the expected electric peak loads that would occur in each of the three defined peak periods if all peak load reduction measures that are cost effective against the future avoided cost of new capacity in NL were fully implemented.
Achievable Potential	The Achievable Potential is the proportion of the savings identified in the Economic Potential Forecasts that could realistically be achieved within the study period. The Achievable Potential recognizes that it is difficult to induce customers to purchase and install all the electrical efficiency technologies that meet the criteria defined by the Economic Potential Forecast. The results are presented as a range, defined as lower and upper.

⁸ The economic threshold value is related to the cost of new avoided electrical supply. The values for each supply system are generally selected to provide the CDM Potential Study with a reasonably useful time horizon (life) to allow planners to examine options that may become more cost effective over time. Further discussion is provided in Section 7 of this report.

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2.2 Major Analytic Steps

The study was conducted within an iterative process that involved a number of well-defined steps, as illustrated in Exhibit 2.



A summary of the steps is presented below.

Step 1: Develop Base Year Electric Energy and Peak Load Calibration Using Actual Utility Billing Data

Build a model of electric energy and demand for the sector, disaggregated to all the building types and end uses, calibrated to sales of electricity in NL. This includes the following sub-steps:

- Compile and analyze available data on NL's existing building stock.
- Develop detailed technical descriptions of the existing building stock.
- Undertake computer simulations of electricity use in each building type and compare these with actual building billing and audit data.
- Compile actual utility billing data.
- Create sector model inputs and generate results.
- Calibrate sector model results using actual utility billing data.
- Use end-use load shape data to convert electric energy use to electric demand in each selected peak period.

Exhibit 2 Major Analytic Steps

• Calibrate the weather-sensitive load shape ratios for all three sectors to produce regional demand results that agree with the actual utility peak demand.

Step 2: Develop Reference Case Electric Energy Use and Peak Load Profile

Extend the base year model to the end of the study period, based on forecast building stock growth and expected natural changes in construction practices, equipment efficiency levels and/or practices. This includes the following sub-steps:

- Compile and analyze building design, equipment and operations data and develop detailed technical descriptions of the new building stock.
- Develop computer simulations of electricity use in each new building type.
- Compile data on forecast levels of building stock growth and "natural" changes in equipment efficiency levels and/or practices.
- Define sector model inputs and create forecasts of electricity use for each of the milestone years.
- Compare sector model results with load forecasting data provided by the Utilities for the study period.
- Use end-use load shape data to convert electric energy use to electric demand in each selected peak period over the study period.

Step 3: Identify and Assess Energy-efficiency and Peak Load Reduction Measures

Compile information on upgrade measures that can save electric energy and/or reduce peak demand, and assess them for technical applicability and economic feasibility. This includes the following sub-steps:

- Develop list of energy-efficiency upgrade and peak load reduction measures.
- Compile detailed cost and performance data for each measure.
- For energy-efficiency measures, identify the baseline technologies employed in the Reference Case, develop energy-efficiency upgrade options and associated electricity savings for each option, and determine the CCE for each upgrade option.
- For each peak load reduction measure, identify the affected end use, the potential load reduction or off-peak shifting and determine the CEPR.
- Based on the above results, prepare summary tables that show the amount of potential peak load reduction provided by each measure and at what cost (\$/kW/yr.).
- Apply each peak load reduction measure to the affected end use, regardless of cost, and determine total peak reduction.
- Summarize the peak load reduction impacts in a supply curve.

Step 4: Estimate Economic Electric Energy Savings Potential

Develop an estimate of the electric energy savings potential that would result from implementing all of the economically feasible measures in all the buildings where they are applicable. This includes the following sub-steps:

- Compile utility economic data on the forecast cost of new electricity generation and set an
 economic threshold value; different economic threshold values were selected for each region
 and milestone year.
- Identify the combinations of energy-efficiency upgrade options and building types where the cost
 of saving one kilowatt of electricity is equal to, or less than, the cost of new electricity generation.
- Apply the economically attractive electrical efficiency measures from Step 3 within the energyuse simulation model developed previously for the Reference Case.

- Determine annual electricity consumption in each building type and end use when the economic efficiency measures are employed.
- Compare the electricity consumption levels when all economic efficiency measures are used with the Reference Case consumption levels and calculate the electricity savings.

Step 5: Estimate Achievable Potential Electricity Savings

Develop an estimate for the peak load impacts associated with the measures that save electric energy. This includes the following sub-steps:

- Convert the electricity (electric energy) savings (MWh) calculated in the preceding steps to peak load (electric demand) savings (kW).⁹
- Convert electricity savings to hourly demand, drawing on a library of specific sub sector and enduse electricity load shapes. Using the load shape data, apply the following steps:
 - Disaggregate annual electricity savings for each combination of sub sector and end use by month
 - Further disaggregate monthly electricity savings by day type (weekday, weekend day and peak day)
 - Finally, disaggregate each day type by hour.
- Produce a post-efficiency case for peak demand, by region, building type, end use, and milestone year, to serve as a base case for estimating the impacts of peak load measures.

Step 6: Estimate Peak Load Impacts of Electricity Savings

Develop an estimate for the peak load impacts associated with the measures that save electric energy. This includes the following sub-steps:

- Compile utility economic data on the forecast cost of new capacity and set an economic threshold value; different economic threshold values were selected for each region and milestone year.
- Identify the combinations of energy efficiency upgrade options and building types where the cost
 of reducing one kilowatt of demand is equal to, or less than, the cost of new electric capacity.
- Apply the economically attractive electrical efficiency measures from Step 3 within the demand simulation model developed previously for the Reference Case, using the post-efficiency case as the starting point for the demand measures.
- Determine annual electric demand in each building type and end use when the economic demand reduction measures are employed.
- Compare the electric demand levels when all economic demand reduction measures are used with the post-efficiency demand levels and calculate the total demand reduction.

Step 7: Estimate Achievable Potential Electricity Savings and Demand Reduction

Develop an estimated range for the portion of economic potential savings and demand reductions that would likely be achievable within realistic CDM programs. This includes the following sub-steps:

- Bundle the electric energy and peak load reduction opportunities identified in the Economic Potential Forecasts into a set of opportunities.
- For each of the identified opportunities, create an Opportunity Profile that provides a high-level implementation framework, including measure description, cost and savings profile, target sub sectors, potential delivery allies, barriers and possible synergies.

⁹ Peak load savings were modelled using the Cross-Sector Load Shape Library Model (LOADLIB).

- Review historical achievable program results and prepare preliminary Assessment Worksheets.
- Conduct a full day workshop involving the client, the consultant team, trade allies and technical experts to reach general agreement on the upper and lower range of Achievable Potential for both efficiency and demand reduction.
- Total potential for demand reduction includes both the demand reductions associated with the energy efficiency measures and the demand reductions from demand management measures.

2.3 Analytical Models

The analysis of the Commercial sector employed two linked modelling platforms:

- CEEAM (Commercial Electricity and Emissions Analysis Model), an in-house, simulation model developed in conjunction with Natural Resources Canada (NRCan) for modelling electricity use in commercial/institutional building stock.
- CSEEM (Commercial Sector Electricity End-use Model), an in-house spreadsheet-based macro model.

CEEAM was used to develop commercial electricity end-use intensities (EUIs) for each of the commercial and institutional building archetypes. CEEAM has been successfully employed in numerous domestic and international conservation and demand management projects.

Domestically, this includes assignments for BC Hydro, FortisBC, SaskPower, Manitoba Hydro, the Independent Electricity System Operator (IESO)¹⁰, Enbridge Gas, Union Gas, NB Power, Newfoundland Power, Newfoundland Labrador Hydro and Natural Resources Canada. CEEAM is a robust modelling platform whose results have been verified against actual end-use metered data for commercial buildings in the cities of Ottawa and Toronto and against results from DOE-2, the widely used building simulation software tool developed by the US Department of Energy (DOE).

CEEAM was developed specifically for applications such as this study. One of its particular strengths is the capability to simulate electricity performance not only in a given building but also in an entire stock of similar buildings (e.g., all Large Offices). In particular, it is capable of tracking the penetration of multiple technologies in combinations that are not possible with other simulation software tools, such as DOE-2.

CEEAM simulates the electricity consumption and peak load for all electricity end uses present in a given commercial building segment. CEEAM calculates energy use and emissions by end use and reports them in kWh/ft²/yr. and kg eCO₂/ft². Because CEEAM is a full modelling program, it calculates both building heating and cooling loads (internal and transmission). It therefore accounts for interactive effects such as the increase in heating energy use and decrease in cooling energy use resulting from lighting retrofits. CEEAM also uses equipment part load performance curves to accurately model the seasonal efficiency of heating and cooling plants.

The commercial EUIs derived by CEEAM provide inputs into CSEEM. CSEEM consists of two modules:

- A general parameters module that contains general sector data (e.g., floor space, growth rates, etc.)
- A building profile module that contains the EUI data for each of the selected building sub sectors

¹⁰ Formerly the Ontario Power Authority (OPA). The OPA merged with the IESO on January 1, 2015.

CSEEM combines data from each of these modules and provides total electricity use by service region, building sub sector and end use. CSEEM also enables the analyst to estimate the impacts of the electrical efficiency measures on a utility's on-peak system demand.

3 Base Year (2014) Electric Energy Use

3.1 Introduction

This section provides a profile of Base Year (2014) electricity use in NL's commercial sector. Development of the Commercial sector Base Year electricity profile required the following major steps:

- NL's commercial buildings were segmented into sub sectors containing buildings with similar energy use patterns
- The major energy end uses within commercial buildings were selected
- Data on end-use fuel shares and space cooling saturation were compiled for each sub sector
- Detailed building and equipment specifications were compiled and used to create building energy-use models for each sub sector
- Utility sales data were compiled for each sub sector
- Utility sales data were combined with the model results showing typical sub sector electricity use to generate an estimate of floor area for each sub sector
- CSEEM was used to combine the above data and provide the detailed Base Year profile.

A brief description of each of the above steps is provided below, together with a summary of the results. Additional information is provided in Appendix A.

3.2 Commercial Sector Segmentation

The first major task in developing the Base Year calibration involved the segmentation of the commercial building stock into specific sub sectors. The choice of building sub sectors is driven by both data availability and the need to facilitate the subsequent analysis and modelling of potential electrical efficiency improvements.

For modelling and analysis of energy-efficiency opportunities, the selected building sub sectors must be reasonably similar in terms of major design and operating considerations, such as building size, typical mechanical and electrical systems, and annual operating hours. In order to facilitate energy modelling, this report deals primarily with buildings in which energy use is dominated by space conditioning and the provision of services to occupants (e.g., lighting and water heating). As discussed below, buildings where energy use is primarily process-driven are segregated into a separate category and treated at a less detailed level.

Based on discussions with the Utilities personnel, it was agreed that NL's existing commercial stock would be segmented into the following sub sectors:

- Large Office
- Small Office
- Large Non-food Retail
- Small Non-food Retail

- Food Retail
- Large Accommodations
- Small Accommodations
- Health Care (Hospitals & Nursing Homes)
- Schools (Elementary and Secondary)
- Universities and Colleges
- Warehouse/Wholesale
- Restaurants
- Isolated C/I Buildings
- Large Other Buildings
- Small Other Buildings
- Other Institutional Buildings
- Non-Buildings
- Street Lighting

A brief description of each Commercial sub sector is included in Appendix A. Additional explanation is provided for selected sub sectors:

- Isolated C/I Buildings: This sub sector includes buildings such as restaurants, schools, variety stores, medical clinics and multi-purpose garages and sheds that are located in isolated communities served by local diesel-powered systems.
- Other Buildings: This sub sector represents buildings that do not fit into the other sub sectors, including churches, theatres, community centres, transportation buildings and recreation complexes.
- Other Institutional Buildings: This sub sector includes buildings such as barracks, mess halls, hangers and warehouses located at Canadian Forces Base Goose Bay.
- Non-Buildings: This sub sector includes facilities such as microwave repeater stations and telephone exchanges. Although these facilities are housed within a "building," the majority of their electricity use is consumed by the unique equipment that it houses. This sub sector will be tracked throughout the study but will not be subjected to detailed analysis.

3.3 End Uses

Electricity use within each of the sub sectors noted above is defined on the basis of specific end uses. In this study, an end use is defined as "the final application or final use to which energy is applied. End uses are the services of economic value to the users of energy."

A summary of the major commercial sector end uses used in this study is provided in Exhibit 3, together with a brief description of each.

End Use	Description
General Lighting	Lighting in main areas of a building (e.g., classrooms in a school)
Secondary Lighting	Lighting in secondary areas of a building (e.g., corridors/lobbies in a school)
Outdoor Lighting	Lighting used for parking lots and exterior building illumination
Computer Equipment	Computers, monitors, printers, fax machines, and copiers
Computer Servers	Computer servers
Other Plug Loads	Other plug loads, excluding computer equipment
Food Service Equipment	Food preparation equipment, including ranges, broilers, ovens, etc.
Refrigeration	Fridges, freezers, coolers, and display cases
Elevator	Passenger and freight elevators
Miscellaneous Equipment	Air compressors, sump pumps, clothes washers, etc.
Space Heating	Electric boilers, unit heaters, baseboard heaters
Space Cooling	Air-conditioning compressors
HVAC Fans & Pumps	Fans, pumps, cooling tower fans, etc.
Domestic Hot Water	Electric water heaters
Street Lighting	Roadway lighting
Block Heaters	Block heaters and other car warming equipment plugged into outlets in commercial building parking lots

Exhibit 3 Commercial Electric End Uses

3.4 End-use Saturation and Fuel Share Data

The next step in the analysis involved an estimation of the electric fuel share for space heating, domestic hot water (DHW) and food service equipment,¹¹ and an estimation of saturation for space cooling.¹² Various information sources were used to derive these estimates, including analysis of NL's sales data, the Commercial End Use Survey (CEUS) from NL, previous project team

¹¹ Space heating fuel share refers to the percentage of the total floor space that is electrically heated; similarly, DHW fuel share refers to the percentage of the total floor space that is served by electrically heated domestic hot water. Food service equipment fuel share refers the electric portion of end-use energy.

¹² Space cooling saturation refers to the percentage of the total floor space that is air conditioned.

experience, comparable data from other Canadian jurisdictions contained in the ICF database, and consultations with local technical advisors.

Exhibit 4 and Exhibit 5 present the estimated fuel shares and space cooling saturations for each sub sector and service region. It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

	Island	Interconr	nected	Labrador Interconnected			Isolated		
Sub Sector	Space Heating	DHW	Food Service	Space Heating	DHW	Food Service	Space Heating	DHW	Food Service
Large Office	85%	90%	100%	100%	100%	100%	-	-	-
Small Office	90%	95%	100%	100%	100%	100%	-	-	-
Large Non-Food Retail	85%	90%	100%	100%	100%	100%	-	-	-
Small Non-Food Retail	85%	95%	100%	100%	100%	100%	-	-	-
Food Retail	85%	90%	100%	100%	100%	100%	-	-	-
Large Accomodation	90%	90%	98%	100%	100%	100%	-	-	-
Small Accomodation	90%	90%	100%	100%	100%	100%	-	-	-
Healthcare	50%	60%	100%	100%	100%	100%	-	-	-
Schools	75%	80%	100%	100%	100%	100%	-	-	-
Universities and Colleges	20%	25%	100%	90%	100%	100%	-	-	-
Warehouse / Wholesale	75%	80%	100%	80%	100%	100%	-	-	-
Restaurant	90%	95%	98%	100%	100%	100%	-	-	-
Labrador Isolated C/I Buildings	-	-	-	-	-	-	15%	15%	50%
Island Isolated C/I Buildings	-	-	-	-	-	-	15%	15%	50%

Exhibit 4 Electric Fuel Share by Sub sector & Service Region (%)

Exhibit 5 Space Cooling Saturation by Sub sector and Service Region (%)

Sub Sector	Island Interconnected	Labrador Interconnected	Isolated
Large Office	85%	50%	
Small Office	75%	25%	
Large Non-Food Retail	75%	50%	
Small Non-Food Retail	70%	50%	
Food Retail	65%	25%	
Large Accomodation	75%	25%	
Small Accomodation	50%	25%	
Healthcare	60%	50%	
Schools	2%	50%	
Universities and Colleges	15%	35%	
Warehouse / Wholesale	5%	2%	
Restaurant	70%	25%	
Labrador Isolated C/I Buildings	-	-	10%
Island Isolated C/I Buildings	-	-	0%
3.5 Detailed Building and Equipment Specifications

The next major task involved the development of detailed technical data on building specifications, mechanical and electrical equipment, operating practices and electricity use for each sub sector and end use identified above.

To facilitate the subsequent analysis of the potential impacts of energy-efficiency measures, the detailed data on building, equipment and operating practices were compiled within ICF's Commercial/Institutional Building Energy-use Simulation Model (CEEAM). Detailed building profiles were created that represent the stock of buildings within each sub sector. The detailed technical profiles constitute a bottom-up profile of energy use in the targeted sub sectors.

The building profiles developed for the 2008 CDM Potential Study were used as a starting point for several of the building profiles that were developed for this study. Development and refinement of the detailed building profiles relied on an analysis of data sources, primarily:

- The Commercial End Use Survey (CEUS) provided by the Utilities
- Professional experience of the study team personnel, including building site visits in Newfoundland and other jurisdictions

Separate building profiles were developed for both the Island Interconnected and the Labrador Interconnected service regions. Exhibit 6 presents a sample building profile summary. Detailed profiles for each existing building sub sector are provided in Appendix A.

Exhibit 6 Sample Building Profile Summary – Existing Large Office

Building Type:	Large Offic	e	Location:		Island Interd	connected		
Description:								
The building characterisitics used to define the La - Average gross floor area of 40,000 ft ² - Average footprint of 13,333 ft ² (approx. 115 ft x ' - Average height of 3 stories	rge Office arcl	netype are as	follows:					
Building Envelope								
roof construction:	0.48	W/m².°C						
wall construction:	0.71	W/m².°C						
windows:	3.97	W/m².°C						
shading coefficient	0.58							
window to wall ratio	0.4							
General Lighting & LPD	550	Lux	14.8	W/m²				
System Types	INC	CEL	T12	T8	HID	T5HO	٦	
	0%	0%	20%	80%	0%	0%	1	
Architectural Lighting & LPD	350	Lux	31.0	W/m²				
System Types	INC	CFL			HID	T5HO	7	
- y	45%	45%			5%	0%]	
Overall I BD	16.4	\//m2						
Plug Loads	10.4	W/m ²						
Computer Equipment	4.6	W/m ²						
Ventilation:								
System Type	CAV	VAV	DD	IU	100%OA	Other]	
	75%	25%	0%	0%	0%			
System air Flow	3.6	L/s.m ²	0.70	CFM/ft ²				
Cooling Plant:	6.0	VV/II1-	0.56	VV/IL*				
System Type	Contrifugal	Contri HE	Pacin Open	DY	LiBr	Othor	٦	
System type	20%	0%	0%	80%	0%	Other	-	
							-	
Calculated Capacity	84	W/m ²	450	ft²/Ton				
Cooling Plant Auxiliaries								
Circulating Pumps	0.5	W/m²	0.1	VV/ft2				
Condenser Fumps	0.0	W/m2	0.1	VV/IL*				
	1.7	VV/III-	0.2	VV/IL-				
End-Use Summary	Elec	ricity	Fuel Oil /	Propane				
	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr				
GENERAL LIGHTING	202	5.2						
ARCHITECTURAL LIGHTING	60	1.5						
SPECIAL PURPOSE LIGHTING	0	0.0						
OUTDOOR LIGHTING	17	0.4						
SPACE HEATING	355	9.2	89.5	2.3				
	38	1.0	0.0	0.0				
	1/3	4.5	2.0	0.1				
	23	0.6	3.0	0.1				
	91	2.4						
OTHER PLUG LOADS	28	0.4						
FOOD SERVICE EQUIPMENT	4	0.1	0.0	0.0				
REFRIGERATION	4	0.1	0.0	0.0				
ELEVATORS	3.9	0.1						
MISCELLANEOUS	10	0.3						
BLOCK HEATERS	0	0.0						
Total	1,025	26.5	92.5	2.4				

3.6 Floor Area Calculations

The addition of floor area is used to drive changes in NL's commercial building stock over the study period, including changes to equipment and electricity use. For the purposes of this study, floor space was derived by dividing the actual sales data for each building sub sector by the applicable fuel share and saturation-weighted whole-building electricity use intensity (EUI). The EUIs used in this calculation were based on the detailed building models for each of the sub sectors and the estimates for fuel share and saturation, as discussed in Sections 3.4 and 0. Exhibit 7 shows the resulting estimates of floor area within each building sub sector and service region.

Sub Sector	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
Large Office	10,328,000	-	-	10,328,000
Small Office	8,407,000	-	168,000	8,575,000
Large Non-food Retail	3,817,000	-	273,000	4,090,000
Small Non-food Retail	5,531,000	-	525,000	6,056,000
Food Retail	2,823,000	-	159,000	2,982,000
Large Accomodation	2,442,000	-	234,000	2,677,000
Small Accomodation	1,162,000	-	31,000	1,193,000
Healthcare	4,034,000	-	573,000	4,608,000
Schools	13,600,000	-	741,000	14,341,000
Universities and Colleges	7,391,000	-	118,000	7,509,000
Warehouse/Wholesale	5,075,000	-	370,000	5,444,000
Restaurants	994,000	-	89,000	1,083,000
Labrador Isolated C/I Buildings	-	2,179,000	-	2,179,000
Island Isolated C/I Buildings	-	205,000	-	205,000
Large Other Buildings	6,373,000	-	2,228,000	8,601,000
Small Other Buildings	6,214,000	-	1,500,000	7,715,000
Other Institutional	-	-	2,960,000	2,960,000
Non-Buildings	-	-	-	-
Street Lighting	-	-	-	-
Grand Total	78,193,000	2,383,000	9,969,000	90,545,000

Exhibit 7 Base Year Floor Area (ft²) by Sub sector and Service Region

Note: Any differences in totals are due to rounding.

For the Island service region, the total floor area of the modelled sub sectors is approximately 78 million square feet. The largest sub sector is Schools, which accounts for 17.4% of the total floor area, followed by Large Office at 13.2%, Small Office at 10.8% and Universities and Colleges at 9.5%.

For the Labrador Interconnected service region, the total floor area of the modelled sub sectors is approximately 10 million square feet. The largest sub sector is Other Institutional, which accounts for 29.7% of the total floor area, followed by Large Other Buildings at 22.3%, Small Other Buildings at 15.1% and Schools at 7.4%.

3.7 Summary of Commercial Base Year Electricity Use

This section presents the results of the analysis of electricity consumption for the Base Year 2014. The results are measured at the customer's point-of-use and do not include line losses; they are presented in five separate exhibits:

- Exhibit 8 presents base year electricity consumption in tabular form by sub sector type and end use
- Exhibit 11 through Exhibit 10 present the results by sub sector, by region and by end use respectively.
- Exhibit 12 presents the model results as a series of stacked bars, showing the percentage consumed by end use for each sub sector.

Additional highlights are provided below.

By Sub Sector

Large Office Buildings account for the largest share of electricity use within the sub sectors (11.6%), followed by Large Other Buildings (9.2%), Non-Buildings (8.7%), and Small Office at 8.2%.

By Region

The Island Interconnected region accounts for 88% of commercial electricity consumption, while the Labrador Interconnected region accounts for 11% of commercial electricity consumption. Commercial accounts connected to isolated diesel grids consume the remaining 1% of commercial electricity.

By End Use

Space heating is the largest end use, accounting for about 27% of Commercial sector electricity use followed by general lighting (17%), HVAC fans & pumps (12%), and Miscellaneous Equipment (9%).

By Sub Sector and End Use

The last exhibit in this section highlights the differences among sub sectors. Offices and schools show a higher percentage of consumption for HVAC and lighting than food retail where the electricity use is dominated by refrigeration. Sub sectors such as large and small accommodation and restaurants have a higher amount of electricity consumption in the domestic hot water end use.

Data Manager

As part of this report, an Excel application called Data Manager is provided. This Excel workbook has the ability to produce charts and tables looking at the data filtered and segmented in many ways. For example:

- The user can produce a pie chart of electricity consumption by end use for an individual sub sector of interest, such as large offices.
- The user can produce a column chart showing the electricity consumption for space heating and lighting in each of several sub sector types, with each sub sector type as a separate column and the different end use consumption values shown stacked on top of each other.
- The user can produce a line chart showing consumption for a particular sub sector type by year.

Data Manager has a user interface designed for someone with basic knowledge of Excel.

Exhibit 8 Base Year Annual Electricity Consumption by Sub sector and End Use, All of NL (MWh/yr.)

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
Large Office	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	-	4,319	1,033	-	273,262
Small Office	76,520	40,527	20,053	2,192	868	6,020	5,263	20,197	-	6,132	3,756	7,928	-	3,586	-	22	193,065
Large Non-food Retail	30,090	36,209	28,344	1,021	6,135	3,845	1,819	2,021	4,090	2,632	3,583	3,224	-	467	-	35	123,515
Small Non-food Retail	45,979	45,510	29,767	1,496	-	5,322	2,835	2,993	-	3,896	5,305	4,984	-	691	-	68	148,847
Food Retail	23,490	20,697	11,522	749	91,544	3,236	3,484	2,323	9,237	2,502	2,612	1,610	-	327	-	21	173,352
Large Accomodation	20,548	7,426	5,946	661	2,073	7,856	16,327	1,194	3,392	1,321	1,172	1,210	-	254	244	30	69,655
Small Accomodation	9,922	3,788	1,435	304	462	2,102	7,230	537	770	589	523	411	-	113	-	4	28,191
Healthcare	57,863	5,258	30,746	1,116	1,784	24,911	10,048	4,163	9,516	8,004	4,036	2,446	-	963	864	222	161,941
Schools	83,105	45,131	9,356	1,082	1,074	10,063	5,700	7,777	1,481	1,567	6,281	279	-	1,363	-	29	174,289
Universities and Colleges	12,738	40,181	35,767	1,923	3,877	5,076	1,269	10,028	2,908	4,881	3,289	1,341	-	714	739	15	124,745
Warehouse/Wholesale	28,325	20,567	4,753	1,358	8,433	4,089	2,136	1,869	-	4,518	2,385	114	-	621	-	48	79,216
Restaurants	13,061	2,564	3,573	268	18,173	8,146	20,519	447	36,502	598	474	1,007	-	124	-	12	105,467
Labrador Isolated C/I Buildings	580	6,909	1,132	-	3,416	1,608	149	1,051	496	677	739	-	-	-	-	305	17,062
Island Isolated C/I Buildings	-	649	106	-	321	151	-	99	47	64	69	-	-	-	-	-	1,505
Large Other Buildings	65,447	36,027	27,825	1,564	22,200	14,680	13,133	8,017	12,662	5,660	4,741	2,936	-	1,388	406	358	217,045
Small Other Buildings	56,786	33,165	21,646	1,450	18,691	10,949	9,525	7,223	9,684	5,022	4,365	2,711	-	1,240	227	238	182,923
Other Institutional	10,017	12,713	8,247	412	1,763	4,559	2,407	1,212	537	2,075	1,406	219	-	-	-	412	45,979
Non-Buildings	-	-	-	204,856	-	-	-	-	-	-	-	-	-	-	-	-	204,856
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	37,127	-	-	-	37,127
Grand Total	629,085	411,214	286,405	223,118	181,881	128,587	107,844	95,476	92,387	57,527	49,260	40,630	37,127	16,170	3,514	1,817	2,362,042

Exhibit 9 Distribution of Electricity Consumption by Sub sector in the Base Year (2014)



Large Office Large Other Buildings Non-Buildings ■ Small Office Small Other Buildings Schools Food Retail Healthcare Small Non-food Retail Universities and Colleges Large Non-food Retail Restaurants Warehouse/Wholesale Large Accomodation Other Institutional Street Lighting Small Accomodation Labrador Isolated C/I Buildings Island Isolated C/I Buildings

Totals may not add to 100% due to rounding.

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Totals may not add to 100% due to rounding.

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Exhibit 11 Distribution of Electricity Consumption, by End Use in the Base Year (2014)



Totals may not add to 100% due to rounding.



Exhibit 12 Distribution of Electricity Consumption, by Sub Sector and End Use in the Base Year (2014)

4 Base Year (2014) Electric Peak Load

4.1 Introduction

This section provides a profile of the Base Year electric peak load for NL's Commercial sector. The discussion is organized into the following subsections:

- Peak period definitions
- Methodology
- Summary of results

Additional details are provided in Appendix B.

4.2 Peak Period Definitions

Based on discussions with utility personnel, the peak period of interest was the same as in the 2007-2008 study:

Peak Period – The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.¹³

The system capacity constraints are very dependent on cold weather. The NL utilities are do not currently experience capacity constraints in the summer. In future, there may be financial advantages to reducing system demand in summer in order to market more power to summer-peaking utilities in the U.S. That possibility was not explored in this study.

4.3 Methodology

The electric peak load profile converts the annual electric energy use (MWh) presented in Section 3 to hourly demand (MW). Development of the electric peak load estimates employs four specific factors, which are described below and shown graphically in **Error! Not a valid bookmark self-reference.**

- Monthly Usage Allocation Factor: This factor represents the percent of annual electric energy usage that is allocated to each month. This set of monthly fractions (percentages) reflects the seasonality of the load shape, whether a facility, process or end use, and is dictated by weather or other seasonal factors. In decreasing order of priority, this allocation factor can be obtained from either:
 - Monthly consumption statistics from end-use load studies
 - Monthly seasonal sales (preferably weather normalized) obtained by subtracting a "base" month from winter and summer heating and cooling months, or
 - Heating or cooling degree days applied to an appropriate base.
- Weekend to Weekday Factor: This factor is a ratio that describes the relationship between weekends and weekdays, reflecting the degree of weekend activity inherent in the facility or end

¹³ Source: NL (Feb 2014) http://hydroblog.nalcorenergy.com/meeting-peak-demand/

use. This may vary by month or season. Based on this ratio, the average electric energy per day type can be computed from the corresponding monthly electric energy.

- Peak Day Factor: This factor reflects the degree of daily weather sensitivity associated with the load shape, particularly heating or cooling; it compares a peak (e.g., hottest or coldest) day to a typical weekday in that month.
- Per Unit Hourly Factor: This factor reflects the operating hours of the commercial electric equipment or end uses among different hours of the day for each day type (weekday, weekend day, peak day) and for each month. For example, for lighting, this would be affected by time of day and season (affected by daylight).



Exhibit 13 Overview of Peak Load Profile Methodology

4.4 Summary of Results

The factors defined above provided the basis for converting the annual commercial electricity use presented in Section 3 to aggregate peak loads in the peak period.

Exhibit 14 presents the results for the Commercial sector Base Year. The results are presented for each of the three regions in NL, by sub sector type. In each case, the results show the contribution of Commercial sector demand that is coincident with the total demand in the peak period.

Sub-Sector Type	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
Large Office	62	-	-	62
Small Office	45	1	-	46
Large Non-food Retail	27	2	-	29
Small Non-food Retail	33	4	-	36
Food Retail	29	3	-	32
Large Accomodation	16	2	-	18
Small Accomodation	7	0	-	8
Healthcare	33	3	-	36
Schools	43	3	-	46
Universities and Colleges	22	1	-	23
Warehouse/Wholesale	16	2	-	17
Restaurants	28	2	-	30
Labrador Isolated C/I Buildings	-	-	3	3
Island Isolated C/I Buildings	-	-	0	0
Large Other Buildings	35	15	-	49
Small Other Buildings	32	10	-	41
Other Institutional	-	9	-	9
Non-Buildings	30	1	-	31
Street Lighting	5	0	0	5
Grand Total	463	56	3	522

Exhibit 14 Commercial Sector Base Year (2014) Aggregate Peak Demand by Region (MW)

Exhibit 15 shows the contribution, by end use, to the commercial component of the peak demand. Some key observations may be made:

- Space heating is the largest commercial component of peak demand. As shown in the previous section, space heating is the largest end use in terms of annual electrical consumption. It also tends to be concentrated in the winter when the NL system peaks.
- General lighting is the second largest commercial component of peak demand. As shown in the previous section, lighting is a relatively large end use in terms of annual electrical consumption.
- HVAC Fans & Pumps are the third largest commercial contributor to peak demand. As shown in the previous section, HVAC Fans & Pumps are a relatively large end use in terms of annual electrical consumption.
- Domestic Hot Water is the fourth largest commercial contributor to peak demand. As shown in the previous section, domestic hot water is a relatively large end use in terms of electrical consumption.

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Exhibit 15 Contribution by End Use to Commercial Aggregate Peak Demand (%)





5 Reference Case Electric Energy Forecast

5.1 Introduction

This section presents the Commercial sector Reference Case for the study period (2014 to 2029). The Reference Case estimates the expected level of electricity consumption that would occur over the study period in the absence of new utility-based CDM initiatives. As such, the Reference Case provides the point of comparison for the calculation of electricity saving opportunities associated with each of the scenarios that are assessed within this study.

The Reference Case discussion is presented within the following subsections:

- Methodology
- New Commercial Buildings
- "Natural Changes" to Electricity Use Intensity
- Commercial Floor Space
- Summary of Model Results
- Selected Highlights

5.2 Methodology

Development of the Reference Case involved the following three steps:

Step 1: Detailed building archetypes were developed for "New" buildings in each of the Commercial sub sectors. For the purposes of this study, any facility built after the Base Year is considered to be a "New" building. Each profile defines building specifications, mechanical equipment, lighting equipment and other electricity-using equipment.

Step 2: Expected "natural" changes in electricity consumption patterns over the study period were estimated. Special consideration was given to three factors:

- Naturally-occurring improvements in equipment efficiency through time.
- Expected stock penetration by more efficient equipment as older, inefficient equipment reaches the end of its service life.
- Changes in equipment density (e.g., computers and plug loads) or loads (e.g., required ventilation rates).

Step 3: The growth in floor space within each building sub sector over the study period was estimated. The growth rates were derived from the load forecast data provided by the Utilities.

5.3 New Commercial Buildings

The first task in building the Reference Case involved the development of detailed technical profiles that define building specifications, mechanical equipment, lighting equipment and electricity use for the new buildings in each of the commercial building sub sectors. In each case, the new building profiles were developed using CEEAM and the same approach as described previously in Section 3.5. Detailed profiles for each building sub sector are provided in Appendix C. Exhibit 16 highlights the resulting whole building electric EUIs for each new commercial building sub sector. For the purposes of comparison, it also shows whole-building electric EUIs for each of the existing building sub sectors.

Other trends include:

- Higher efficiency building envelopes, including improved window U-values and higher levels of wall and roof insulation.
- Improved lighting system efficiency, including higher efficacy lighting sources and lower light levels where appropriate.
- Increased saturation of space cooling in some sub sectors.
- 100% penetration of electric space heating and domestic hot water heating in new construction.

Certain sub sectors were not modelled with CEEAM. The methodology for determining the end use EUIs for these sub sectors is described in more detail below:

- Large Other Buildings: These buildings are assumed to be a composite of the Large Office, Large Non-Food Retail, Food Retail, Large Accommodation, Healthcare, Schools, Universities and Colleges, Warehouse/Wholesale, and Restaurants sub sectors. Their EUIs for each end use are estimated by taking a weighted average of the end use EUIs of each of the aforementioned building types.
- Small Other Buildings: These buildings are assumed to be a composite of the Small Office, Small Non-Food Retail, Food Retail, Small Accommodation, Healthcare, Schools, Universities and Colleges, Warehouse/Wholesale, and Restaurants sub sectors. Their EUIs for each end use are estimated by taking a weighted average of the end use EUIs of each of the aforementioned building types.
- Other Institutional: The military base at Goose Bay is assumed to be a composite of the Small Office, Food Retail, Small Non-Food Retail, Small Accommodation, Healthcare, Warehouse/Wholesale, and Restaurant sub sectors.
- Isolated C/I Buildings: The end use EUIs for these sub sectors, Island and Labrador, are based on energy audit data for buildings in these regions. The buildings in the isolated regions are not further broken down into sub sectors because of a lack of detailed information about specific sub sectors and because building types do not differ as much in the isolated regions as they do in larger urban areas.

Island Labrador Interconnected Interconnected Sub Sector Comments Existing New Existing New **Buildings Buildings Buildings Buildings** New Office buildings have higher efficiency 28.3 25.7 28.6 35.7 Large Office lighting and envelope systems. This is offset by a higher space cooling saturation and Small Office 23.8 22.2 22.8 26.9 electric space heating share. New Non-food retail buildings have higher 31.9 24.1 29.4 29.5 Large Non-food Retail efficiency lighting and envelope systems. This is offset by a higher space cooling Small Non-food Retail 26.0 23.6 27.9 25.6 saturation and electric space heating share. New Food Retail buildings are typically equipped with higher efficiency lighting, Food Retail 59.0 53.2 72.2 53.2 HVAC and envelope systems. This is offset by higher a space cooling saturation and electric space heating share. New Hotels and Motels have higher 27.3 23.4 30.3 28.6 efficiency lighting and envelope systems. Large Accommodation This is offset by a higher electric space heating share and higher space cooling **Small Accommodation** 25.4 22.2 30.3 saturations due primarily to increased 30.1 instance of in-room heating/cooling units. New healthcare buildings have higher efficiency lighting and envelope systems, and higher space cooling saturation. This is 35.0 29.6 31.0 Healthcare 51.4 offset somew hat by higher ventilation rates, particularly in larger buildings and a higher electric space heating share. New Schools have higher efficiency lighting School 14.9 13.3 18.5 15.3 and envelope systems. This is offset by a higher electric space heating share. New Universities and Colleges have higher Universities and efficiency lighting and envelope systems. 24.1 19.6 26.3 24.8 Colleges This is offset by a higher electric space heating share. New Warehouse/Wholesale buildings have Warehouse / higher efficiency lighting and envelope 16.2 14.0 21.1 16.8 Wholesale systems. This is offset by a higher electric space heating share. New Restaurants have higher efficiency 100.9 102.9 97.0 Restaurant 92.9 lighting, and envelope systems. This is offset by a higher electric space heating share. Changes to this sub sector are a Large Other 24.0 23.4 28.8 26.9 consequence of changes to its constituent building types (see below). Changes to this sub sector are a Small Other 22.7 22.7 28.0 26.3 consequence of changes to its constituent building types (see below). No major changes to construction practices Other Institutional N/A N/A 15.5 14.6 are anticipated. Natural changes to equipment efficiency are Island Isolated C/I 7.4 7.1 N/A N/A expected to drive EUI reduction. Natural changes to equipment efficiency are Labrador Isolated C/I N/A N/A 7.8 7.5 expected to drive EUI reduction.

Exhibit 16 Comparison of Whole Building Electric EUIs by Sub Sector, (kWh/ft²/yr.)

5.4 "Natural Changes" to Electricity Use Intensity

The next task involved estimating changes in electricity consumption patterns that would occur within the existing building stock over the study period in the absence of any CDM programming or influence. This included consideration of three major factors:

- Naturally-occurring improvements in equipment efficiency
- Expected stock penetration by more efficient equipment
- Changes in the saturation/intensity of end-use services (e.g., cooling, plug loads etc.)

These factors strongly influence future electric energy use within the Commercial sector. While the first two factors will have the effect of reducing electricity consumption, the last factor will result in increased electricity demand. Other considerations, such as operating hours and fuel share, may also affect future electricity demand. However, the values assumed in existing and new stock were assumed to remain constant over the study period.

Based on the assessment of current trends, the most significant natural changes are expected to involve the following end uses:

- Reduced lighting EUIs in existing buildings due to efficiency improvements at the time of natural stock turnover
- A trend toward more efficient space cooling equipment in existing buildings
- Increased computer equipment and plug load EUIs due to higher equipment densities

Detailed assumptions regarding natural change are presented in Appendix C.

5.5 Commercial Floor Space

The final task in the construction of the Reference Case involved calibration with NLH and NLP's load forecasts through time. This was accomplished using the following steps:

- Estimate and apply the expected impact of natural changes (see Section 5.4 above) within the existing building stock for each sub sector (i.e., an adjusted EUI that includes the effects of natural conservation at each milestone year)
- Add new buildings to the stock in order to match forecasted consumption in each combination of sub sector and milestone year.

A summary of the resulting floor space estimates in the Island Interconnected, Labrador Interconnected, and Isolated grids by sub sector and milestone year are provided in the following exhibits.

Large Office 10,328,000 10,615,000 11,014,000 11,559,000 11,950,000 12,399,000 Small Office 8,407,000 8,588,000 9,043,000 9,439,000 9,722,000 10,047,000 Large Non-food Retail 3,817,000 3,930,000 4,169,000 4,377,000 4,532,000 4,708,000
Small Office 8,407,000 8,588,000 9,043,000 9,439,000 9,722,000 10,047,000 Large Non-food Retail 3,817,000 3,930,000 4,169,000 4,377,000 4,532,000 4,708,000
Large Non-food Retail 3,817,000 3,930,000 4,169,000 4,377,000 4,532,000 4,708,000
Small Non-food Retail 5,531,000 5,606,000 5,841,000 6,082,000 6,266,000 6,474,000
Food Retail 2,823,000 2,864,000 2,990,000 3,111,000 3,198,000 3,297,000
Large Accomodation 2,442,000 2,490,000 2,620,000 2,742,000 2,831,000 2,933,000
Small Accomodation 1,162,000 1,174,000 1,221,000 1,271,000 1,308,000 1,349,000
Healthcare 4,034,000 4,059,000 4,176,000 4,303,000 4,397,000 4,502,000
Schools 13,600,000 13,817,000 14,448,000 15,083,000 15,562,000 16,102,000
Universities and Colleges 7,391,000 7,475,000 7,617,000 7,744,000 7,847,000 7,961,000
Warehouse/Wholesale 5,075,000 5,187,000 5,435,000 5,654,000 5,816,000 6,001,000
Restaurants 994,000 1,011,000 1,061,000 1,106,000 1,138,000 1,174,000
Large Other Buildings 6,373,000 6,492,000 6,778,000 7,040,000 7,232,000 7,451,000
Small Other Buildings 6,214,000 6,184,000 6,328,000 6,543,000 6,705,000 6,885,000
Grand Total 78,193,000 79,492,000 82,741,000 86,053,000 88,504,000 91,284,000

Exhibit 17 Commercial Sector Floor Space (ft²), by Sub Sector and Milestone Year – Island Interconnected

Note: Any differences in totals are due to rounding.

Exhibit 18 Commercial Sector Floor Space (ft²), by Sub Sector and Milestone Year – Labrador Interconnected

Sub Sector	2014	2017	2020	2023	2026	2029
Large Office	-	-	-	-	-	-
Small Office	168,000	168,000	172,000	176,000	180,000	184,000
Large Non-food Retail	273,000	275,000	277,000	279,000	281,000	283,000
Small Non-food Retail	525,000	528,000	545,000	560,000	575,000	590,000
Food Retail	159,000	159,000	160,000	161,000	162,000	163,000
Large Accomodation	234,000	235,000	236,000	237,000	238,000	239,000
Small Accomodation	31,000	31,000	32,000	33,000	33,000	34,000
Healthcare	573,000	442,000	444,000	446,000	449,000	451,000
Schools	741,000	744,000	752,000	760,000	768,000	776,000
Universities and Colleges	118,000	118,000	119,000	119,000	120,000	120,000
Warehouse/Wholesale	370,000	371,000	377,000	382,000	388,000	393,000
Restaurants	89,000	90,000	91,000	92,000	93,000	94,000
Large Other Buildings	2,228,000	2,236,000	2,245,000	2,254,000	2,263,000	2,271,000
Small Other Buildings	1,500,000	1,503,000	1,547,000	1,585,000	1,622,000	1,658,000
Other Institutional	2,960,000	2,983,000	3,005,000	3,028,000	3,051,000	3,075,000
Grand Total	9,969,000	9,882,000	10,003,000	10,113,000	10,222,000	10,331,000

Note: Any differences in totals are due to rounding.

Exhibit 19 Commercial Sector Floor Space (ft²), by Sub Sector and Milestone Year – Isolated

Sub Sector	2014	2017	2020	2023	2026	2029
Labrador Isolated C/I Buildings	2,179,000	2,153,000	2,506,000	2,620,000	2,727,000	2,836,000
Island Isolated C/I Buildings	205,000	201,000	240,000	251,000	262,000	273,000
Grand Total	2,383,000	2,354,000	2,746,000	2,870,000	2,989,000	3,109,000

Note: Any differences in totals are due to rounding.

5.6 Summary of Results

This section presents the results of the model runs for the entire study period. The results are measured at the customer's point-of-use and do not include line losses. They are presented in four exhibits:

- Exhibit 20 presents the model results in tabular form, by sub sector type, end use and milestone year
- Exhibit 21 presents the model results for 2029 by subsector type
- Exhibit 22 presents the model results for 2029 by by region

Exhibit 23 presents the model results for 2029 by end use

 Exhibit 24 shows the evolving relative contribution of different summary end uses towards the total consumption in different sub sector types.

As illustrated, the combined Reference Case for all regions indicates that, in the absence of new utility-based CDM initiatives, total Commercial sector electricity consumption is expected to increase from approximately 2.36 million MWh/yr. in the Base Year to approximately 2.70 million MWh/yr. in 2029. This is an increase of approximately 14.1% over the study period.

Selected highlights are provided below.

By Sub Sector

Large and small office buildings contribute the largest portion of electricity consumption increases to the overall growth rate, about 25% of total load growth. The retail sector, including food retail and large and small non-food retail, also accounts for a significant portion of load growth (18%).

By Region

The division of electricity consumption by region is expected to remain stable over the study period, with the Island Interconnected region continuing to account for 88% of commercial electricity consumption, the Labrador Interconnected region accounting for 11%, and accounts connected to isolated diesel grids consuming the remaining 1%.

By End Use

Overall, electricity use grows a total of about 14% over the study period. This growth is driven in large part by increases in space heating electricity consumption, which grows by 21% between 2014 and 2029, due to a large number of new electrically heated buildings being introduced in to the building stock. A knock-on effect of the move toward electric space heating in new buildings is that electricity consumption for water heating also increases dramatically (17% growth), as electrically heated buildings rarely invest in fossil fuel infrastructure for water heating only.

Three additional end uses also experience significant growth from 2014 to 2029: space cooling (19%), HVAC fans and pumps (17%), and computer equipment (26%), servers (27%), and plug loads (24%).

Between 2014 and 2029 space cooling (19%) and HVAC fans and pumps (17%) increase as a consequence of a trend towards higher space cooling saturations. Computer equipment (26%), servers (27%), and plug loads (24%) increase between 2014 and 2029, reflecting increased densities of computer equipment and plug loads which offset efficiency gains in equipment over the period.

End uses which grow at a significantly slower rate than average include general lighting (4%) and secondary lighting, which decreases by 1.2%. Lighting end uses show a slight decline in importance as more efficient new buildings are introduced into the building stock through time, and as a result of naturally occurring lighting retrofits in existing buildings.

In terms of absolute contribution, space heating accounts for the largest portion of overall load growth (133,000 MWh or about 40% of total load growth). This is followed by HVAC fans & pumps (15%), miscellaneous equipment (9%), refrigeration (8%) and computer equipment (8%).

By Sub sector and End Use

The last exhibit in this section shows the trends in consumption by sub sector and end-use groupings. The following key observations can be made:

- Consumption in the HVAC end uses is expected to modestly increase in most commercial sub sectors between now and 2029
- Lighting is expected to account for a slightly diminishing share of commercial electricity consumption between now and 2029, even without new CDM intervention, largely as a result of naturally occurring lighting retrofits in existing buildings.
- The exhibit also permits comparisons of end-use consumption proportions from one sub sector type to another. These patterns are expected to remain relatively consistent through the study period.

Exhibit 20 Reference Case Electricity Consumption, Modelled by End Use, Sub sector and Milestone Year (MWh/yr.)

Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
	2014	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	0	4,319	1,033	0	273,262
	2017	96,854	54,127	47,938	2,740	1,096	15,870	6,179	25,489	1,096	7,739	4,469	10,463	0	4,526	1,062	0	279,648
Large Office	2020	99,960	54,868	50,370	2,843	1,137	15,850	6,427	26,914	1,137	8,172	4,462	10,855	0	4,779	1,101	0	288,877
Large onnoe	2023	104,216	56,281	53,700	2,984	1,194	15,942	6,768	28,686	1,194	8,710	4,520	11,430	0	5,093	1,156	0	301,873
	2026	107,265	56,989	56,085	3,085	1,234	15,916	7,013	30,093	1,234	9,137	4,510	11,813	0	5,343	1,195	0	310,912
	2029	110,768	57,962	58,826	3,201	1,280	15,935	7,293	31,637	1,280	9,606	4,526	12,268	0	5,617	1,240	0	321,441
	2014	76,520	40,527	20,053	2,192	868	6,020	5,263	20,197	0	6,132	3,756	7,928	0	3,586	0	22	193,065
	2017	77,805	40,464	20,877	2,239	868	5,953	5,376	21,027	0	6,384	3,685	8,062	0	3,733	0	22	196,495
Small Office	2020	81,110	41,554	22,953	2,357	868	5,967	5,663	22,513	0	6,836	3,736	8,520	0	3,997	0	22	206,097
	2023	83,988	42,399	24,762	2,460	868	5,964	5,913	23,860	0	7,244	3,761	8,910	0	4,236	0	23	214,387
	2026	86,061	42,775	26,056	2,533	868	5,927	6,092	24,940	0	7,572	3,736	9,166	0	4,428	0	23	220,180
	2029	88,432	43,325	27,540	2,618	868	5,903	6,298	26,118	0	7,930	3,730	9,472	0	4,637	0	24	226,895
	2014	30,090	30,209	28,344	1,021	0,130	3,843	1,019	2,021	4,090	2,032	3,583	3,224	0	407	0	30	123,313
	2017	30,629	30,278	29,000	1,050	0,308	3,823	1,873	2,110	4,205	2,758	3,540	3,293	0	489	0	30	120,409
Large Non-food Retail	2020	31,740	37,212	30,309	1,112	6,009	3,002	2,006	2,210	4,440	2,900	3,000	3,472	0	550	0	30	130,310
	2023	32,723	38 202	37,590	1,100	7 210	3,000	2,090	2,422	4,030	3,133	3,040	3,024	0	586	0	36	137 386
	2020	3/ 201	38,800	33 526	1,200	7 /87	3,004	2,173	2,540	4,013	3,307	3,042	3,750	0	616	0	37	140,806
	2023	45 979	45 510	29 767	1 496	0,101	5,000	2 835	2,000	-,331	3,896	5,000	4 984	0	691	0	68	148 847
	2017	46,550	45 134	30 163	1,400	0	5 252	2,000	3 091	0	4 025	5 161	5 012	0	713	0	68	149 557
	2020	48,422	45,949	31,431	1,578	0	5,262	2,997	3,275	0	4,020	5,170	5,208	0	710	0	70	154.382
Small Non-food Retail	2023	50.318	46,793	32,723	1.642	0	5.274	3.122	3,461	0	4.507	5,182	5,409	0	799	0	72	159.301
	2026	51.805	47,249	33.725	1.692	0	5,259	3.220	3.620	0	4.713	5,144	5,553	0	836	0	74	162.891
	2029	53,457	47,862	34,845	1,747	0	5,255	3,329	3,790	0	4,934	5,127	5,720	0	875	0	76	167,017
	2014	23,490	20,697	11,522	749	91,544	3,236	3,484	2,323	9,237	2,502	2,612	1,610	0	327	0	21	173,352
	2017	23,684	20,545	11,683	760	92,742	3,205	3,538	2,401	9,364	2,587	2,561	1,619	0	338	0	21	175,048
Feed Datell	2020	24,284	20,942	12,182	793	96,442	3,244	3,702	2,544	9,759	2,744	2,622	1,683	0	359	0	21	181,322
Food Retail	2023	24,858	21,302	12,659	824	99,978	3,279	3,859	2,684	10,137	2,896	2,676	1,743	0	380	0	21	187,295
	2026	25,273	21,447	13,003	847	102,532	3,286	3,973	2,798	10,410	3,020	2,686	1,781	0	396	0	21	191,473
	2029	25,745	21,671	13,396	872	105,442	3,304	4,103	2,921	10,720	3,154	2,712	1,828	0	414	0	21	196,304
	2014	20,548	7,426	5,946	661	2,073	7,856	16,327	1,194	3,392	1,321	1,172	1,210	0	254	244	30	69,655
	2017	20,894	7,362	6,051	673	2,092	7,807	16,653	1,238	3,423	1,371	1,147	1,226	0	264	249	30	70,481
Large Accomodation	2020	21,816	7,440	6,330	707	2,143	7,938	17,530	1,316	3,506	1,462	1,157	1,291	0	282	262	30	73,210
Large Accomodation	2023	22,685	7,505	6,593	738	2,190	8,053	18,355	1,391	3,585	1,549	1,164	1,350	0	298	274	31	75,762
	2026	23,322	7,512	6,786	762	2,225	8,095	18,959	1,452	3,642	1,620	1,157	1,391	0	312	283	31	77,550
	2029	24,046	7,542	7,006	788	2,265	8,165	19,647	1,519	3,708	1,697	1,155	1,439	0	327	293	31	79,627
	2014	9,922	3,788	1,435	304	462	2,102	7,230	537	770	589	523	411	0	113	0	4	28,191
	2017	10,008	3,730	1,450	307	466	2,076	7,305	553	777	606	507	413	0	117	0	4	28,319
Small Accomodation	2020	10,385	3,728	1,514	319	485	2,107	7,630	584	809	642	507	437	0	124	0	4	29,276
	2023	10,777	3,731	1,581	332	505	2,141	7,971	615	841	679	508	462	0	131	0	4	30,280
	2026	11,069	3,713	1,631	342	519	2,156	8,222	642	866	709	504	480	0	137	0	4	30,992
	2029	11,397	3,702	1,687	353	536	2,177	8,506	670	893	742	501	500	0	143	0	4	31,812

Exhibit 20 Reference Case Electricity Consumption, Modelled by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
	2014	57,863	5,258	30,746	1,116	1,784	24,911	10,048	4,163	9,516	8,004	4,036	2,446	0	963	864	222	161,941
	2017	57,443	5,038	30,085	1,105	1,743	23,821	9,690	4,148	9,296	7,975	3,787	2,414	0	960	856	171	158,532
Healthcare	2020	58,774	5,092	30,958	1,135	1,789	23,841	10,089	4,336	9,542	8,337	3,737	2,472	0	1,003	880	171	162,156
	2023	60,227	5,160	31,908	1,169	1,839	23,905	10,524	4,534	9,809	8,717	3,697	2,537	0	1,049	905	172	166,153
	2026	61,299	5,184	32,612	1,193	1,876	23,828	10,846	4,702	10,007	9,039	3,626	2,579	0	1,088	924	172	168,975
	2029	62,507	5,224	33,404	1,221	1,918	23,801	11,208	4,880	10,230	9,382	3,566	2,629	0	1,129	946	172	172,217
	2014	83,105	45,131	9,356	1,082	1,074	10,063	5,700	7,777	1,481	1,567	6,281	279	0	1,363	0	29	174,289
	2017	84,471	44,837	9,534	1,099	1,091	9,983	5,808	8,052	1,504	1,623	6,126	300	0	1,411	0	29	175,868
Schools	2020	88,451	45,707	10,053	1,148	1,141	10,136	6,122	8,555	1,570	1,724	6,155	365	0	1,499	0	29	182,656
	2023	92,446	46,585	10,575	1,198	1,191	10,290	6,437	9,059	1,636	1,826	6,186	430	0	1,588	0	29	189,475
	2026	95,470	47,029	10,970	1,235	1,228	10,358	6,676	9,478	1,686	1,910	6,148	479	0	1,661	0	30	194,358
	2029	98,878	47,644	11,415	1,277	1,271	10,460	6,945	9,931	1,743	2,001	0,130	535	0	1,740	720	30	200,006
	2014	12,730	40,101	35,707	1,923	3,077	5,070	1,209	10,020	2,900	4,001	3,209	1,341	0	7 14	739	10	124,740
	2017	13,100	39,760	30,075	1,945	3,921	5,017	1,323	10,341	2,940	5,033	3,194	1,419	0	730	748	15	123,027
Universities and Colleges	2020	14 504	39,399	37 058	2 015	4 060	4,907	1,413	11 102	2,995	5 404	3,123	1,007	0	704	702	15	120 321
	2025	15 022	39,073	37,030	2,013	4,000	4,000	1,437	11 //2	3,045	5 569	2 963	1,001	0	814	785	15	130 574
	2020	15,589	38 754	37 852	2,041	4 172	4 857	1,004	11 794	3,000	5 741	2,303	1,773	0	839	705	16	132 017
	2014	28,325	20,567	4 753	1,358	8 433	4 089	2 136	1 869	0,120	4 518	2,002	1,007	0	621	0	48	79 216
	2017	28,899	20,571	4 825	1,387	8,608	4 028	2,100	1 945	0	4 703	2,000	118	0	646	0	48	80,312
	2020	30,202	21,092	4.988	1,452	9.003	3,992	2,326	2.070	0	5.004	2,355	128	0	688	0	49	83.349
Warehouse/Wholesale	2023	31,347	21,500	5,131	1,509	9,349	3,951	2,442	2,184	0	5,280	2,358	137	0	726	0	49	85,963
	2026	32,210	21,703	5,239	1,551	9,609	3,899	2,528	2,279	0	5,510	2,336	144	0	757	0	50	87,817
	2029	33,185	21,988	5,361	1,600	9,903	3,852	2,626	2,382	0	5,758	2,323	152	0	791	0	51	89,972
	2014	13,061	2,564	3,573	268	18,173	8,146	20,519	447	36,502	598	474	1,007	0	124	0	12	105,467
	2017	13,396	2,552	3,624	273	18,467	8,065	20,868	463	37,092	620	463	1,016	0	128	0	12	107,038
Restaurants	2020	14,360	2,617	3,769	286	19,321	8,140	21,878	493	38,804	660	466	1,061	0	136	0	12	112,003
Restaurants	2023	15,233	2,671	3,900	297	20,093	8,192	22,793	521	40,355	697	468	1,101	0	144	0	12	116,476
	2026	15,856	2,694	3,994	306	20,646	8,183	23,447	544	41,465	727	463	1,126	0	150	0	12	119,614
	2029	16,569	2,729	4,101	315	21,278	8,196	24,195	568	42,733	760	461	1,157	0	157	0	12	123,231
	2014	580	6,909	1,132	0	3,416	1,608	149	1,051	496	677	739	0	0	0	0	305	17,062
	2017	573	6,689	1,118	0	3,375	1,557	148	1,059	490	682	701	0	0	0	0	301	16,693
Labrador Isolated C/I	2020	650	7,498	1,409	0	3,931	1,724	172	1,258	573	810	813	0	0	0	0	351	19,187
Buildings	2023	674	7,663	1,501	0	4,109	1,756	180	1,335	599	860	830	0	0	0	0	367	19,874
	2026	698	7,815	1,590	0	4,279	1,785	187	1,410	624	908	844	0	0	0	0	382	20,521
	2029	721	7,968	1,679	0	4,449	1,814	194	1,486	650	956	858	0	0	0	0	397	21,173
	2014	0	649	106	0	321	151	0	99	47	64	69	0	0	0	0	0	1,505
	2017	0	626	105	0	316	146	0	99	46	64	66	0	0	0	0	0	1,466
Island Isolated C/I Buildings	2020	0	716	136	0	377	164	0	120	55	78	78	0	0	0	0	0	1,725
	2023	0	732	145	0	393	168	0	128	57	82	80	0	0	0	0	0	1,786
	2026	0	748	154	0	411	171	0	135	60	87	82	0	0	0	0	0	1,847
	2029	0	765	163	0	428	174	0	143	62	92	83	0	0	0	0	0	1,910

Exhibit 20 Reference Case Electricity Consumption, modelled by End Use, Sub Sector and Milestone Year (MWN/yr.) (cont d.	∩t'd…))
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Sub-Sector	Year	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
	2014	65,447	36,027	27,825	1,564	22,200	14,680	13,133	8,017	12,662	5,660	4,741	2,936	0	1,388	406	358	217,045
	2017	66,313	35,786	28,269	1,590	22,506	14,521	13,332	8,306	12,823	5,854	4,623	2,986	0	1,437	413	359	219,118
Large Other Buildings	2020	68,311	36,189	29,295	1,651	23,216	14,534	13,783	8,769	13,190	6,152	4,598	3,146	0	1,516	429	360	225,139
Large other Dunungs	2023	70,141	36,495	30,234	1,707	23,865	14,520	14,196	9,206	13,525	6,435	4,560	3,290	0	1,591	444	361	230,570
	2026	71,504	36,537	30,933	1,748	24,348	14,437	14,505	9,572	13,777	6,675	4,482	3,389	0	1,653	455	362	234,377
	2029	73,045	36,680	31,724	1,795	24,895	14,380	14,855	9,964	14,061	6,931	4,420	3,504	0	1,720	467	363	238,804
	2014	56,786	33,165	21,646	1,450	18,691	10,949	9,525	7,223	9,684	5,022	4,365	2,711	0	1,240	227	238	182,923
	2017	56,611	32,383	21,570	1,444	18,624	10,696	9,497	7,339	9,654	5,106	4,176	2,673	0	1,260	226	238	181,497
Small Other Buildings	2020	57,970	32,437	22,175	1,479	19,060	10,671	9,774	7,656	9,895	5,329	4,114	2,754	0	1,315	232	242	185,103
Sinal Other Buildings	2023	59,756	32,744	22,979	1,527	19,645	10,698	10,135	8,039	10,204	5,592	4,089	2,879	0	1,381	239	246	190,153
	2026	61,179	32,844	23,617	1,565	20,107	10,679	10,424	8,369	10,453	5,821	4,033	2,969	0	1,438	245	250	193,994
	2029	62,724	33,015	24,311	1,606	20,611	10,675	10,738	8,717	10,722	6,062	3,987	3,071	0	1,498	251	254	198,243
	2014	10,017	12,713	8,247	412	1,763	4,559	2,407	1,212	537	2,075	1,406	219	0	0	0	412	45,979
	2017	33,698	12,550	8,319	415	1,775	4,494	2,423	1,246	542	2,133	1,362	218	0	0	0	415	69,591
Other Institutional	2020	50,460	12,387	8,392	418	1,788	4,428	2,438	1,280	547	2,191	1,318	218	0	0	0	418	86,285
	2023	50,522	12,225	8,466	421	1,801	4,362	2,454	1,314	552	2,250	1,274	218	0	0	0	421	86,281
	2026	50,585	12,063	8,540	425	1,814	4,297	2,470	1,348	558	2,308	1,231	217	0	0	0	425	86,280
	2029	50,648	11,902	8,615	428	1,827	4,232	2,486	1,382	563	2,366	1,187	217	0	0	0	428	86,282
	2014	0	0	0	204,856	0	0	0	0	0	0	0	0	0	0	0	0	204,856
	2017	0	0	0	207,490	0	0	0	0	0	0	0	0	0	0	0	0	207,490
Non Ruildings	2020	0	0	0	214,805	0	0	0	0	0	0	0	0	0	0	0	0	214,805
Non-Buildings	2023	0	0	0	221,041	0	0	0	0	0	0	0	0	0	0	0	0	221,041
	2026	0	0	0	225,350	0	0	0	0	0	0	0	0	0	0	0	0	225,350
	2029	0	0	0	230,330	0	0	0	0	0	0	0	0	0	0	0	0	230,330
	2014	0	0	0	0	0	0	0	0	0	0	0	0	37,127	0	0	0	37,127
	2017	0	0	0	0	0	0	0	0	0	0	0	0	36,851	0	0	0	36,851
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	36,931	0	0	0	36,931
Street Lighting	2023	0	0	0	0	0	0	0	0	0	0	0	0	36,999	0	0	0	36,999
	2026	0	0	0	0	0	0	0	0	0	0	0	0	37,043	0	0	0	37,043
	2029	0	0	0	0	0	0	0	0	0	0	0	0	37,086	0	0	0	37,086
	2014	629,085	411,214	286,405	223,118	181,881	128,587	107,844	95,476	92,387	57,527	49,260	40,630	37,127	16,170	3,514	1,817	2,362,042
	2017	660,988	408,432	290,691	226,032	183,999	126,314	109,081	98,914	93,254	59,263	47,906	41,233	36,851	16,760	3,553	1,768	2,405,038
Grand Tatal	2020	700,771	415,029	302,937	234,065	191,362	126,848	113,939	104,692	96,828	62,594	48,023	43,168	36,931	17,744	3,665	1,831	2,500,428
Grand Total	2023	724,416	421,095	315,512	241,030	198,063	127,332	118,743	110,542	100,196	65,882	48,049	45,201	36,999	18,765	3,793	1,860	2,577,476
	2026	742,075	423,639	324,872	245,880	203,029	127,062	122,301	115,362	102,679	68,634	47,587	46,596	37,043	19,600	3,887	1,887	2,632,135
	2029	762,002	427,532	335,451	251,473	208,630	127,074	126,322	120,570	105,485	71,588	47,311	48,233	37,086	20,505	3,994	1,915	2,695,172

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Exhibit 21 Distribution of Electricity Consumption in 2029 by Sub Sector



Large Other Buildings Non-Buildings Small Office Schools Small Other Buildings Food Retail Healthcare Small Non-food Retail Large Non-food Retail Universities and Colleges Restaurants Warehouse/Wholesale Other Institutional Large Accomodation Street Lighting Small Accomodation Labrador Isolated C/I Buildings Island Isolated C/I Buildings

Large Office

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Exhibit 22 Distribution of Electricity Consumption in 2029 by Region



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Exhibit 23 Distribution of Electricity Consumption in 2029 by End Use



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6 Reference Case Electric Peak Load Forecast

6.1 Introduction

This section provides a profile of the electric peak load for Newfoundland and Labrador's Commercial sector over the Reference Case period of 2014 to 2029. The Reference Case peak load profile estimates the expected level of demand in the peak period that would occur over the study period in the absence of new CDM initiatives or rate changes. As such, the Reference Case provides the point of comparison for the calculation of peak load savings associated with each of the subsequent scenarios that are assessed within this study.

The discussion is organized into the following sub-sections:

- Methodology
- Summary of results

6.2 Methodology

The electric peak loads for each combination of end use, sub sector and milestone year were calculated in exactly the same manner as shown in Section 4, which presented the Base Year peak load profiles.

For this Reference Case, the electric energy consumption (from Section 5) is converted to a demand value for the peak period definition by dividing the applicable electric energy value for each sub sector and end use by the corresponding Commercial sector load shape hours-use factors, as presented in Appendix B.

6.3 Summary of Results

A summary of the Reference Case peak load profiles is presented in Exhibit 25.

Sub Sector	Voor	Island	loolatad	Labrador	Crand Total
Sub-Sector	rear	Interconnected	Isolateu	Interconnected	
	2014	62	-	-	62
	2017	64	-	-	64
Large Office	2020	66	-	-	66
	2023	69	-	-	69
	2026	71	-	-	71
	2029	73	-	-	73
	2014	45	-	1	46
	2017	46	-	1	47
Small Office	2020	48	-	1	49
	2023	50	-	1	51
	2026	51	-	1	52
	2029	53	-	1	54
	2014	27	-	2	29
	2017	27	-	2	29
Large Non-food Retail	2020	28	-	2	30
Large non roou netan	2023	29	-	2	31
	2026	30	-	2	32
	2029	31	-	2	33
	2014	33	-	4	36
	2017	33	-	4	37
Small Non-food Retail	2020	34	-	4	38
	2023	35	-	4	39
	2026	36	-	4	40
	2029	37	-	4	41
	2014	29	-	3	32
	2017	29	-	3	32
Food Retail	2020	30	-	3	33
	2023	31	-	3	34
	2026	32	-	3	35
	2029	33	-	3	36
	2014	16	-	2	18
	2017	17	-	2	18
Large Accomodation	2020	17	-	2	19
Ū	2023	18	-	2	20
	2026	19	-	2	20
	2029	19	-	2	21
	2014	7	-	0	8
	2017	7	-	0	8
Small Accomodation	2020	8	-	0	8
	2023	8	-	0	8
	2026	8	-	0	8
	2029	8	-	0	9
	2014	33	-	3	36
	2017	33	-	3	36
Healthcare	2020	34	-	3	37
	2023	35	-	3	37
	2026	36	-	3	38
	2029	36	-	3	39

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW)

Sub-Sector	Year	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
Schools	2014	43	-	3	46
	2017	44	-	3	46
	2020	45	-	3	48
	2023	47	-	3	50
	2026	49	-	3	52
	2029	50	-	3	53
Universities and Colleges	2014	22	-	1	23
	2017	22	-	1	23
	2020	23	-	1	23
	2023	23	-	1	24
	2026	23	-	1	24
	2029	24	-	1	25
	2014	16	-	2	17
	2017	16	-	2	18
Warehouse/Wholesale	2020	17	-	2	18
	2023	17	-	2	19
	2026	18	-	2	19
	2029	18	-	2	20
	2014	28	-	2	30
	2017	28	-	2	31
Restaurants	2020	30	-	3	32
	2023	31	-	3	34
	2026	32	-	3	35
	2029	33	-	3	36
	2014	-	3	-	3
Labrador Isolated C/I Buildings	2017	-	3	-	3
	2020	-	3	-	3
	2023	-	3	-	3
	2020	-	4	-	4
Island Isolated C/I Buildings	2023				
	2017	-	0	-	0
	2020	-	0	-	0
	2023	-	0	-	0
	2026	-	0	-	0
	2029	-	0	-	0
	2014	35	-	15	49
	2017	35	-	15	50
	2020	36	-	15	51
Large Other Buildings	2023	38	-	15	53
	2026	39	-	15	54
	2029	40	-	15	55
Small Other Buildings	2014	32	-	10	41
	2017	32	-	10	41
	2020	32	-	10	42
	2023	33	-	10	43
	2026	34	-	10	44
	2029	35	-	10	45

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW) (cont'd...)

Sub-Sector	Year	Island Interconnected	Isolated	Labrador Interconnected	Grand Total
Other Institutional	2014	-	-	9	9
	2017	-	-	15	15
	2020	-	-	20	20
	2023	-	-	20	20
	2026	-	-	20	20
	2029	-	-	20	20
Non-Buildings	2014	30	-	1	31
	2017	31	-	1	32
	2020	32	-	1	33
	2023	33	-	1	34
	2026	34	-	1	34
	2029	34	-	1	35
Street Lighting	2014	5	0	0	5
	2017	5	0	0	5
	2020	5	0	0	5
	2023	5	0	0	5
	2026	5	0	0	5
	2029	5	0	0	5
Grand Total	2014	463	3	56	522
	2017	469	3	62	534
	2020	486	4	67	557
	2023	503	4	67	575
	2026	516	4	68	588
	2029	530	4	68	603

Exhibit 25 Electric Peak Loads, by Milestone Year, Sub sector & Region (MW) (cont'd...)

Selected highlights include:

- Since the hours-use factors applied are not assumed to change during the study period, trends in peak demand contributions for specific sub sectors are expected to follow the electricity consumption trends for those sub sectors. Large and small offices, for example, will continue to make the largest commercial contribution to the peak demand throughout the study period.
- Similarly, peak demand contributions for specific end uses are expected to follow the electricity consumption trends for those end uses. Space heating becomes an increasingly important contributor to peak demand through time, while indoor lighting, because of natural gains in efficiency, will make a gradually declining contribution towards the peak demand.

7 Technology Assessment: All Measures

7.1 Introduction

This section identifies and assesses the economic attractiveness of the selected energy efficiency measures for the Commercial sector. It also identifies and assesses the economic attractiveness of selected Commercial sector electric capacity-only peak load reduction measures, which in this study are defined as those measures that affect electric peak but have minimal or no impact on electric energy use. The discussion is organized and presented as follows:

- Methodology
- Energy efficiency technologies
- Electric peak load reduction measures
- Summary of unbundled results
- Energy efficiency supply curves
- Demand reduction supply curves.

7.2 Methodology

The following steps were employed to assess the measures:

- Select candidate measures
- Establish technical performance for each option
- Establish the capital, installation and operating costs for each option
- Calculate the cost of conserved energy (CCE) for each energy efficiency technology and O&M measure
- Calculate the cost of electric peak load reduction (CEPR) for each option.

A brief description of each step is provided below.

Step 1 Select Candidate Measures

The candidate measures were selected in close collaboration with client personnel based on a combination of a literature review and previous study team experience. The selected measures are all considered to be technically proven and commercially available, even if only at an early stage of market entry. Technology costs, which will be addressed in this section, were not a factor in the initial selection of candidate technologies.

Step 2 Establish Technical Performance

Information on the performance improvements provided by each measure was compiled from available secondary sources, including the experience and on-going research work of study team members. In the case of some of the peak load reduction measures, comfort may be affected and the trade-off between benefits (e.g., cost savings) and costs (including reduction in comfort) were judged based on past experience with similar technologies and customer acceptance.

Step 3Establish Capital, Installation and Operating Costs for Each Measure

Information on the cost of implementing each measure was also compiled from secondary sources, including the experience and on-going research work of study team members.

In the case of energy efficiency measures, the incremental cost is applicable when a measure is installed in a new facility, or at the end of its useful life in an existing facility; in this case, incremental cost is defined as the cost difference for the energy efficiency measure relative to the baseline technology. The full cost is applicable when an operating piece of equipment is replaced with a more efficient model prior to the end of its useful life.¹⁴

Unlike energy efficiency measures, in which major equipment, such as heating and water heating systems are typically replaced, or thermal envelope measures such as insulation upgrades affect systems directly, capacity-only measures are typically implemented via add-on control equipment, although some built-in control equipment exists. The incremental cost is thus defined as the control equipment itself or incremental cost for a controllable appliance or device relative to the baseline appliance cost (e.g., remote accessible thermostat vs. standard thermostat), plus any required infrastructure (e.g., automatic meter reading or communications gateways). In cases where a more efficient appliance with peak control functions replaces a standard appliance, both electric energy and electric peak reduction are achieved, with some splitting of incremental costs attributable to each function. Where a new or replacement end use is installed that operates off peak, thus achieving electric peak reduction without significant energy impacts, incremental costs for the electric peak reduction device will be compared with standard equipment without assuming any early replacement and, thus, salvage value.

In all cases the costs and savings are annualized, based on the number of years of equipment life and the discount rate, and the costs incorporate applicable changes in annual O&M costs. All costs are expressed in constant 2014 dollars.

Step 4 Calculate CCE for Each Energy Efficiency Measure

One of the important sets of information provided in this section is the CCE associated with each energy efficiency measure. The CCE for an energy efficiency measure is defined as the annualized incremental cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs required to achieve full use of the technology or measure. All cost information presented in this section and in the accompanying TRM Workbook is expressed in constant 2014 dollars.

The CCE provides a basis for the subsequent selection of measures to be included in the Economic Potential Forecast (see Section 8). The CCE is calculated according to the following formula:

$$\frac{C_A + M}{S}$$

¹⁴ With some exceptions, many measures could conceivably be applied as either a full-cost measure (applicable immediately) or as an incremental cost measure (upon end of service life), depending on how financially attractive it is. Therefore, for all but a few measures, the TRM Workbook is configured to evaluate the measure at full cost and include it on that basis if it passes the screen, then roll to evaluating it on an incremental basis, and only fail it completely if it fails both tests. Where a measure is always full cost (such as the block heater timer, where the baseline technology is the "do nothing" option), the incremental cost option is excluded. Where a measure is always incremental cost (such as high-performance homes, where the baseline technology has to be a standard construction home, not no home at all), the full cost option is excluded.

It is recognized that some measures can be implemented prior to the end of their useful life, that is, early retirement. This intermediate option between full and incremental cost could increase the rate of adoption for some of the incremental measures, raising the Economic Potential savings modestly. However, in this study early retirement is treated as a program option.

Where:

 C_A is the annualized installed cost M is the incremental annual cost of operation and maintenance (O&M) S is the annual kWh electricity savings

And A is the annualization factor

$$A = \frac{i(1+i)^{n}}{(1+i)^{n} - 1}$$

Where:

i is the discount rate *n* is the life of the measure

The detailed CCE tables (see TRM Workbook) show both incremental and full installed costs for the energy efficiency measures, as applicable. If the measure or technology is installed in a new facility or at the point of natural replacement in an existing facility, then the incremental cost of the measure versus the cost of the baseline technology is used. If, prior to the end of its life, an operating piece of equipment is replaced with a more efficient model, then the full cost of the efficient measure is used.

The annual saving associated with the efficiency measure is the difference in annual electricity consumption with and without the measure.

The CCE calculation is sensitive to the chosen discount rate. In the CCE calculations that accompany this document, a discount rate of 7% (real) is used.

Step 5 Calculate CEPR for Each Peak Load Measure

The CEPR for a peak load reduction measure is defined as the annualized incremental cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs required to achieve full use of the technology or measure. All cost information presented in this section and in the TRM Workbook is in constant (2014) dollars.

The CEPR provides a basis for the subsequent selection of measures to be included in the Economic Potential Forecast (see Section 8). The CEPR is calculated according to the following formula:

$$\frac{C_A + M}{S_p}$$

Where:

 C_A is the annualized installed cost M is the incremental annual cost of operation and maintenance (O & M) S_p is the annual kW load reduction associated with peak definition p.

And A is the annualization factor.

 $A = \frac{i(1+i)^{n}}{(1+i)^{n} - 1}$

Where:

i is the discount rate; *n* is the life of the measure.
Note that the annual O&M cost will include, in some cases, amortized costs associated with infrastructure considered a prerequisite for implementation of the measure. This could include automated metering infrastructure (AMI), such as advanced metering, communications gateways and other related system investments. These costs would typically support multiple applications (e.g., communications gateways could enable control of heating, air conditioning, water heating, and HVAC fans and pumps), as well as facilitate time-differentiated rates that would be required for a feasible and cost-effective program implementation (e.g., thermal energy storage). It should also be noted that the measure lifetime is for the control device, function or feature, rather than that of the unit it is controlling. The study does not presume any specific technology or infrastructure, but does assume that a marketplace will develop for such systems, whether or not NL utilities adopt them, or develops access directly or indirectly to customer control equipment.

The CEPR can be compared to benefits, which include the value of reduced peak for the utility (avoided capacity and transmission and distribution (T&D) investment or purchase costs), the customer (e.g., bill savings) and society (e.g., value of environmental benefits) to determine its cost effectiveness from various perspectives (societal, utility, participant and non-participant).

As with the CCE for energy savings, the CEPR calculation is sensitive to the chosen discount rate, which, as for the CCE, used a 7% (real) discount rate. Higher discount rates will tend to reduce savings and decrease cost effectiveness where costs are incurred upfront and benefits accrue over many years.

Step 6Estimate Approximate Unbundled Electric Energy Savings Potential for Each
Energy Efficiency Measure and Demand Reduction for Each Peak Load
Measure

The next step in the assessment was to prepare an approximate estimate of the potential unbundled electric energy savings that could theoretically be provided by each energy efficiency measure over the study period, and similarly to prepare an estimate of demand reductions that could be provided by each peak load measure. The term "unbundled" means that the savings for each measure are calculated in isolation from other important factors that ultimately determine the potential for real life savings.

The strength of this approach is that it provides insight into the relative size of the potential electric energy savings or demand reductions associated with individual measures; this perspective is often of particular value to utility CDM program design personnel who may need to consider combinations of measures that differ from those selected for the CDM potential assessment.

However, it should be noted that the savings from individual measures cannot be used directly to calculate total savings potential or demand reduction. This is due primarily to two factors:

- More than one upgrade may affect a given end use: For example, improved insulation reduces space heating electricity use, as does the installation of a heat pump. On its own, each measure will reduce overall space heating electricity use. However, the two savings are not additive. The order in which some upgrades are introduced is also important. In this study, the approach has been to select and model the impact of bundles of measures that reduce the load for a given end use (e.g., wall insulation and window upgrades that reduce the space heating load) and then to introduce measures that meet the remaining load more efficiently (e.g., a heat pump heating system). Similarly, more than one peak load measure may affect a given end use, or peak load measures may be applied to the same end use that one or more energy efficiency measures may also affect.
- There are interactive effects among end uses: For example, the electricity savings from more
 efficient lighting result in reduced waste heat. During the space heating season, lighting waste
 heat contributes to a facility's internal heat gains, which lower the amount of heat that must be

provided by the space heating system. The magnitude of the interactive effects can be significant, both on energy consumption and peak demand. However, it is important to note that assessing the impact of interactive effects in commercial facilities is more complex since heat may be generated in spaces that heat the conditioned space much less effectively (e.g. high bay fixtures or equipment in mechanical rooms). Interactive effects were captured on a measure by measure basis for measures that were more likely to have an impact on space heating requirements and a 30% heating penalty was assumed for this subset of measures. For example, it was assumed that about 30% of the savings from the LED lamps measure would be lost due to increased space heating requirements. Rather than reducing the savings from these measures directly, interactive effects have been taken into consideration with the measure "HVAC Impact from Other Savings".

The above factors are incorporated in later stages of the analysis.

Step 7 Prepare Energy Efficiency and Demand Reduction Supply Curves

The final step in the assessment of the selected energy efficiency measures was the generation of an energy efficiency supply curve and a demand reduction supply curve. Energy efficiency supply curves are built up based on the conserved electricity and the CCE for each measure. Similarly, demand reduction supply curves are built up based on the demand reduction and the CEPR for each measure. The CSEEM model was used to model the application of all technically feasible measures, accumulating the electricity savings or demand reduction and associated implementation costs for each sub sector type.

Measures were applied sequentially to account, at least approximately, for interaction between measures. The impact of building shell measures was modelled using ICF's Commercial/Institutional Building Energy-use Simulation Model (CEEAM), but only individually. The full package of measures was not modelled together, nor was the impact of internal gains on space heating and cooling included. These effects are modelled more thoroughly for the Economic Potential calculation, when all the measures that pass the economic screen are modelled together. Similarly, the demand measures were also applied sequentially, but began with the demand reference case, not the demand that would remain after all the efficiency measures were applied. Thus the interaction between energy efficiency and demand reduction is neglected for this supply curve.

The accumulated savings and costs for each measure were added together to present the overall energy efficiency supply curve for the province. They were sorted in order from lowest cost per kWh saved to highest cost, and presented on a graph showing CCE versus electricity savings.

The accumulated demand reduction and costs for each measure were added together to present the overall demand reduction supply curve for the province. They were sorted in order from lowest cost per kW reduction to highest cost, and presented on a graph showing CEPR versus demand reduction.

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7.3 Energy Efficiency Technology Assessment

Exhibit 26 shows the energy efficiency technologies and measures that are included in this study. A description and detailed financial and economic assessment of each measure is provided in the TRM Workbook that accompanies this report.

Exhibit 26 Energy Efficiency Technologies Included in this Study

 Block Heater S Block Heater Controls Computer Equipment (ENERGY STAR ®) ENERGY STAR® Computers ENERGY STAR® Office Equipment Energy-Efficient Server Technologies Activate PC Power Management* Domestic Hot Water On-Demand Water Heaters Heat Pump Water Heaters Low-Flow Pre-Rinse Spray Valves Low-Flow Flow Faucet Aerators Low-Flow Showerheads Drainwater Heat Recovery ENERGY STAR® Dishwashers Food Service Equipment High-Efficiency Cooking Equipment LED Screw-In Lamps** LED Troffers** LED Outdoor Fixtures LED Exit Signs LED Refrigerated Display Case Lighting High Performance T8 Fixtures** Occupancy Sensors (Lighting) 	 Refrigeration Cooler Night Covers Refrigerated Cases with Doors ECM Motors and Evaporator Fan Motor Controllers Freezer Defrost Controllers High Efficiency Compressors Automatic Door Closers (Walk-in Coolers) Refrigeration Heat Recovery Refrigeration Controls CEE-Rated Refrigerators and Freezers HVAC High-Efficiency Air Source Heat Pumps Ground Source Heat Pumps Ductless Mini-Split Heat Pumps HVAC Occupancy Sensors Demand Control Ventilation (DCV) VFDs on HVAC Motors Ventilation Heat Recovery Radiant Infrared Heaters High Efficiency Anotors Ventilation Heat Recovery Radiant Infrared Heaters High Efficiency Motors Advanced Building Automation Systems Building Recommissioning Programmable Thermostats Demand Control Kitchen Ventilation (DCKV) Use Shades/Blinds (Summer)* Use Shades/Blinds (Winter)* Keep Doors Closed (Winter)*
 T5HO Fixtures** Occupancy Sensors (Lighting) 	 Keep Doors Closed (Summer)* Keep Doors Closed (Winter)*
 Dimming Control (Daylighting) Lighting Controls (Outdoor) Make Use of Daylighting* Use Task Light Instead of Ambient* 	Other Plug Loads Refrigerated Vending Machine Controllers Reduce Number of Fridges*
Building Envelope Roof Insulation Wall Insulation High Performance Glazing Systems Air Curtains	 New Construction New Construction (25% more efficient) New Construction (40% more efficient) Street Lighting LED Street Lighting

* Denotes behavioural measure

** Measures assessed separately for primary (e.g. classrooms in a school) and secondary lighting (e.g. hallways in a school), since hours of operation differ for these scenarios. As such, many of the following exhibits include two line items with the same measure name.

7.3.1 **Technology Screening Results**

A summary of the results is provided in Exhibit 27. For each of the measures reviewed, the exhibit shows:

- The name of the measure
- The cost basis¹⁵ for the CCE that is shown (e.g. full versus incremental) The measure's average CCE for each region¹⁶ Average CCE refers to a weighted average of the CCE values for the measure in different sub sectors.

Measures analyzed on the basis of full cost have been placed towards the top of Exhibit 27 because they are qualitatively different from the measures that pass only on an incremental basis. A measure that passes on a full-cost basis can be applied immediately, even if the piece of equipment it replaces or improves is currently working properly. That means the rate at which the measure can be implemented as a utility CDM measure is limited only by market and program constraints. A measure that passes only on an incremental basis, on the other hand, is limited by the rate of natural replacement (due to failure or obsolescence) or purchase of the piece of equipment it replaces. A measure that passes on a full-cost basis in some sub sector types and on an incremental cost basis in others is shown as "Full/Incr". The exhibit does not include behavior measures as there are no measure-level costs associated with implementing these measures (i.e. CCE of 0 ¢/kWh).

	Peoio	Average CCE (¢/kWh)		
measure Name	Basis	Island	Labrador	Isolated
Activate PC Power Management	Full	0.0	0.0	0.0
Make Use of Daylighting	Full	0.0	0.0	0.0
Use Task Light Instead of Ambient	Full	0.0	0.0	0.0
Reduce Number of Fridges	Full	0.0	0.0	0.0
Use Shades/Blinds (Winter)	Full	0.0	0.0	0.0
Keep Doors Closed (Winter)	Full	0.0	0.0	0.0
Use Shades/Blinds (Summer)	Full	0.0	0.0	0.0
Use Natural Ventilation (Summer)	Full	0.0	0.0	0.0
Keep Doors Closed (Summer)	Full	0.0	0.0	0.0
Low-Flow Showerheads	Full	0.1	0.1	0.1
Low-Flow Showerheads	Full	0.1	0.1	0.1
Low-Flow Faucet Aerators	Full	0.1	0.1	0.1
Lighting Controls (Outdoor)	Full	0.4	0.4	0.7
Cooler Night Covers	Full	0.7	0.7	0.7
Low-Flow Pre-Rinse Spray Valves	Full	0.7	0.9	1.1
Automatic Door Closers (Walk-In Coolers & Freezers)	Full	1.2	1.2	N/A
LED Screw-In Lamps (Secondary)	Full	1.7	1.4	1.6
Programmable Thermostats	Full	1.8	2.0	1.4
LED Screw-In Lamps	Full	2.2	1.8	2.1

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results¹⁸

¹⁵ See Step 4 in Section 7.2 for a fuller description.

¹⁶ The thresholds that were employed for the economic screening of the measures are summarized in Section 8.2

¹⁷ In the subsequent modeling described in Section 8, measure pass or fail the economic screen on the basis of their CCE in the individual sub sector and region, not on the basis of this weighted average value. ¹⁸ Average CCE does not include program costs.

	Basis	Average CCE (¢/kWh)		
Measure Name		Island	Labrador	Isolated
Refrigerated Vending Machine Controllers	Full	2.6	2.6	2.6
High Efficiency Compressors (Refrigeration)	Full	2.7	2.7	N/A
High Performance T8 Fixtures (Secondary)	Full	3.7	2.7	3.3
VFDs on HVAC Motors	Full	3.5	3.2	3.1
Building Recommissioning	Full	3.4	3.6	2.9
Hotel Occupancy Sensors	Full	3.8	2.8	N/A
ENERGY STAR Dishwashers	Full	5.0	5.0	0.0
T5HO Fixtures (Secondary)	Full	3.9	2.9	3.6
LED High Bay Fixtures (Secondary)	Full	4.0	3.2	3.8
LED Exit Signs	Full	3.8	3.8	3.8
High Performance T8 Fixtures	Full	4.7	3.5	4.2
Demand Control Kitchen Ventilation (DCKV)	Full	4.2	4.2	N/A
T5HO Fixtures	Full	4.7	3.7	4.5
Refrigeration Controls	Full	4.5	4.5	N/A
LED High Bay Fixtures	Full	5.0	4.0	4.8
Ventilation Heat Recovery	Full	5.2	4.7	4.1
ECM Motors and Evaporator Fan Motor Controllers	Full	4.7	4.7	4.7
Occupancy Sensors (Lighting)	Full	4.7	4.9	5.3
LED Street Lighting	Full	7.8	7.8	0.0
Radiant Infrared Heaters	Full	5.9	6.1	N/A
LED Tubular Lamps (Secondary)	Full	7.1	5.3	6.8
Ductless Mini-Split Heat Pump	Full	9.0	4.4	6.2
Demand Control Ventilation (DCV)	Full	8.1	5.9	N/A
Refrigeration Heat Recovery	Full	8.2	8.2	N/A
Block Heater Controls	Full	N/A	10.0	10.0
Advanced Building Automation Systems	Full	9.9	11.2	N/A
Refrigerated Cases with Doors	Full	10.9	10.9	N/A
Dimming Control (Daylighting)	Full	18.5	14.2	18.6
Air Curtains	Full	18.8	18.8	N/A
Freezer Defrost Controllers	Full	27.9	27.9	27.9
High-Efficiency Air Source Heat Pumps	Full/Incr.	4.6	0.9	9.4
Heat Pump Water Heaters	Full/Incr.	4.8	3.4	12.2
LED Tubular Lamps	Full/Incr.	8.9	5.3	8.7
Ground Source Heat Pumps	Full/Incr.	12.3	10.0	12.5
Energy-Efficient Server Technologies	Incr.	0.0	0.0	0.0
ENERGY STAR Computers	Incr.	0.0	0.0	0.0
ENERGY STAR Office Equipment	Incr.	0.0	0.0	0.0
New Construction (25% More Efficient)	Incr.	3.3	3.1	3.8
Drainwater Heat Recovery	Incr.	4.5	4.5	4.5

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results (cont'd...)

Moosure Namo	Peoio	Average CCE (¢/kWh)		
measure name	Dasis	Island	Labrador	Isolated
Premium Efficiency Motors	Incr.	4.9	4.5	4.3
High Performance Glazing Systems	Incr.	5.6	6.1	3.2
LED Outdoor Fixtures	Incr.	3.0	3.0	11.3
New Construction (40% More Efficient)	Incr.	6.1	5.8	7.2
CEE-Rated Refrigerators and Freezers	Incr.	8.4	8.4	8.4
Wall Insulation	Incr.	14.1	13.8	5.8
Roof Insulation	Incr.	15.8	16.4	5.0
LED Refrigerated Display Case Lighting	Incr.	11.5	11.5	16.0
On-Demand Water Heaters	Incr.	13.2	13.2	N/A
LED Troffers (Secondary)	Incr.	15.9	12.7	26.2
High Efficiency Chillers	Incr.	14.9	21.7	N/A
LED Troffers	Incr.	20.1	16.3	19.3
High Efficiency RTUs	Incr.	24.6	34.7	32.1

Exhibit 27 Commercial Sector Energy Efficiency Technology Measures, Screening Results (cont'd...)

7.4 **Demand Reduction Technology Assessment**

Exhibit 28 shows the demand reduction technologies and measures that are included in this study. A description and detailed financial and economic assessment of each measure is provided in the TRM Workbook that accompanies this report.

Exhibit 28 Demand Reduction Technologies Included in this Study¹⁹

 Space Heating Thermal Storage Heating Controls HVAC Fans and Pumps HVAC Demand Controls 	Domestic Hot Water DHW Controls Refrigeration Refrigeration Demand Controls
Lighting Lighting Demand Controls	

Technology Screening Results 7.4.1

A summary of the results is provided in Exhibit 29. For each of the measures reviewed, the exhibit shows:

- The name of the measure
- The cost basis²⁰ for the CEPR that is shown (e.g. full versus incremental)
- The measure's average CEPR for each region²¹

¹⁹ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

 ²⁰ See Step 4 in Section 7.2 for a fuller description.
 ²¹ The thresholds that were employed for the economic screening of the measures are summarized in Section 8.2

Measures analyzed on the basis of full cost have been placed towards the top of Exhibit 29 because they are qualitatively different from the measures that pass only on an incremental basis. A measure that passes on a full-cost basis can be applied immediately, even if the piece of equipment it replaces or improves is currently working properly. That means the rate at which the measure can be implemented as a utility CDM measure is limited only by market and program constraints. A measure that passes only on an incremental basis, on the other hand, is limited by the rate of natural replacement (due to failure or obsolescence) or purchase of the piece of equipment it replaces. A measure that passes on a full-cost basis in some sub sector types and on an incremental cost basis in others is shown as "Full/Incr."

Measure Name	Basis	Average CEPR (\$/kW)		
		Island	Labrador	Isolated
Lighting Demand Controls	Full	37.7	37.7	37.7
Refrigeration Demand Controls	Full	69.2	69.2	N/A
HVAC Demand Controls	Full	72.4	72.4	72.4
Heating Controls	Full	87.1	87.1	87.1
DHW Controls	Full	103.7	92.9	82.7
Thermal Storage	Full	241.0	241.0	241.0

Exhibit 29 Commercial Sector Demand Reduction Technology Measures, Screening Results²²

7.5 Energy Efficiency Supply Curve

This sub-section includes energy efficiency supply curves for each of the three regions studied. It is important to present the supply curves for each region separately, because the avoided costs are different. The supply curves presented are for the year 2029, but the Data Manager can be used to generate supply curves for the other years. Each supply curve shows the avoided cost for that region as a horizontal line, with dashed lines showing the upper and lower edge of the range of reasonableness.

The supply curves were constructed based on the approximate Technical Potential savings associated with the measures listed in Exhibit 23. The following approach was used:

- Measures were introduced in sequence
- Where more than one measure affected the same end use, the savings shown for the second measure are incremental to those already shown for the first
- Sequence was determined by listing first the items that reduce the electrical load, then those that
 meet residual load with the most efficient technology. It included consideration of CCE results
 from the preceding exhibit, but not for the purposes of economic screening.
- Items appear in order, starting with the lowest average CCE, but do not stop at the avoided cost threshold. Hence, the supply curve presents a type of Technical Potential scenario.

The results are presented in six exhibits:

- Exhibit 30 presents the potential by measure for the Island Interconnected region. The columns
 provide the savings for the measure, cumulative savings, and CCE, with measures sorted and
 numbered in order of increasing CCE.
- Exhibit 31 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 30.

²² Average CEPR does not include program costs.

- Exhibit 32 presents the potential by measure for the Labrador Interconnected region. The columns provide the savings for the measure, cumulative savings, and CCE, with measures sorted and numbered in order of increasing CCE.
- Exhibit 33 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 32.
- Exhibit 34 presents the potential by measure for the Labrador Interconnected region. The columns provide the savings for the measure, cumulative savings, and CCE, with measures sorted and numbered in order of increasing CCE.
- Exhibit 35 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 34.

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	26,019	26,019	\$0.00
2	Activate PC Power Management	8,476	34,495	\$0.00
3	Energy-Efficient Server Technologies	2,510	37,005	\$0.00
4	ENERGY STAR Office Equipment	1,834	38,839	\$0.00
5	Make Use of Daylighting	1,055	39,894	\$0.00
6	Reduce Number of Fridges	587	40,481	\$0.00
7	Use Task Light Instead of Ambient	456	40,938	\$0.00
8	Use Shades/Blinds (Winter)	239	41,177	\$0.00
9	Keep Doors Closed (Winter)	114	41,291	\$0.00
10	Use Shades/Blinds (Summer)	41	41,332	\$0.00
11	Use Natural Ventilation (Summer)	20	41,351	\$0.00
12	Keep Doors Closed (Summer)	11	41,362	\$0.00
13	Low-Flow Showerheads	4,628	45,990	\$0.00
14	Low-Flow Faucet Aerators	15,350	61,340	\$0.00
15	Lighting Controls (Outdoor)	3,873	65,213	\$0.00
16	Low-Flow Pre-Rinse Spray Valves	1,004	66,217	\$0.00
17	Cooler Night Covers	3,660	69,877	\$0.01
18	Automatic Door Closers (Walk-In Coolers & Freezers)	561	70,438	\$0.01
19	LED Screw-In Lamps	14,213	84,652	\$0.02
20	Programmable Thermostats	31,416	116,068	\$0.02
21	High-Efficiency Air Source Heat Pumps	109,737	225,804	\$0.02
22	LED Screw-In Lamps	10,497	236,301	\$0.02
23	Refrigerated Vending Machine Controllers	6,819	243,121	\$0.03
24	High Efficiency Compressors (Refrigeration)	8,537	251,658	\$0.03
25	High Performance T8 Fixtures	2,832	254,490	\$0.03
26	LED Outdoor Fixtures	21,223	275,714	\$0.03
27	New Construction (25% More Efficient)	45,360	321,074	\$0.03
28	VFDs on HVAC Motors	22,300	343,374	\$0.03
29	Building Recommissioning	96,103	439,477	\$0.03
30	Heat Pump Water Heaters	6,015	445,492	\$0.03
31	Advanced Building Automation Systems	49,883	495,376	\$0.04
32	Hotel Occupancy Sensors	2,434	497,810	\$0.04
33	LED Exit Signs	169	497,979	\$0.04

Exhibit 30 Island Interconnected Measure Potential and CCE

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
34	Demand Control Kitchen Ventilation (DCKV)	1,569	499,548	\$0.04
35	Premium Efficiency Motors	3,516	503,064	\$0.04
36	High Performance Glazing Systems	27,639	530,703	\$0.04
37	Occupancy Sensors (Lighting)	33,225	563,928	\$0.04
38	T5HO Fixtures	3,345	567,273	\$0.04
39	Refrigeration Controls	3,318	570,591	\$0.04
40	Drainwater Heat Recovery	4,108	574,699	\$0.05
41	ECM Motors and Evaporator Fan Motor Controllers	5,901	580,600	\$0.05
42	LED High Bay Fixtures	4,486	585,086	\$0.05
43	High Performance T8 Fixtures	19,273	604,359	\$0.05
44	T5HO Fixtures	804	605,162	\$0.05
45	ENERGY STAR Dishwashers	2,856	608,018	\$0.05
46	Ventilation Heat Recovery	19,399	627,417	\$0.05
47	LED High Bay Fixtures	1,095	628,512	\$0.05
48	New Construction (40% More Efficient)	26,877	655,388	\$0.06
49	Radiant Infrared Heaters	3,270	658,658	\$0.06
50	LED Tubular Lamps	4,989	663,648	\$0.06
51	High-Efficiency Cooking Equipment	3,658	667,306	\$0.06
52	LED Tubular Lamps	33,184	700,490	\$0.07
53	LED Street Lighting	14,638	715,127	\$0.08
54	Refrigeration Heat Recovery	896	716,023	\$0.08
55	CEE-Rated Refrigerators and Freezers	5,714	721,738	\$0.08
56	Ductless Mini-Split Heat Pump	62,016	783,754	\$0.09
57	Demand Control Ventilation (DCV)	23,996	807,750	\$0.09
58	Ground Source Heat Pumps	24,316	832,067	\$0.11
59	Refrigerated Cases with Doors	13,416	845,482	\$0.11
60	LED Refrigerated Display Case Lighting	3,310	848,793	\$0.11
61	Wall Insulation	29,480	878,272	\$0.13
62	On-Demand Water Heaters	843	879,115	\$0.13
63	LED Troffers	915	880,030	\$0.14
64	Roof Insulation	20,435	900,466	\$0.14
65	High Efficiency Chillers	1,193	901,659	\$0.15
66	Air Curtains	299	901,957	\$0.19
67	Dimming Control (Daylighting)	9,011	910,968	\$0.19
68	LED Troffers	5,826	916,794	\$0.19
69	High Efficiency RTUs	5,442	922,236	\$0.26
70	Freezer Defrost Controllers	291	922,527	\$0.28

Exhibit 30 Island Interconnected Measure Potential and CCE (cont'd...)



Exhibit 31 Island Interconnected Energy Efficiency Supply Curve

 2027-2029 Island Lower Reasonable 	 2027-2029 Island Upper Reasonable
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Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	1,784	1,784	\$0.00
2	Activate PC Power Management	387	2,171	\$0.00
3	ENERGY STAR Office Equipment	99	2,270	\$0.00
4	Energy-Efficient Server Technologies	48	2,318	\$0.00
5	Make Use of Daylighting	40	2,358	\$0.00
6	Keep Doors Closed (Winter)	16	2,374	\$0.00
7	Reduce Number of Fridges	5	2,379	\$0.00
8	Use Task Light Instead of Ambient	5	2,384	\$0.00
9	Use Shades/Blinds (Winter)	3	2,387	\$0.00
10	Keep Doors Closed (Summer)	0	2,387	\$0.00
11	Use Shades/Blinds (Summer)	0	2,387	\$0.00
12	Use Natural Ventilation (Summer)	0	2,387	\$0.00
13	Low-Flow Showerheads	605	2,992	\$0.00
14	Low-Flow Faucet Aerators	3,117	6,109	\$0.00
15	Lighting Controls (Outdoor)	518	6,626	\$0.00
16	Low-Flow Pre-Rinse Spray Valves	129	6,755	\$0.00
17	Cooler Night Covers	175	6,929	\$0.01

Exhibit 32 Labrador Interconnected Measure Potential and CCE

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Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
18	High-Efficiency Air Source Heat Pumps	21,261	28,190	\$0.01
19	Automatic Door Closers (Walk-In Coolers & Freezers)	68	28,259	\$0.01
20	LED Screw-In Lamps	1,458	29,716	\$0.02
21	Programmable Thermostats	6,414	36,130	\$0.02
22	LED Screw-In Lamps	1,293	37,423	\$0.02
23	Refrigerated Vending Machine Controllers	736	38,159	\$0.03
24	High Efficiency Compressors (Refrigeration)	415	38,574	\$0.03
25	Hotel Occupancy Sensors	262	38,836	\$0.03
26	LED Outdoor Fixtures	2,881	41,717	\$0.03
27	New Construction (25% More Efficient)	1,753	43,470	\$0.03
28	High Performance T8 Fixtures	461	43,931	\$0.03
29	VFDs on HVAC Motors	1,886	45,817	\$0.03
30	Ductless Mini-Split Heat Pump	14,318	60,135	\$0.03
31	LED Exit Signs	39	60,174	\$0.04
32	Building Recommissioning	14,030	74,204	\$0.04
33	Heat Pump Water Heaters	1,114	75,317	\$0.04
34	High-Efficiency Cooking Equipment	314	75,631	\$0.04
35	High Performance T8 Fixtures	1,323	76,953	\$0.04
36	Demand Control Kitchen Ventilation (DCKV)	160	77,114	\$0.04
37	T5HO Fixtures	78	77,192	\$0.04
38	LED High Bay Fixtures	345	77,537	\$0.04
39	Premium Efficiency Motors	367	77,904	\$0.04
40	LED High Bay Fixtures	105	78,009	\$0.04
41	Refrigeration Controls	157	78,167	\$0.04
42	Ventilation Heat Recovery	4,624	82,791	\$0.04
43	T5HO Fixtures	270	83,061	\$0.04
44	Drainwater Heat Recovery	324	83,384	\$0.05
45	LED Tubular Lamps	830	84,214	\$0.05
46	ECM Motors and Evaporator Fan Motor Controllers	411	84,625	\$0.05
47	Occupancy Sensors (Lighting)	3,056	87,681	\$0.05
48	Advanced Building Automation Systems	7,460	95,141	\$0.05
49	ENERGY STAR Dishwashers	277	95,418	\$0.05
50	New Construction (40% More Efficient)	1,031	96,449	\$0.06
51	Demand Control Ventilation (DCV)	6,440	102,889	\$0.06
52	High Performance Glazing Systems	5,351	108,240	\$0.06
53	Radiant Infrared Heaters	554	108,794	\$0.06
54	LED Tubular Lamps	2,332	111,126	\$0.06
55	LED Street Lighting	883	112,010	\$0.08
56	Refrigeration Heat Recovery	637	112,647	\$0.08
57	CEE-Rated Refrigerators and Freezers	1,169	113,815	\$0.08
58	Ground Source Heat Pumps	5,383	119,198	\$0.09
59	Block Heater Controls	407	119,605	\$0.10
60	Refrigerated Cases with Doors	650	120,255	\$0.11

Exhibit 32 Labrador Interconnected Measure Potential and CCE (cont'd...)

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Exhibit 32 Labrador Interconnected Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
61	LED Refrigerated Display Case Lighting	167	120,422	\$0.11
62	Roof Insulation	6,822	127,244	\$0.13
63	On-Demand Water Heaters	68	127,312	\$0.13
64	Wall Insulation	7,924	135,236	\$0.14
65	LED Troffers	153	135,389	\$0.14
66	Dimming Control (Daylighting)	172	135,561	\$0.17
67	Air Curtains	54	135,615	\$0.19
68	LED Troffers	417	136,032	\$0.19
69	High Efficiency Chillers	41	136,073	\$0.21
70	Freezer Defrost Controllers	69	136,142	\$0.28
71	High Efficiency RTUs	146	136,288	\$0.36



Exhibit 34 Isolated Measure Potential and CCE

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
1	ENERGY STAR Computers	334	334	\$0.00
2	Activate PC Power Management	127	462	\$0.00
3	Make Use of Daylighting	44	506	\$0.00
4	ENERGY STAR Office Equipment	24	529	\$0.00
5	Use Shades/Blinds (Winter)	1	530	\$0.00
6	Low-Flow Faucet Aerators	30	559	\$0.00
7	Low-Flow Showerheads	3	562	\$0.00
8	Lighting Controls (Outdoor)	73	635	\$0.01
9	Cooler Night Covers	91	725	\$0.01
10	Low-Flow Pre-Rinse Spray Valves	2	727	\$0.01
11	Programmable Thermostats	110	837	\$0.01
12	LED Screw-In Lamps	169	1,006	\$0.02
13	LED Screw-In Lamps	345	1,351	\$0.02
14	Refrigerated Vending Machine Controllers	186	1,536	\$0.03
15	Building Recommissioning	921	2,457	\$0.03
16	VFDs on HVAC Motors	18	2,476	\$0.03
17	High Performance Glazing Systems	25	2,501	\$0.03
18	High Performance T8 Fixtures	64	2,565	\$0.03
19	T5HO Fixtures	6	2,571	\$0.04
20	New Construction (25% More Efficient)	821	3,392	\$0.04
21	LED High Bay Fixtures	9	3,401	\$0.04
22	LED Exit Signs	3	3,404	\$0.04
23	Ventilation Heat Recovery	30	3,434	\$0.04
24	High Performance T8 Fixtures	343	3,777	\$0.04
25	Premium Efficiency Motors	17	3,794	\$0.04
26	Drainwater Heat Recovery	3	3,796	\$0.05
27	T5HO Fixtures	18	3,814	\$0.05
28	ECM Motors and Evaporator Fan Motor Controllers	28	3,842	\$0.05
29	LED High Bay Fixtures	27	3,869	\$0.05
30	Roof Insulation	39	3,908	\$0.05
31	Occupancy Sensors (Lighting)	430	4,338	\$0.05
32	Wall Insulation	42	4,381	\$0.06
33	Ductless Mini-Split Heat Pump	173	4,554	\$0.06
34	LED Tubular Lamps	115	4,668	\$0.07
35	New Construction (40% More Efficient)	460	5,128	\$0.07
36	CEE-Rated Refrigerators and Freezers	1,272	6,400	\$0.08
37	LED Tubular Lamps	609	7,008	\$0.09
38	High-Efficiency Air Source Heat Pumps	16	7,024	\$0.09
39	LED Outdoor Fixtures	397	7,422	\$0.11
40	Ground Source Heat Pumps	7	7,428	\$0.12
41	Heat Pump Water Heaters	14	7,442	\$0.12
42	LED Refrigerated Display Case Lighting	131	7,574	\$0.16
43	Dimming Control (Daylighting)	135	7,709	\$0.19

Exhibit 34 Isolated Measure Potential and CCE (cont'd...)

Ref #	Measure Name	Savings (MWh/yr.)	Cumulative Savings (MWh/yr.)	CCE (\$/kWh)
44	LED Troffers	112	7,820	\$0.19
45	LED Troffers	22	7,842	\$0.26
46	Freezer Defrost Controllers	9	7,851	\$0.28
47	High-Efficiency Cooking Equipment	33	7,884	\$1.11



Exhibit 35 Isolated Energy Efficiency Supply Curve

-- 2027-2029 Isolated Lower Reasonable - - 2027-2029 Isolated Upper Reasonable

7.6 Demand Reduction Supply Curve

This sub-section includes demand reduction supply curves for each of the three regions studied. It is important to present the supply curves for each region separately, because the avoided costs are different. The supply curves presented are for the year 2029, but the Data Manager can be used to generate supply curves for the other years. Each supply curve shows the avoided cost for that region as a horizontal line, with dashed lines showing the upper and lower edge of the range of reasonableness.

The supply curves were constructed based on the approximate Technical Potential savings associated with the measures listed in Exhibit 28. The following approach was used:

- Measures were introduced in sequence
- Where more than one measure affected the same end use, the reduction shown for the second measure are incremental to those already shown for the first
- Sequence was determined by listing first the items that reduce the electrical load, then those that
 meet residual load with the most efficient technology. It included consideration of CEPR results
 from the preceding exhibit, but not for the purposes of economic screening.
- Items appear in order, starting with the lowest average CEPR, but do not stop at the avoided cost threshold. Hence, the supply curve presents a type of Technical Potential scenario.

The results are presented in six exhibits:

- Exhibit 36 presents the potential by measure for the Island Interconnected region. The columns
 provide the reduction for the measure, cumulative reduction, and CEPR, with measures sorted
 and numbered in order of increasing CEPR.
- Exhibit 37 presents the supply curve for the Island Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 36.
- Exhibit 38 presents the potential by measure for the Labrador Interconnected region. The columns provide the savings for the measure, cumulative savings, and CCE, with measures sorted and numbered in order of increasing CCE.
- Exhibit 39 presents the supply curve for the Labrador Interconnected region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 38.
- Exhibit 40 presents the potential by measure for the Isolated region. The columns provide the savings for the measure, cumulative savings, and CCE, with measures sorted and numbered in order of increasing CCE.
- Exhibit 41 presents the supply curve for the Isolated region. A few of the larger measures are numbered as landmarks. The numbers match those in Exhibit 40.

Ref #	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
1	Lighting Demand Controls	3	3	\$37.65
2	Refrigeration Demand Controls	1	4	\$69.24
3	HVAC Demand Controls	10	14	\$72.41
4	Heating Controls	2	16	\$87.13
5	DHW Controls	13	29	\$89.31
6	Thermal Storage	75	104	\$240.96

Exhibit 36 Island Interconnected Measure Potential and CEPR





Exhibit 37 Island Interconnected Demand Reduction Supply Curve

Exhibit 38 Labrador Interconnect	ed Measure Potential and CE	PR
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Ref #	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
1	Lighting Demand Controls	1	1	\$37.65
2	Refrigeration Demand Controls	0	1	\$69.24
3	HVAC Demand Controls	1	2	\$72.41
4	DHW Controls	2	4	\$85.31
5	Heating Controls	1	5	\$87.13
6	Thermal Storage	8	12	\$240.96

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Exhibit 39 Labrador Interconnected Demand Reduction Supply Curve

Ref #	Measure Name	Demand Reduction (MW)	Cumulative Reduction (MW)	CEPR (\$/kW)
1	Lighting Demand Controls	0.07	0.07	\$37.65
2	HVAC Demand Controls	0.01	0.08	\$72.41
3	DHW Controls	0.04	0.12	\$82.74
4	Heating Controls	0.00	0.12	\$87.13
5	Thermal Storage	0.34	0.46	\$240.96





Exhibit 41 Isolated Demand Reduction Supply Curve

8 Economic Potential: Electric Energy Forecast

8.1 Introduction

This section presents the Commercial sector Economic Potential Forecast for electric energy and demand for the study period 2014 to 2029. The Economic Potential Electric Energy Forecast estimates the level of electricity consumption that would occur if all equipment and building envelopes were upgraded to the level that is cost effective against the economic threshold values for electricity in the three regions in NL. The model also estimates the peak demand implications of applying all the cost-effective efficiency measures. Starting from that point, the Economic Potential Peak Demand Forecast estimates the level of peak demand that would occur if all cost-effective demand reduction measures were also applied. In this study, "cost effective" means that the technology upgrade cost, referred to as the cost of conserved energy (CCE) or the cost of electricity peak reduction (CEPR) in the preceding section, is equal to or less than the economic threshold value for a given region.

The discussion in this section covers the following:

- Avoided costs used for screening
- Major modelling tasks
- Technologies included in Economic Potential Forecast
- Presentation of energy efficiency results
- Interpretation of energy efficiency results
- Summary of peak load reductions from energy efficiency
- Presentation of load reduction results
- Interpretation of load reduction results
- Range of reasonableness.

8.2 Avoided Costs Used For Screening

The Utilities agreed on a set of economic threshold values for electricity supply to be used in this study. The values vary by region and milestone year as shown in Exhibit 42. Each of the values for the years after 2014 represents the average of the three years in the milestone period.

Exhibit 42 Avoided Costs of New Electricity Supply

	Avoided Cost per kWh				
Year	Island Interconnected	Labrador Interconnected	Isolated		
2014	\$0.108	\$0.037	\$0.21		
2017	\$0.125	\$0.039	\$0.23		
2020	\$0.050	\$0.045	\$0.26		
2023	\$0.059	\$0.053	\$0.29		
2026	\$0.068	\$0.061	\$0.34		
2029	\$0.076	\$0.068	\$0.37		

The Economic Potential Electric Energy Forecast then incorporates all the electric energy-efficient upgrades that the technology assessment found to have a CCE equal to or less than these thresholds.

The Utilities also agreed on a set of economic threshold values for new generation capacity to be used in this study. These values also vary by region and milestone year as shown in Exhibit 43. Again, each value for the years after 2014 represents an average of the three years in the milestone period. The cost of new capacity for the Isolated region was not available. For the purposes of the study, the higher of the two values for the other two regions was used in each milestone year.

	Avoided Cost per kW			
Year	Island Interconnected	Labrador Interconnected	Isolated	
2014	\$50.911	\$72.059		
2017	\$65.116	\$82.527		
2020	\$101.821	\$91.601		
2023	\$115.126	\$103.571		
2026	\$124.930	\$112.390		
2029	\$124.907	\$112.370		

Exhibit 43 Avoided Costs of New Electric Generation Capacity

The Economic Potential Peak Demand Forecast then incorporates all the demand reduction upgrades that the technology assessment found to have a CEPR equal to or less than these thresholds.

The Utilities also provided a range of reasonableness for all of these avoided costs. The lower range for new electricity supply is considered to be 10% below the costs per kWh shown in Exhibit 42 while the upper range is considered to be 30% above those values. The upper range for new electric generation capacity supply is considered to be 10% below the costs per kW shown in Exhibit 43 while the upper range is considered to be 20% above those values. The purpose for establishing the range of reasonableness is to show the sensitivity of the results to varying avoided cost scenarios and to improve the ability of planners to examine options that may become more cost effective over time.

Emerging end-use technology measures are becoming cheaper over time as these markets become more cost effective. This is apparent by examining a range of measures whose costs have reduced significantly in the last several years (e.g., the cost of LED lamps has reduced by a factor of 5-10x since their introduction). Including these apparently more costly measures in this study allows the review of these measures in the near future, as programs are effective in introducing more competitiveness within these markets. At the same time, new sources of supply are expected to come online during the study period, so it is important to explore the implications of lower avoided costs.

8.3 Major Modelling Tasks

By comparing the results of the Commercial sector Economic Potential Electric Energy and Peak Demand Forecasts with the Reference Case, it is possible to determine the aggregate level of potential electricity savings and demand reductions within the Commercial sector, as well as identify which specific building sub sectors and end uses provide the most significant opportunities for savings.

To develop the Commercial sector Economic Potential Electric Energy Forecast, the following tasks were completed:

- The CCE for each of the energy-efficient upgrades presented in Exhibit 27 were reviewed, using the 7% (real) discount rate.
- Technology upgrades that had a CCE equal to, or less than, the threshold values for each region and milestone year were selected for inclusion in the Economic Potential scenario, either on a full-cost or incremental basis. It is assumed that technical upgrades having a full-cost CCE that met the cost threshold were implemented in the first forecast year. It is assumed that those upgrades that only met the cost threshold on an incremental basis are being introduced more slowly as the existing stock reaches the end of its useful life.
- Electricity use within each of the building sub sectors was modelled with the same energy
 models that were used to generate the Reference Case. However, for this forecast, the
 remaining baseline technologies included in the Reference Case forecast were replaced with the
 most efficient technology upgrade option and associated performance efficiency that met the
 cost thresholds for each region and milestone period.
- When more than one upgrade option was applied to a given end use, the first measure selected was the one that reduced the electrical load. For example, measures to reduce the overall space heating load (e.g., roof insulation and more efficient glazing) were applied before a heat pump.

To develop the Commercial sector Economic Potential Peak Demand Forecast, the following tasks were completed:

- The Economic Potential Electric Energy Forecast was used to generate the reductions in peak demand associated with efficiency improvements. These reductions were applied to the demand Reference Case to generate a Post-Efficiency Case to serve as the starting point for the demand reduction model. This was intended to avoid any double counting of demand reductions.
- The CEPR for each of the load reduction upgrades presented in Exhibit 28 were reviewed, using the 7% (real) discount rate.
- Technology upgrades that had a CEPR equal to, or less than, the threshold values for each
 region and milestone year were selected for inclusion in the Economic Potential scenario, either
 on a full-cost or incremental basis. It is assumed that technical upgrades having a full-cost CEPR
 that met the cost threshold were implemented in the first forecast year. It is assumed that those
 upgrades that only met the cost threshold on an incremental basis are being introduced more
 slowly as the existing stock reaches the end of its useful life.
- Peak demand within each of the building sub sectors was modelled with the same demand models that were used to generate the Reference Case. However, for this forecast, the remaining baseline technologies included in the Reference Case forecast were replaced with the most efficient technology upgrade option and associated performance efficiency that met the cost thresholds for each region and milestone period.

8.4 Technologies Included in Economic Potential Forecast

Exhibit 44 provides a listing of the efficiency technologies included in this forecast. Exhibit 45 provides a listing of the demand reduction technologies included in this forecast. In each case, the exhibits show the following:

- End use affected
- Upgrade option(s) selected
- Building type to which the upgrade options were applied
- Rate at which the upgrade options were introduced into the stock.

Some of the technologies listed in the exhibits below are the subject of current utility programs in the province of NL. The load forecast provided by the Utilities assumed a modest level of continued program activity and continued savings from efficiency improvements made under past programs, but no new program activity. The reference case for this project was constructed to be consistent with that forecast, in that the penetrations of the energy technologies below were not all assumed to remain static at their current levels. Reference case penetrations were assumed to increase, to account for natural adoption and the modest level of program activity assumed in the reference case.

In most cases, current programs are unlikely to capture all the economic potential for the technologies over the next 15 years. Therefore, none of the technologies have actually been removed from consideration in the study. Nonetheless, there are cases where the reference case penetration "catches up" to the economic penetration, and the economic potential diminishes, as can be seen later in this section in Exhibit 48.

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast

End Use Category	Upgrade Option	Applicability	Rate of Introduction
	ENERGY STAR Computers	All existing facilities	At natural rate of replacement
Computer Equipment	ENERGY STAR Office Equipment	All existing facilities	At natural rate of replacement
-4	Energy-Efficient Server Technologies	All existing facilities	At natural rate of replacement
	LED Screw-In Lamps	All existing facilities	Immediate
	LED Tubular Lamps	All existing facilities	At natural rate of replacement/Immediate in some facility types
	LED Troffers	All existing facilities	At natural rate of replacement
	High Performance T8 Fixtures	All existing facilities	Immediate
	LED Exit Signs	All existing facilities	Immediate
Link (n	LED High Bay Fixtures	Facilities with high bay fixtures (e.g. warehouses)	Immediate
Lighting	T5HO Fixtures	Facilities with high bay fixtures (e.g. warehouses)	Immediate
	Occupancy Sensors (Lighting)	All existing facilities	Immediate
	Dimming Control (Daylighting)	Facilities with a significant proportion of windows	Immediate
	LED Outdoor Fixtures	All existing facilities	At natural rate of replacement/Immediate in some cases
	Lighting Controls (Outdoor)	All existing facilities	Immediate
	LED Street Lighting	All street lighting	At natural rate of replacement/Immediate in some cases
	Low-Flow Faucet Aerators	All existing facilities	Immediate
	On-Demand Water Heaters	Accommodation facilities	Immediate (at time of major renovation)
	Drainwater Heat Recovery	Accommodation facilities	Immediate (at time of major renovation)
	Heat Pump Water Heaters	Facilities with waste heat in their mechanical rooms (excludes retail and warehouses)	At natural rate of replacement/Immediate in some facility types
DHW	Low-Flow Pre-Rinse Spray Valves	Facilities with larger commercial kitchens (excludes Offices)	Immediate
	ENERGY STAR Dishwashers	Facilities with larger commercial kitchens (excludes Offices)	At natural rate of replacement/Immediate in some facility types
	Low-Flow Showerheads	Facilities with significant shower use	Immediate
	Refrigeration Heat Recovery	Large Other facilities (focus on arenas)	Immediate
Refrigeration	LED Refrigerated Display Case Lighting	Food Retail and Large Non-Food Retail	At natural rate of replacement
Reingeration	Cooler Night Covers	Food Retail and Large Non-Food Retail	Immediate

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast (cont'd...)

End Use Category	Upgrade Option	Applicability	Rate of Introduction
	Refrigerated Cases with Doors	Food Retail and Large Non-Food Retail	Immediate
	ECM Motors and Evaporator Fan Motor Controllers	All facilities with significant commercial refrigeration loads	Immediate
	Freezer Defrost Controllers	All facilities with significant commercial refrigeration loads	Immediate
Refrigeration	High Efficiency Compressors (Refrigeration)	Food Retail and Large Non-Food Retail	Immediate
	Automatic Door Closers (Walk-In Coolers & Freezers)	Food Retail and Restaurants	Immediate
	Refrigeration Controls	Food Retail and Large Non-Food Retail	Immediate
	CEE-Rated Refrigerators and Freezers	All facilities with stand-alone refrigerators	At natural rate of replacement
	High-Efficiency Air Source Heat Pumps	All commercial facilities with rooftop units (RTUs)	At natural rate of replacement/Immediate in some facility types
	Ground Source Heat Pumps	All existing facilities	At natural rate of replacement/Immediate in some facility types
	Ductless Mini-Split Heat Pump	All small commercial facilities	Immediate
	Ventilation Heat Recovery	Facilities where exhaust air ducting is located close to supply air ducting	Immediate
	Radiant Infrared Heaters	Warehouses	Immediate
HVAC	High Efficiency Chillers	All commercial facilities with chillers	At natural rate of replacement
Equipment and	High Efficiency RTUs	All commercial facilities with rooftop units (RTUs)	At natural rate of replacement
Controls	Hotel Occupancy Sensors	Accommodation facilities	Immediate
	Demand Control Ventilation (DCV)	Facilities with large variances in occupancy, excluding restaurants	Immediate
	Programmable Thermostats	All existing facilities	Immediate
	Demand Control Kitchen Ventilation (DCKV)	Restaurants	Immediate
	VFDs on HVAC Motors	All facilities with variable air volume (VAV) HVAC systems	Immediate
	Premium Efficiency Motors	All existing facilities	At natural rate of replacement
	Roof Insulation	All existing facilities	Immediate (at time of major renovation)
Building	Wall Insulation	All existing facilities	Immediate (at time of major renovation)
Envelope	High Performance Glazing Systems	All existing facilities	At natural rate of replacement
	Air Curtains	Food Retail and Large Non-Food Retail	Immediate

Exhibit 44 Efficiency Technologies Included in Economic Potential Forecast (cont'd...)

End Use Category	Upgrade Option	Applicability	Rate of Introduction
Whole Building	Advanced Building Automation Systems	Larger commercial facilities	Immediate
whole building	Building Recommissioning	All existing facilities	Immediate
New	New Construction (25% More Efficient)	All new facilities	At time of new construction
Construction	New Construction (40% More Efficient)	All new facilities	At time of new construction
	Refrigerated Vending Machine Controllers	All facilities with vending machines	Immediate
Other	High-Efficiency Cooking Equipment	All facilities with commercial kitchens	At natural rate of replacement
	Block Heater Controls	Labrador and Isolated only	Immediate
	Activate PC Power Management	All existing facilities	Immediate
	Make Use of Daylighting	Facilities with a significant proportion of windows	Immediate
	Use Task Light Instead of Ambient	Offices	Immediate
	Reduce Number of Fridges	Offices	Immediate
Behaviour	Use Shades/Blinds (Winter)	Offices	Immediate
	Use Shades/Blinds (Summer)	Offices	Immediate
	Use Natural Ventilation (Summer)	Offices	Immediate
	Keep Doors Closed (Winter)	Retail facilities and Warehouses	Immediate
	Keep Doors Closed (Summer)	Retail facilities and Warehouses	Immediate

Exhibit 45 Load Reduction Technologies Included in Economic Potential Forecast

End Use Category	Upgrade Option	Applicability	Rate of Introduction		
	Space Heating Controls	Accommodation facilities	Immediate		
HVAC	Electric Thermal Storage Systems	All facilities, excluding large retail, Universities and Warehouses	Immediate		
	HVAC Fans & Pumps Controls	Larger facilities with central HVAC controls	Immediate		
Lighting	Lighting Controls	All facilities	Immediate		
DHW	Domestic Hot Water (DHW) Controls	Facilities with DHW loads during peak periods	Immediate		
Refrigeration	Refrigeration Controls	All facilities with significant refrigeration loads	Immediate		

8.5 Summary of Electric Energy Savings

Exhibit 46 compares the commercial electricity consumption forecasts for the Reference Case and the Economic Potential Electric Energy scenarios.²³ Under the Reference Case, commercial electricity consumption would grow from the Base Year level of about 2,360 GWh/yr. to approximately 2,700 GWh/yr. by 2029. This contrasts with the Economic Potential Forecast in which electricity use would decrease to approximately 1,760 GWh/yr. for the same period. This represents a difference of approximately 940 GWh/yr., or about 35%.

The exhibit shows a large fraction of the economic potential savings occurring in the first milestone period. There are several reasons for this, including a large number of measures that pass on a full-cost basis, and avoided costs in the Island Interconnected region that are forecast to drop sharply after 2018. These factors are discussed in more detail in Section 8.5.2.





²³ All results are reported at the customer's point-of-use and do not include line losses.

8.5.1 Electric Energy Savings

Further detail on the total potential electric energy savings provided by the Economic Potential Forecast is provided in the following exhibits:²⁴

- Exhibit 47 presents the results by end use, sub sector and milestone year
- Exhibit 48 provides a further disaggregation of the savings by measure and milestone year
- Exhibit 49 presents savings by major end use, milestone year and region
- Exhibit 50 presents savings by major end use, milestone year and sub sector
- Exhibit 51 presents savings by major end use, milestone year and vintage

²⁴ MWh/yr. savings shown in the following exhibits are not incremental. For example, the space heating savings in 2029 are not in addition to the space heating savings from the previous milestone years. Rather, they are the difference between the Reference Case space heating consumption in 2029 and the space heating consumption if all the measures included in the Economic Potential scenario are implemented.

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	35,396	21,111	14,702	112	2,009	7,233	4,890	1,856	-	2,385	2,000	-	643	92,337
	2020	40,728	20,671	15,130	118	2,047	9,231	4,640	2,251	-	2,430	2,048	-	1,093	100,389
Large Office	2023	47,060	20,538	15,984	132	2,129	9,532	4,441	2,669	-	2,563	2,101	-	1,114	108,262
	2026	51,318	25,502	16,999	148	2,227	9,797	4,260	2,988	-	2,728	2,149	-	1,135	119,251
	2029	58,110	25,654	18,382	170	2,363	10,076	4,119	2,902	-	2,967	2,199	-	1,156	128,099
	2017	44,075	15,639	6,969	-	1,515	5,995	1,842	1,540	-	2,384	215	-	534	80,708
	2020	44,508	15,394	7,186	-	1,648	7,685	1,745	1,867	-	2,407	231	-	908	83,577
Small Office	2023	45,850	15,353	7,715	-	1,830	7,923	1,667	2,218	-	2,511	245	-	925	86,236
	2026	45,843	18,520	8,269	-	2,012	8,134	1,591	2,479	-	2,621	256	-	943	90,666
	2029	48,379	19,236	9,021	-	2,186	8,355	1,526	2,402	-	2,782	268	-	960	95,116
	2017	9,704	17,204	9,596	2,257	489	602	1,411	1,471	-	948	829	-	-	44,511
	2020	11,305	16,818	9,720	2,300	502	772	1,344	1,786	-	955	846	-	-	46,347
Large Non-food Retail	2023	13,142	16,653	10,057	2,405	533	797	1,294	2,126	-	994	862	-	-	48,864
	2026	15,226	16,513	10,418	2,492	565	819	1,247	2,382	-	1,037	878	-	-	51,577
	2029	17,206	16,521	10,914	2,614	610	843	1,211	2,318	-	1,100	895	-	-	54,231
	2017	18,270	16,073	7,408	-	760	887	1,936	2,174	-	1,105	-	-	-	48,613
	2020	20,230	15,879	7,578	-	776	1,135	1,842	2,634	-	1,118	-	-	-	51,191
Small Non-food Retail	2023	21,848	15,704	7,891	-	805	1,169	1,761	3,112	-	1,159	-	-	-	53,449
	2026	23,084	18,549	8,283	-	842	1,200	1,688	3,473	-	1,215	-	-	-	58,333
	2029	26,040	18,600	8,817	-	893	1,232	1,628	3,354	-	1,299	-	-	-	61,863
	2017	8,169	10,190	3,909	33,502	909	688	951	1,071	-	472	789	163	-	60,813
	2020	9,536	10,028	3,979	33,872	926	880	924	1,301	-	474	804	345	-	63,068
Food Retail	2023	10,849	9,914	4,099	34,930	969	906	914	1,552	-	487	820	517	-	65,958
	2026	12,165	9,812	4,230	35,784	1,016	929	899	1,743	-	501	835	574	-	68,489
	2029	13,559	9,786	4,413	37,022	1,079	954	894	1,702	-	524	850	574	-	71,357
	2017	9,754	4,933	2,051	360	6,988	354	2,396	481	-	355	390	58	-	28,119
	2020	10,151	4,787	2,075	363	7,455	453	2,281	582	-	356	398	58	-	28,960
Large Accomodation	2023	10,722	4,692	2,146	389	8,039	467	2,210	691	-	370	405	58	-	30,189
	2026	11,309	4,581	2,221	401	8,632	479	2,145	772	-	386	413	58	-	31,396
	2029	12,525	4,491	2,325	418	9,316	492	2,108	748	-	409	421	58	-	33,308
	2017	4,724	2,389	340	0	3,337	159	643	214	-	91	174	-	-	12,069
	2020	4,840	2,309	347	2	3,545	203	611	259	-	92	177	-	-	12,384
Small Accomodation	2023	5,032	2,244	365	7	3,804	209	591	306	-	98	181	-	-	12,836
	2026	5,332	2,177	384	13	4,072	214	573	342	-	105	184	-	-	13,396
	2029	5,579	2,118	411	21	4,378	220	563	330	-	115	187	-	-	13,922

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	36,691	1,670	14,522	162	2,587	1,197	3,849	1,606	-	692	151	173	140	63,438
	2020	37,767	1,723	14,946	168	2,858	1,525	3,707	1,938	-	701	154	345	237	66,070
Healthcare	2023	38,734	1,702	15,160	179	3,157	1,566	3,629	2,280	-	709	157	518	242	68,033
	2026	39,687	1,903	15,425	193	3,472	1,604	3,580	2,531	-	723	160	576	246	70,099
	2029	40,867	1,986	15,793	213	3,770	1,642	3,586	2,424	-	746	163	576	251	72,016
	2017	44,326	16,758	2,417	110	2,231	2,306	2,926	2,574	-	63	307	-	-	74,016
	2020	45,341	16,530	2,454	115	2,263	2,951	2,790	3,115	-	69	313	-	-	75,940
Schools	2023	47,323	16,488	2,526	123	2,322	3,041	2,730	3,668	-	79	319	-	-	78,619
	2026	48,896	16,862	2,637	134	2,385	3,123	2,633	4,078	-	92	325	-	-	81,164
	2029	50,672	16,994	2,762	147	2,471	3,208	2,710	3,913	-	109	331	-	-	83,318
	2017	2,922	19,998	17,143	774	489	2,966	1,392	1,347	-	396	956	-	106	48,488
Universities and Colleges	2020	3,408	19,576	17,190	777	500	3,771	1,329	1,622	-	406	974	-	181	49,734
	2023	4,224	19,173	17,267	790	516	3,860	1,271	1,897	-	425	993	-	184	50,599
	2026	5,118	18,909	17,469	815	554	3,946	1,231	2,106	-	480	1,012	-	188	51,826
	2029	6,190	18,643	17,669	839	591	4,032	1,191	2,003	-	536	1,030	-	191	52,915
	2017	9,491	11,239	727	852	574	555	442	978	-	17	-	-	-	24,877
	2020	11,448	11,412	746	862	582	711	411	1,179	-	18	-	-	-	27,368
Warehouse/Wholesale	2023	13,713	11,260	793	986	609	732	394	1,394	-	20	-	-	-	29,901
	2026	16,359	11,294	835	1,046	634	751	370	1,548	-	22	-	-	-	32,859
	2029	18,576	11,180	886	1,130	666	771	511	1,485	-	25	-	-	-	35,230
	2017	6,393	1,013	848	1,710	6,693	133	3,930	194	-	222	-	681	-	21,817
	2020	7,071	1,012	868	1,807	6,826	170	3,765	236	-	226	-	1,363	-	23,343
Restaurants	2023	7,647	1,006	902	2,072	7,295	175	3,619	279	-	234	-	2,044	-	25,274
	2026	8,437	1,004	943	2,288	7,570	180	3,480	311	-	246	-	2,272	-	26,729
	2029	9,260	1,013	997	2,588	7,944	184	3,359	301	-	262	-	2,272	-	28,181
	2017	- 330	2,812	277	647	49	306	431	542	-	-	157	-	-	4,893
Labrador Isolated C/L	2020	- 310	2,864	310	1,034	53	405	428	529	-	-	160	-	-	5,473
Buildings	2023	- 266	2,895	343	1,427	56	418	423	516	-	-	164	-	-	5,975
	2026	- 221	2,951	384	1,610	59	431	425	507	-	-	167	-	-	6,312
	2029	- 174	3,013	436	1,702	64	443	434	502	-	-	170	-	-	6,589
	2017	- 64	263	26	61	-	29	42	51	-	-	15	-	-	422
Island Isolated C/I	2020	- 64	270	30	98	-	38	42	50	-	-	15	-	-	479
Buildings	2023	- 61	274	33	135	-	39	42	49	-	-	15	-	-	525
	2026	- 59	280	37	153	-	41	42	48	-	-	16	-	-	558
	2029	- 56	287	42	162	-	42	43	48	-	-	16	-	-	584

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	ΤΟΤΑΙ
	2017	23,286	14,207	9,809	339	4,562	2,385	3,787	1,947	-	845	1,672	-	-	62,840
	2020	27,260	14,223	9,936	413	5,124	3,047	3,600	2,352	-	853	1,705	-	-	68,514
arge Other Buildings	2023	32,510	14,408	10,110	529	5,193	3,132	3,436	2,761	-	871	1,738	-	-	74,687
	2026	36,861	14,340	10,502	796	5,356	3,210	3,331	3,085	-	931	1,771	-	-	80,183
	2029	41,277	14,276	10,898	1,066	5,521	3,290	3,232	2,962	-	990	1,804	-	-	85,316
	2017	21,487	10,048	5,347	0	2,273	2,127	2,871	1,781	-	593	-	-	-	46,529
Small Other Buildings	2020	22,765	9,988	5,414	38	2,297	2,711	2,721	2,146	-	592	-	-	-	48,672
	2023	25,953	10,125	5,540	125	2,351	2,787	2,594	2,518	-	605	-	-	-	52,597
	2026	29,908	11,656	5,800	310	2,891	2,857	2,505	2,807	-	644	-	-	-	59,377
	2029	32,411	11,573	6,094	520	3,386	2,929	2,428	2,691	-	689	-	-	-	62,719
	2017	9,842	-	1,179	-	546	258	22	547	-	19	-	-	-	12,412
	2020	17,828	-	1,208	-	546	350	19	631	-	18	-	-	-	20,600
Other Institutional	2023	23,123	29	1,239	4	550	357	24	716	-	18	-	-	-	26,061
	2026	28,089	2,627	2,411	7	554	364	27	798	-	47	-	-	-	34,924
	2029	30,009	2,600	2,439	11	559	371	32	847	-	47	-	-	-	36,916
	2017	-	-	-	-	-	-	-	-	17,083	-	-	-	-	17,083
	2020	-	-	-	-	-	-	-	-	16,530	-	-	-	-	16,530
Street Lighting	2023	-	-	-	-	-	-	-	-	15,941	-	-	-	-	15,941
	2026	-	-	-	-	-	-	-	-	15,311	-	-	-	-	15,311
	2029	-	-	-	-	-	-	-	-	14,638	-	-	-	-	14,638
	2017	284,135	165,544	97,271	40,886	36,012	28,181	33,762	20,374	17,083	10,585	7,655	1,074	1,423	743,986
	2020	313,812	163,484	99,116	41,968	37,946	36,040	32,199	24,477	16,530	10,714	7,826	2,110	2,418	788,639
Grand Total	2023	347,403	162,458	102,169	44,234	40,157	37,109	31,040	28,751	15,941	11,143	7,998	3,137	2,465	834,005
	2026	377,351	177,479	107,245	46,188	42,841	38,078	30,028	31,999	15,311	11,775	8,165	3,479	2,511	892,450
	2029	410,430	177,969	112,300	48,622	45,797	39,084	29,576	30,931	14,638	12,600	8,333	3,479	2,558	936,317

Exhibit 47 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year (MWh/yr.) (cont'd...)

Notes:

1) Results are measured at the customer's point-of-use and do not include line losses.

2) Any differences in totals are due to rounding.

3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.

4) MWh/yr. savings are not incremental. The space heating savings in 2029 are not in addition to the savings from the previous milestone years. Rather, they are the difference between the Reference Case space heating consumption in 2029 and the space heating consumption if all the measures included in the Economic Potential scenario are implemented.

	Annual	Annual	Annual	Annual	Annual
Mooguro	Savings,	Savings,	Savings,	Savings,	Savings,
Measure	2017,	2020,	2023,	2026,	2029,
	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)	(MWh/yr.)
Building Recommissioning	137,102	133,362	128,738	128,412	123,507
High-Efficiency Air Source Heat Pumps	45,572	71,317	96,559	120,842	144,057
Ductless Mini-Split Heat Pump	79,528	81,486	80,623	82,501	82,190
Advanced Building Automation Systems	54,053	52,542	50,623	47,612	45,501
Programmable Thermostats	53,150	51,176	48,444	45,286	42,110
Occupancy Sensors (Lighting)	39,154	38,926	39,384	38,737	38,093
Demand Control Ventilation (DCV)	38,334	36,498	42,422	38,946	35,175
ENERGY STAR Computers	19,568	26,603	27,114	27,626	28,137
VFDs on HVAC Motors	24,176	24,176	24,176	24,205	24,205
LED Tubular Lamps	20,749	18,649	16,599	32,973	31,915
Ventilation Heat Recovery	19,429	23,712	23,712	23,712	23,712
High Performance T8 Fixtures	21,584	22,254	21,869	21,403	20,938
New Construction (25% More Efficient)	925	6,523	17,289	30,239	47,934
Low-Flow Faucet Aerators	19,005	18,906	18,814	18,722	18,629
LED Outdoor Fixtures	7,605	14,484	21,161	26,078	24,502
LED Screw-In Lamps	20,760	19,513	18,277	17,053	15,840
LED Street Lighting	17,083	16,530	15,941	15,311	14,638
High Performance Glazing Systems	5,575	8,854	12,601	19,915	31,999
LED Screw-In Lamps	16,135	15,110	14,101	13,109	12,134
Refrigerated Cases with Doors	13,416	13,416	13,416	13,416	13,416
New Construction (40% More Efficient)	561	2,674	8,009	15,513	24,134
High Efficiency Compressors (Refrigeration)	9,347	9,368	9,389	9,410	9,431
Ground Source Heat Pumps	9,586	9,046	8,511	7,951	7,420
Activate PC Power Management	7,706	7,588	8,110	8,531	8,990
Lighting Controls (Outdoor)	12,729	9,731	6,882	4,659	4,463
Refrigerated Vending Machine Controllers	7,178	7,319	7,460	7,601	7,741
ECM Motors and Evaporator Fan Motor Controllers	6,672	6,574	6,973	6,870	6,768
Heat Pump water Heaters	5,085	5,852	6,062	6,713	7,204
Low-Flow Snowerneads	6,036	5,831	5,640	5,450	5,259
LED High Roy Exturned	6,232	5,870	5,515	5,162	5,122
	5,∠18 0.074	5,059	4,900	4,739	4,007
	2,071	3,437	4,204	5,504	0,443
Cooler Night Covers	4,545	4,303	4,201	3,930	3,033
Radiant Infrared Heaters	3 708	3 700	3 770	4,124	4,130
Refrigeration Controls	3,730	3,733	3,113	3,648	3 660
High Performance T8 Fixtures	3,421 3,6/2	3,042	3,030	3,040 2 /22	3,000
Hotel Occupancy Sensors	3,042	3,500	3,300	3,432	2,337 2 Q/2
ENERGY STAR Dishwashers	3,293 2 868	3,234 2 865	3,174	3,097	2,542
Roof Insulation	2,000	2,000 2 <u>44</u> 1	2 836	3,130	3 625
CEE-Rated Refrigerators and Freezers	2,047	2,441 2 <u>4</u> 78	2,030	2 986	2 986
High-Efficiency Cooking Equipment	1 074	2,770	2,009	2,000	2,300
Drainwater Heat Recovery	822	1.774	2.661	3.548	4,435

Exhibit 48 Economic Potential Electricity Savings by Measure and Milestone Year (MWh/yr.)

Measure	Annual Savings, 2017, (MWh/yr.)	Annual Savings, 2020, (MWh/yr.)	Annual Savings, 2023, (MWh/yr.)	Annual Savings, 2026, (MWh/yr.)	Annual Savings, 2029, (MWh/yr.)
Energy-Efficient Server Technologies	1,423	2,418	2,465	2,511	2,558
Premium Efficiency Motors	714	1,526	2,286	3,041	3,795
Demand Control Kitchen Ventilation (DCKV)	2,390	2,547	2,360	2,088	1,854
ENERGY STAR Office Equipment	907	1,849	1,885	1,921	1,956
Make Use of Daylighting	1,227	1,278	1,320	1,246	1,263
LED High Bay Fixtures	1,345	1,299	1,253	1,208	1,163
Low-Flow Pre-Rinse Spray Valves	1,171	1,160	1,152	1,143	1,135
T5HO Fixtures	1,153	1,075	1,040	963	888
Refrigeration Heat Recovery	931	922	913	905	896
Automatic Door Closers (Walk-In Coolers & Freezers)	669	670	665	666	667
Use Task Light Instead of Ambient	660	651	643	539	524
LED Refrigerated Display Case Lighting	985	792	598	403	207
Reduce Number of Fridges	477	507	538	564	592
LED Exit Signs	572	477	385	296	211
Use Shades/Blinds (Winter)	295	295	294	286	274
Keep Doors Closed (Winter)	189	184	179	167	157
Dimming Control (Daylighting)	112	129	131	133	135
LED Troffers	31	60	89	116	112
Use Shades/Blinds (Summer)	41	44	46	47	48
Use Natural Ventilation (Summer)	20	21	22	23	23
Keep Doors Closed (Summer)	11	12	12	13	13
Freezer Defrost Controllers	-	-	10	9	9
High Efficiency Chillers	5	4	4	3	3
HVAC Impact from Other Savings	- 35,027	- 36,221	- 34,898	- 39,084	- 38,142
Grand Total	743,986	788,639	834,005	892,450	936,317

Exhibit 48 Economic Potential Electricity Savings by Measure and Milestone Year (MWh/yr.) (cont'd)



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Exhibit 50 Economic Potential Savings by Major End Use, Year and Sub sector Type (MWh/yr.)





8.5.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Savings by Milestone Year

The Economic Potential savings increase modestly from about 740 GWh/yr. in 2017 to approximately 940 GWh/yr. in 2029. As such, almost 80% of the savings possible at the end of the study period are already economically viable within the first milestone period. This occurs because it is economically attractive to implement the majority of the efficiency upgrades immediately, before the existing equipment reaches the end of its useful life. Many of the measures pass the economic screen on the basis of their full cost, meaning that under the definition of economic potential they would be implemented in the first year.

Savings by Sub sector

Office Buildings account for about 24% of the potential savings in 2029, with over 10% of the potential savings in Small Offices and 14% of the savings occurring in Large Offices. This reflects their large share of the commercial floor area and energy use. Retail facilities, including Small Non-Food Retail, Large Non-Food Retail, and Food Retail, also account for a significant portion of the overall 2029 savings, at about 20%. Other notable sub sectors include Educational facilities at about 15% and Hospitality and Healthcare facilities each at about 8% of the 2029 economic potential savings.

Savings by Region

The Island Interconnected region accounts for the overwhelming majority of the potential savings in 2029, at about 88%. The Labrador Interconnected region accounts for about 11% of the 2029 potential savings, and the Isolated region accounts for the remaining 1% of the potential savings. This distribution reflects the overall breakdown in the consumption for the three regions but the 2029 potential savings versus the reference case are highest in the Labrador region (36%) and lowest in the Isolated region (32%). The economic potential savings in the Island region in 2029 represent 35% of the reference case consumption in that milestone year.

Savings By Existing Buildings versus New Construction

Savings in existing buildings account for almost all of the savings potential at the beginning of the study period but, as buildings are constructed, the savings potential associated with them occupies a progressively larger portion of the total. By 2029, savings from new buildings account for about 8% of the total economic potential.

Savings by End Use

Savings in the HVAC major end use (which includes space heating, space cooling, and HVAC Fans and Pumps) accounts for 57% of the total electrical savings in the Economic Potential Forecast. Nearly 77% of this savings, or 44% of the overall savings, is from space heating measures, including air source heat pumps (15% of overall savings), ductless minisplit heat pumps (9% of overall savings), recommissioning (5% of overall savings)²⁵, and demand control ventilation (4% of overall savings). Other

Space heating measures dominate the results, including both efficient equipment and building envelope improvements.

space heating measures account for 3% or less of the overall savings. In addition, the "HVAC Impact from Other Savings" measure, which represents increased heating requirements due to less heat being generated in the buildings envelope, accounts for -4% of the overall economic potential savings (i.e. a penalty on the savings).

²⁵ As noted below, the recommissioning measure applies to multiple end uses. As such, it accounts for a larger portion of the economic potential savings. Only the savings that apply to the space heating end use are noted here.
Measures related to HVAC Fans and Pumps account for 12% of the total Economic Potential savings. Recommissioning represents 4% of the overall savings²⁶, while 3% of the overall savings are from VFDs, 2% are from advanced BAS, and another 2% are from programmable thermostats. Space cooling measures account for only 1% of the overall economic potential savings, reflecting the relatively small space cooling load in Newfoundland and Labrador.

The Lighting major end use (which is made up of General Lighting, Secondary Lighting, Outdoor Lighting, and Street Lighting) accounts for 27% of the total electricity savings in the Economic Potential Forecast. General lighting measures account for about 70% lighting savings, followed by outdoor lighting measures (12%), secondary lighting measures (12%), and street lighting measures (6%). LED lighting measures account for about 13% of the total electricity savings at the beginning of the Economic Potential Forecast but fall to 12% by 2029. This is due to the expected natural adoption of LED lighting products or other products of similar efficiency by the end of the study period.

DHW measures account for 5% of the total electricity savings in the Economic Potential Forecast. This is made up of 3% of the overall savings from low flow fixtures, such as showerheads, faucets, and faucet aerators, and 1% of the overall savings from heat pump water heaters. Other DHW measures account for less than 1% of the potential savings.

Measures that pertain to Plug Loads (made up of the Computer Equipment, Computer Servers and Plug Loads end uses) account for 5% of the total electricity savings in the Economic Potential Forecast. Of this, 3% is from ENERGY STAR[®] Computers, 1% is from the behavior measure related to implementing PC power management features and 1% is from vending machine controllers.

Refrigeration measures also account for about 5% of the total electricity savings in the Economic Potential Forecast. Refrigerated display cases, high efficiency compressors and evaporator fan upgrades each account for approximately 1% of these overall economic potential savings. Other refrigeration measures account for less than 1% of total electricity savings.

Some measures are applied across multiple end uses. The energy saving measures applied across multiple end uses include recommissioning, advanced BAS and the high performance new construction (HPNC) measures. Recommissioning accounts for a total of 13% of the electricity savings in the Economic Potential Forecast, while the HPNC measures account for about 8% of the economic savings (i.e. 5% savings from HPNC (25% better) and 3% savings from HPNC (40% better)). The Advanced BAS measure accounts for approximately 5% of the overall economic potential savings.

8.5.3 Caveats on Interpretation of Results

A systems approach was used to model the energy impacts of the efficiency upgrades presented in the preceding section. In the absence of a systems approach, there would be double counting of savings and an accurate assessment of the total contribution of the energy-efficient upgrades would not be possible. More specifically, there are two particularly important considerations:

More than one upgrade may affect a given end use: For example, improved insulation
reduces space heating electricity use, as does the installation of a heat pump. On its own, each
measure will reduce overall space heating electricity use. However, the two savings are not
additive. The order in which some upgrades are introduced is also important. In this study, the

²⁶ As noted below, the recommissioning measure applies to multiple end uses. As such, it accounts for a larger portion of the economic potential savings. Only the savings that apply to the HVAC fans and pumps end use are noted here.

approach has been to select and model the impact of "bundles of measures" that reduce the load for a given end use (e.g., wall insulation and window upgrades that reduce the space heating load) and then to introduce measures that meet the remaining load more efficiently (e.g., a high-efficiency space heating system).

There are interactive effects among end uses: For example, the electricity savings from more efficient lighting result in reduced waste heat. During the space heating season, this waste heat contributes to the building's internal heat gains, which lower the amount of heat that must be provided by the space heating system. Interactive effects have been taken into consideration with the measure "HVAC Impact from Other Savings". The magnitude of the interactive effects can be significant. For example, for low bay lighting measures, it was estimated that a 100 kWh savings in lighting electricity use results, on average, in an increased space heating load of up to 30 kWh (a 60% rate of interaction).

However, it is important to note that assessing the impact of interactive effects in commercial facilities is more complex since heat may be generated in spaces that heat the main conditioned space much less effectively (e.g. high bay fixtures or equipment in mechanical rooms). Interactive effects were captured on a measure by measure basis for measures that were more likely to have an impact on space heating requirements and a 30% heating penalty was assumed for this subset of measures. The subset of measures included low bay lighting measures (i.e. LED screw-in lamps, LED tubular lamps, and high performance T8 fixtures), ENERGY STAR computers and office equipment, and refrigerated vending machine controllers.

The model implements this interaction by multiplying the savings for any relevant measures with significant interactive effects by the 30% factor. This becomes the additional heating load for the building. This is, in turn, multiplied by the space heating electric share for the type of building, because the non-electric heating sources are assumed to provide their share of the additional heating load. Exhibit 48 shows the total heating penalty caused by internal end use savings as a separate line item, just before the grand total. In other words, the heating penalty is not subtracted from the savings of individual measures, but is instead shown as a separate item in the exhibit.

8.6 Electric Peak Load Reductions from Energy Efficiency

Exhibit 52 presents a summary of the peak load reductions that would occur as a result of the electric energy savings contained in the Economic Potential Forecast. The reductions are shown by milestone year and region. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case presented previously in Sections 4 and 6. Exhibit 53 shows the same information graphically for the winter peak period.

Exhibit 52 and Exhibit 53 only approximate the potential demand impacts associated with the energy-efficiency measures because they are based on the assumption that the measures do not change the load shape of the end uses they affect. This is not always correct. For example, most of the heat pump measures will not produce any peak demand savings, because during the winter peak period heat pumps (i.e. air source and ductless mini-splits heat pump measures) will revert to back-up electric resistance heating. As such, there will be no net reduction in space heating peak demand for these measures. Accordingly, the demand reductions for the heat pump measures have been manually filtered out of the results presented in these exhibits.

Exhibit 54 shows the demand reductions associated with each electric energy savings measure contained in the Economic Potential Forecast for the milestone year 2029. The heat pump measures are omitted from the exhibit, as with the previous two exhibits.

One notable line item in the exhibit is "HVAC Impact from Other Savings" - the impact on peak space heating load resulting from the savings for other end uses within the facilities. This is to capture the fact that in an electrically-heated facility, savings of energy consuming devices within the facility will not reduce the winter peak demand. On the coldest winter days, reducing the energy used by a lamp will simply make the electric baseboard beside it work harder. However, heat from lamps and other equipment is often generated in areas where the heat is not useful (e.g. near the ceiling of a warehouse). The non-heating end uses also produce some peak load reductions in other cases, such as facilities that are heated by non-electric fuels, in outside light fixtures, or in heated water that drains out of the facility while still warm. The impact of demand reductions for other end uses on the space heating demand can be seen graphically. As the demand impacts for many of the other end uses rise with time, the demand impacts for space heating actually decreases over time.

Electric peak load reductions related to capacity-only measures are presented separately in Section 8.7.

Exhibit 52 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year, Peak Period and Sub sector (MW)

Sub Sector	Milestone Year	Island	Labrador	Isolated	Grand Total
	2017		mierconnecieu	0	10
	2017	19	0	0	19
Large Office	2020	19	0	0	19
Large Onice	2025	20	0	0	20
	2020	20	0	0	20
	2023	13	0	0	13
	2020	13	0	0	13
Small Office	2023	14	0	0	14
	2026	14	0	0	15
	2029	16	0	0	16
	2017		0	0	9
	2020	8	0	0	9
Large Non-food Retail	2023	8	0	0	9
Ŭ	2026	8	0	0	9
	2029	8	0	0	8
	2017	8	1	0	9
	2020	8	1	0	9
Small Non-food Retail	2023	8	1	0	9
	2026	9	1	0	10
	2029	9	1	0	10
	2017	9	1	0	9
	2020	9	1	0	9
Food Retail	2023	9	1	0	10
	2026	9	1	0	10
	2029	9	1	0	10
	2017	5	1	0	6
	2020	5	1	0	6
Large Accomodation	2023	6	1	0	6
	2026	6	1	0	7
	2029	6	1	0	7
	2017	2	0	0	2
.	2020	2	0	0	2
Small Accomodation	2023	2	0	0	3
	2026	3	0	0	3
	2029	3	0	0	3
	2017	9	0	0	9
l la altha ana	2020	10	1	0	10
nealmcare	2023	10	1	0	11
	2020	11	1	0	12
	2029	12	1	0	12
	2017	12	1	0	13
Schools	2020	12	1	0	13
	2026	13	1	0	13
	2029	13	1	0	14
	2017	14 8	0	0	8
	2020	8	0	0	م
Universities and	2023	8	0	0	8
Colleges	2026	8	0	0	8
	2029	8	0	0	8

Exhibit 52 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year, Peak Period and Sub sector (MW) (cont'd)

Sub Sector	Milestone Year	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
	2017	5	0	0	5
	2020	5	0	0	5
Warehouse/Wholesale	2023	5	0	0	5
	2026	5	0	0	5
	2029	5	0	0	5
	2017	5	0	0	5
	2020	5	0	0	6
Restaurants	2023	6	0	0	6
	2026	6	1	0	6
	2029	6	0	0	7
	2017	0	0	1	1
Labrador Isolated C/I	2020	0	0	1	1
Buildings	2023	0	0	1	1
	2026	0	0	1	1
	2029	0	0	1	1
	2017	0	0	0	0
Island Isolated C/I	2020	0	0	0	0
Buildings	2023	0	0	0	0
	2026	0	0	0	0
	2029	0	0	0	0
	2017	11	3	0	13
Larga Othar Buildings	2020	10	3	0	13
Large Other Buildings	2023	10	3	0	14
	2020	10		0	14
	2023	7	3	0	14
	2020	6	2	0	8
Small Other Buildings	2023	6	2	0	9
	2026	7	2	0	9
	2029	7	2	0	9
	2017	0	1	0	1
	2020	0	2	0	2
Other Institutional	2023	0	3	0	3
	2026	0	5	0	5
	2029	0	5	0	5
	2017	2	0	0	2
	2020	2	0	0	2
Street Lighting	2023	2	0	0	2
	2026	2	0	0	2
	2029	2	0	0	2
	2017	123	10	1	134
	2020	124	12	1	137
Grand Total	2023	127	14	1	142
	2026	131	16	1	148
	2029	136	16	1	153

Notes: 1) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.



Exhibit 53 Electric Peak Load Reductions from Economic Energy Savings Measures, by Milestone Year End Use and Subsector, Winter Peak Period

Measure	Island Interconnected	Labrador Interconnected	Isolated	Grand Total
Building Recommissioning	24	4	0	28
Demand Control Ventilation (DCV)	9	2	0	11
New Construction (25% More Efficient)	11	0	0	11
Programmable Thermostats	9	2	0	11
Advanced Building Automation Systems	10	0	0	10
High Performance Glazing Systems	9	1	0	10
Ventilation Heat Recovery	6	1	0	7
Low-Flow Faucet Aerators	6	1	0	7
Occupancy Sensors (Lighting)	6	1	0	7
New Construction (40% More Efficient)	6	0	0	6
LED Tubular Lamps	5	0	0	5
ENERGY STAR Computers	4	0	0	4
High Performance T8 Fixtures	3	0	0	4
VFDs on HVAC Motors	3	0	0	4
LED Outdoor Fixtures	3	0	0	3
Heat Pump Water Heaters	2	0	0	3
LED Screw-In Lamps	2	0	0	2
Ground Source Heat Pumps	2	0	0	2
LED Street Lighting	2	0	0	2
LED Screw-In Lamps	2	0	0	2
Low-Flow Showerheads	2	0	0	2
Wall Insulation	2	0	0	2
Drainwater Heat Recovery	2	0	0	2
Refrigerated Cases with Doors	2	0	0	2
Radiant Infrared Heaters	1	0	0	1
Activate PC Power Management	1	0	0	1
High-Efficiency Cooking Equipment	1	0	0	1
Refrigerated Vending Machine Controllers	1	0	0	1
ENERGY STAR Dishwashers	1	0	0	1
Roof Insulation	1	0	0	1
High Efficiency Compressors (Refrigeration)	1	0	0	1
LED High Bay Fixtures	1	0	0	1
Controllers	1	0	0	1
Hotel Occupancy Sensors	1	0	0	1
LED Tubular Lamps	1	0	0	1
T5HO Fixtures	1	0	0	1
Lighting Controls (Outdoor)	1	0	0	1
Premium Efficiency Motors	1	0	0	1
Demand Control Kitchen Ventilation (DCKV)	1	0	0	1
High Performance T8 Fixtures	0	0	0	0
Cooler Night Covers	0	0	0	0
Low-Flow Pre-Rinse Spray Valves	0	0	0	0
Refrigeration Controls	0	0	0	0
Energy-Efficient Server Technologies	0	0	0	0

Exhibit 54 Electric Peak Load Reductions from Economic Energy Savings Measures, 2029 (MW)

Measure	Island	Labrador	Isolated	Grand
	Interconnected	Interconnected		Total
CEE-Rated Refrigerators and Freezers	0	0	0	0
Refrigeration Heat Recovery	0	0	0	0
ENERGY STAR Office Equipment	0	0	0	0
Make Use of Daylighting	0	0	0	0
LED High Bay Fixtures	0	0	0	0
T5HO Fixtures	0	0	0	0
Use Task Light Instead of Ambient	0	0	0	0
Reduce Number of Fridges	0	0	0	0
Use Shades/Blinds (Winter)	0	0	0	0
Automatic Door Closers (Walk-In Coolers & Freezers)	0	0	0	0
Keep Doors Closed (Winter)	0	0	0	0
LED Exit Signs	0	0	0	0
LED Refrigerated Display Case Lighting	0	0	0	0
Dimming Control (Daylighting)	0	0	0	0
LED Troffers	0	0	0	0
Use Shades/Blinds (Summer)	0	0	0	0
Use Natural Ventilation (Summer)	0	0	0	0
Keep Doors Closed (Summer)	0	0	0	0
High Efficiency Chillers	0	0	0	0
Freezer Defrost Controllers	0	0	0	0
HVAC Impact from Other Savings	-12	-1	0	-13
Grand Total	136	16	1	153

Exhibit 54 Electric Peak Load Reductions from Economic Energy Savings Measures, 2029 (MW) (cont'd...)

8.7 Summary of Peak Load Reduction

Exhibit 55 compares the Reference Case and Economic Potential Peak Demand Forecast levels of winter peak demand.²⁷ Under the Reference Case, commercial peak demand would grow from the Base Year level of about 520 MW to approximately 600 MW by 2029. This contrasts with the Economic Potential Forecast in which peak demand would decrease to approximately 400 MW for the same period, a difference of approximately 200 MW or about 32%. As illustrated in the exhibit, nearly 80% of this reduction comes from the impact of energy efficiency measures.





²⁷ All results are reported at the customer's point-of-use and do not include line losses.

²⁸ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

8.7.1 Peak Demand Reduction

Further detail on the total potential peak demand reduction provided by the Economic Potential Forecast is provided in the following exhibits:²⁹

- Exhibit 56 presents the results by end use, sub sector and milestone year
- Exhibit 57 provides a further disaggregation of the savings by end use, technology, and milestone year
- Exhibit 58 presents peak demand reduction by major end use, milestone year and supply system
- Exhibit 59 presents peak demand reduction by major end use, milestone year and sub sector
- Exhibit 60 presents peak demand reduction by major end use, milestone year and vintage

²⁹ MW reductions shown in the following exhibits are not incremental. For example, the space heating reductions in 2029 are not in addition to the space heating reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.

Cub contor	Milestone	Domestic Hot	mestic Hot HVAC Fans & Defrice and Se		Secondary Space		Croud Total
Sub sector	Year	Water	Pumps	Refrigeration	Lighting	Heating	Grand Total
	2017	0	0	0	1	0	1
	2020	0	3	0	1	2	5
Large Office	2023	0	3	0	1	2	5
	2026	0	3	0	1	2	5
	2029	0	3	0	1	2	5
	2017	0	0	0	0	0	0
Sub sector Large Office Small Office Carge Non-food Retail Small Non-food Retail Food Retail Large Accomodation Small Accomodation Healthcare	2020	0	0	0	0	1	1
Small Office	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	2	0	0	1	3
Large Non-food Retail	2023	0	2	0	0	1	3
	2026	0	2	0	0	1	3
	2029	0	2	0	0	1	3
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Non-food Retail	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	1	1	0	1	2
Food Retail	2023	0	1	1	0	1	2
	2026	0	1	1	0	1	2
	2029	0	1	1	0	0	2
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	4
Large Accomodation	2023	2	0	0	0	1	4
	2026	2	0	0	0	1	4
	2029	2	0	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	1
Small Accomodation	2023	1	0	0	0	1	2
	2026	1	0	0	0	1	2
	2029	1	0	0	0	1	2
	2017	0	0	0	1	0	1
I la a lel a a su	2020	2	1	0	1	1	4
Healthcare	2023	2	1	0	1	1	4
	2026	2	1	0	1	1	4
	2029	2	1	0	1	1	4
	2017	0	0	0	0	0	0
Sahaala	2020	0	1	0	0	1	2
Schools	2023	0	1	0	0	1	2
	2026	0	1	0	0	2	3
	2029	0	1	0	0	2	3
	2017	0	0	0	0	0	0
Universities and	2020	0	1	0	0	0	2
Colleges	2023	0	2	0	0	0	2
	2020	0	2	0	0	0	2
	2029	0	2	0	0	0	2

Exhibit 56 Total Economic Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Warehouse/Wholesale	2023	0	0	0	0	1	1
	2026	0	0	0	0	0	1
	2029	0	0	0	0	0	1
	2020	4	0	0	0	0	4
Bootouronto	2023	4	0	0	0	0	4
Restaurants	2026	4	0	0	0	0	4
	2029	4	0	0	0	0	4
	2017	0	0	0	0	0	0
Labrador Isolated C/I	2020	0	0	0	0	0	0
Labrador Isolated C/I	2023	0	0	0	0	0	0
bullulliys	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
laland laalated C/l	2020	0	0	0	0	0	0
Buildings	2023	0	0	0	0	0	0
Buildings	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	2	1	0	1	1	5
Large Other Buildings	2023	2	2	0	1	1	5
	2026	2	2	0	1	1	5
	2029	2	2	0	1	1	5
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	3
Small Other Buildings	2023	2	0	0	0	1	3
	2026	2	0	0	0	1	3
	2029	2	0	0	0	1	3
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Other Institutional	2023	0	1	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	3	0	3
	2020	13	10	1	4	13	41
Grand Total	2023	13	11	1	4	13	42
	2026	13	11	1	4	13	42
	2029	13	11	1	4	12	42

Exhibit 56 Total Economic Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Notes:

1) Results are measured at the customer's point-of-use and do not include line losses.

2) Any differences in totals are due to rounding.

3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.
4) MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.

5) The values in this exhibit do not include peak demand reductions from energy efficiency measures.

Measure	Peak Demand Reduction, 2017 (MW)	Peak Demand Reduction, 2020 (MW)	Peak Demand Reduction, 2023 (MW)	Peak Demand Reduction, 2026 (MW)	Peak Demand Reduction, 2029 (MW)
DHW Controls	0	13	13	13	13
Heating Controls	0	13	13	13	12
Lighting Demand Controls	3	4	4	4	4
Refrigeration Demand Controls	0	1	1	1	1
HVAC Demand Controls	0	10	11	11	11
Grand Total	3	41	42	42	42

Exhibit 57 Economic Potential Peak Demand Reduction by Measure and Milestone Year (MW)

Notes:

1) Results are measured at the customer's point-of-use and do not include line losses.

2) Any differences in totals are due to rounding.

3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value.

4) MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented. 5) The values in this exhibit do not include peak demand reductions from energy efficiency measures.

6) Demand-specific measure savings are impacted by the demand savings from conservation measures. The demand reference case to which demand-specific measures are applied already factors in the corresponding Economic Potential demand savings from conservation measures. So the more peak demand reductions are generated through conservation measures, the less peak demand remains for demand-specific measures to reduce.

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8.7.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Peak Demand Reduction by Milestone Year

The Economic Potential peak load reductions increase from about 3 MW in 2017 to 42 MW in 2029. From 2020 onwards, space heating controls, domestic hot water controls, and HVAC fans and pumps controls are cost effective. The CEPR for electric thermal storage systems does not fall below the avoided cost of demand throughout the study period. As such, this measure does not contribute to the economic potential savings.

Peak Demand Reduction by Sub Sector

Offices account for the largest portion of the potential peak load reductions, at 16%. Peak load reductions in the retail sub sectors also account for a significant portion of the overall peak load reductions in 2029 (14%). Other sub sectors with significant contributions to the peak load reductions include hotels (13%), education (11%), restaurants (10%), and healthcare (10%). Peak load reductions in hotels are mostly due to potential DHW and HVAC savings in this sector, while the potential peak reductions in the healthcare and restaurant sub sectors are largely driven by the relatively high domestic hot water consumption in these sub sectors for cooking, sterilization and bathing.

Peak Demand Reduction by Region

The Island Interconnected region accounts for 86% of the 2029 potential peak load reductions, while the Labrador Interconnected region accounts for about 13% of the potential peak load reductions, and the Isolated region contributes less than 1% to the potential peak load reductions in 2029.

Peak Demand Reduction by Existing Buildings versus New Construction

Peak load reductions in existing buildings account for almost all of the reduction potential at the beginning of the study period, but as buildings are constructed, the savings potential associated with them occupies a progressively larger portion of the total reduction potential. By 2029, peak load reductions from new buildings account for about 17% of the total potential peak load reductions.

Peak Demand Reduction by End Use

DHW controls account for 32% of the 2029 load reductions in the Economic Potential Forecast, not including load reductions from energy efficiency measures. Space heating controls and HVAC fans and pumps controls are also significant opportunities, accounting for 30% and 27% of the overall peak demand potential reductions in 2029, respectively (not including load reductions from energy efficiency measures).

8.8 Sensitivity of the Results to Changes in Avoided Cost

The avoided costs used in the Economic Potential model are varied by region and by milestone year. As with any forecast, the projected avoided costs are subject to uncertainty. Accordingly, the model has been re-run with avoided costs varied within a reasonable range. The lower end of this range is considered to be 10% below the current projection, for both energy cost and demand cost. The upper end of the range is considered to be 30% above the current projections for energy cost and 20% above the current projections for demand cost.

Exhibit 61 shows that the results are sensitive to this range of avoided costs. By 2029, the exhibit shows the following changes in potential:

- The lower range of reasonableness produces energy savings that are about 1% lower in the Island Interconnected and Isolated regions and 3% lower in the Labrador Interconnected region.
- The lower range of reasonableness produces peak demand reductions that are 1% lower in the Island Interconnected region and Isolated regions and less than 1% lower in the Labrador Interconnected region.
- The upper range of reasonableness produces energy savings that are 3% higher in the Island Interconnected region, 6% higher in the Labrador Interconnected region, and almost unchanged in the Isolated region.
- The upper range of reasonableness produces peak demand reductions that are 4% higher in the Island Interconnected and Labrador Interconnected regions, and almost unchanged in the Isolated region.
- The small changes in energy savings and peak demand reductions for the different scenarios
 reflect the fact that a large number of measures comfortably fall below the economic screen, as
 shown in the supply curves in Sections 7.5 and 7.6.

		Lower Range of Reasonableness		Base So	cenario	Upper Range of Reasonableness	
Region	Year	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)
	2017	680,044	125	685,417	126	697,977	139
la la u d	2020	706,717	157	712,673	159	728,517	163
Island Interconnected	2023	737,037	161	743,138	162	763,376	167
	2026	770,962	165	785,647	167	803,522	173
	2029	816,944	171	821,902	172	842,106	180
	2017	51,603	10	53,255	10	67,620	15
	2020	64,137	17	70,014	18	89,763	23
Labrador Interconnected	2023	82,534	20	84,367	20	99,758	22
	2026	95,570	21	99,933	21	107,854	22
	2029	104,065	21	107,242	22	113,548	22
	2017	5,291	1	5,315	1	5,344	1
	2020	5,906	1	5,952	1	5,979	1
Isolated	2023	6,423	1	6,500	1	6,516	1
	2026	6,782	1	6,870	1	6,886	1
	2029	7,089	1	7,173	1	7,189	1

Exhibit 61 Sensitivity of the Energy Savings and Peak Demand Reduction to Avoided Cost

9 Achievable Potential: Electric Energy Forecast

9.1 Introduction

This section presents the Commercial sector Achievable Potential for the study period (2014 to 2029). The Achievable Potential is defined as the proportion of the energy-efficiency opportunities identified in the Economic Potential Forecast that could realistically be achieved within the study period.

The remainder of this discussion is organized into the following subsections:

- Description of Achievable Potential
- Approach to the estimation of Achievable Potential
- Achievable Potential Workshop results
- Summary of potential electric energy savings
- Electric peak load reductions for energy efficiency measures
- Summary of peak load reductions
- Sensitivity of the results to changes in avoided cost
- Description of the application of net-to-gross ratios

9.2 Description of Achievable Potential

Achievable Potential recognizes that, in many instances, it is difficult to induce all customers to purchase and install all the energyefficiency technologies that meet the criteria defined by the Economic Potential Forecast. For example, customer decisions to implement energy-efficient measures can be constrained by important factors such as:

- Higher first cost of efficient product(s)
- Need to recover investment costs in a short period (payback)
- Lack of product performance information
- Lack of product availability
- Lack of available financial resources
- Lack of available human resources to implement the project
- Competing priorities for financial and human resources

The rate at which customers accept and purchase energy-efficiency products will be influenced by the level of financial incentives, information and other measures put in place by the Utilities and the Government of Newfoundland, other levels of government, and the private sector to remove barriers such as those noted above.

Exhibit 62 presents the levels of electricity consumption that are estimated in the Achievable Potential scenario. As illustrated, the Achievable Potential scenarios are banded by the two forecasts presented in previous sections: the Economic Potential Forecast and the Reference Case.

As illustrated in Exhibit 62 electric energy savings under the Achievable Potential scenario are less than in the Economic Potential Forecast. In this CDM study, the primary factor that contributes to the outcome shown in Exhibit 62 is the rate of market penetration. In the Economic Potential Forecast, efficient new technologies are theoretically assumed to fully penetrate the market as soon as it is economically attractive to do so. However, the Achievable Potential recognizes that it is unrealistic to expect customers to purchase and install all the electrical energy efficiency technologies that meet the criteria defined by the Economic Potential Forecast.





As also illustrated in Exhibit 62 the Achievable Potential results are presented as a band of possibilities, rather than a single line. This is because any estimate of Achievable Potential over a 20-year period is necessarily subject to uncertainty. Consequently, the results are presented as a range, defined as Lower Achievable and Upper Achievable.

The Lower Achievable Potential assumes Newfoundland market conditions that are similar to those contained in the Reference Case. That is, the customers' awareness of energy-efficiency options and their motivation levels remain similar to those in the recent past, technology improvements continue at historical levels, and new energy performance standards continue as per current known schedules. It also assumes that the ability of the Newfoundland utilities and government to influence customers' decisions towards increased investments in energy-efficiency options remains roughly in line with previous company CDM experience.

The Upper Achievable Potential assumes Newfoundland market conditions that aggressively support investment in energy efficiency. For example, this scenario assumes that real electricity prices increase over the study period. It also assumes that federal and territorial government actions to

mitigate climate change result in increased levels of complementary energy-efficiency initiatives. The upper Achievable Potential typically does not reach economic potential levels; this recognizes that some portion of the market is typically constrained by barriers that cannot realistically be affected by CDM programs within the study period.

9.2.1 Achievable Potential versus Detailed Program Design

It should also be emphasized that the estimation of Achievable Potential is not synonymous with either the setting of specific program targets or with program design. While both are closely linked to the discussion of Achievable Potential, they involve more detailed analysis that is beyond the scope of this study.

Exhibit 63 illustrates the relationship between Achievable Potential and the more detailed program design.



Exhibit 63 Achievable Potential versus Detailed Program Design

This study examined about 80 technologies applicable to commercial electric end uses. Although considerable effort has been made to obtain up-to-date information on each technology and to tailor it to the local market in Newfoundland, this is not a substitute for the type of detailed groundwork needed to prepare a utility program. For each of the technologies selected for further investigation, it will be important to obtain further information on the technical viability and durability of the products in the Newfoundland climate, on the costs in the Newfoundland marketplace, and on real savings under local conditions. If the viability of the technology is confirmed, an assessment of the market barriers is required, leading to the development of program strategies to overcome these barriers.

9.3 Approach to the Estimation of Achievable Potential

Achievable Potential was estimated in a five-step approach.

- Priority opportunities were selected
- Opportunity profiles were created
- Opportunity worksheets were prepared
- A full-day workshop was held
- Workshop results were aggregated and applied to the remaining opportunities.

Further discussion is provided below.

Step 1 Select Priority Opportunities

The first step in developing the Achievable Potential estimates required selection of the energysaving opportunities identified in the Economic Potential Forecasts to be discussed during the Achievable workshop. Several criteria determined selection, including:

- The priority measures should represent a substantial fraction of the overall economic potential
- The priority measures should represent several different energy end uses
- The priority measures should have a variety of different likely patterns of market adoption, so the discussions will be widely varied.

A summary of the selected energy-efficiency actions, along with the approximate percentage that it represents in the Economic Potential Forecast, is provided in Exhibit 64.

			Percentage Economic P	of 2029 Potential
Measure #	Measure	End Use	Consumption Savings	Demand Savings from EE Measures
C1	LED Tubular Lamps	General Lighting	3%	2%
C2	High-Efficiency Air Source Heat Pumps	Space Heating	15%	21%
C3	ECM Motors and Evaporator Fan Motor Controllers	Refrigeration	1%	0%
C4	VFDs on HVAC Motors	HVAC Fans and Pumps	3%	2%
C5	Advanced Building Automation Systems	Multiple	5%	4%
C6	High Performance New Construction (25% Better)	Multiple	5%	5%
C7	PC Power Management	Computer Equipment	1%	1%
C8	High Performance Glazing Systems	Multiple	3%	4%
	Grand Total		36%	39%

Exhibit 64 Commercial Sector Actions – Energy Efficiency

Step 2 Create Opportunity Assessment Profiles

The next step involved the development of brief profiles for each of the opportunities noted above in Exhibit 64, in the form of PowerPoint slides. The slides are presented in Appendix G.

The purpose of the opportunity profiles was to provide a high-level logic framework that would serve as a guide for participant discussions in the Achievable workshop (see Step 4 below). The intent was to define a broad rationale and direction without getting into the much greater detail required of program design, which, as noted previously, is beyond the scope of this project. As illustrated in Appendix G, each opportunity profile addresses the following areas:

- Technology Description: Provides a summary statement of the broad goal and rationale for the action.
- Target Sub sector and Typical Application: Highlights the sub sectors and applications
 offering the most significant opportunities, and which provide a good starting point for discussion
 of the technology.
- Financial and Economic Indicators: Provides estimates of average simple payback, cost of conserved electricity (CCE) and basis of assessment (full-cost versus incremental).
- Eligible Participants: Provides an estimate of the sub sectors that could be affected during the study period if the entire Economic Potential were to be captured.
- Economic Potential versus Time: Shows the pattern of the changing size of the opportunity over the study period, for existing and new buildings. Some opportunities grow steadily through the study period, as more and more equipment reach the age when they would be replaced. Other opportunities are economical to capture immediately, and after that the growth over time is limited to opportunities in new buildings being built. Still other opportunities decline with time as they are eroded by natural conservation activities.

Step 3 Prepare Opportunity Worksheets

A draft assessment worksheet was also prepared for each opportunity profile in advance of the Achievable workshop. The assessment worksheets complemented the information contained in the opportunity profiles by providing quantitative data on the potential electric energy savings for each opportunity as well as providing information on the size and composition of the eligible population of potential participants. Energy impacts and population data were taken from the detailed modelling results contained in the Economic Potential Forecast.

The worksheets, including the results recorded during the workshop discussions, are provided in Appendix H. As illustrated in Appendix H, each opportunity assessment worksheet addresses the following areas:

- Approximate Cost of Conserved Electricity: Shows the approximate levelized cost of saving each kWh of electricity saved by the measure. For the purposes of the workshop, this information provided participants with an indication of the cost-effectiveness of measures in certain scenarios.
- Customer Payback: Shows the simple payback from the customer's perspective for the package of energy-efficiency measures included in the opportunity. This information provided an indication of the level of attractiveness that the opportunity would present to customers. This

provided an important reference point for the workshop participants when considering potential participation rates. When combined with the preceding CCE information, participants were able to roughly estimate the level of financial incentives that could be employed to increase the opportunity's attractiveness to customers without making it economically unattractive to the Newfoundland utilities.

- Economic Potential in Terms of Applicable Participants (e.g., number of sites): Shows the total number of potential participants in terms of either sites or equipment (as appropriate) that could theoretically take part in the opportunity. Numbers shown are from the eligible populations used in the Economic Potential Forecasts.
- Participation Rates (%): These fields were filled in during the workshops (described below in the following step), based on input from the participants. They show the percentage of economic savings that workshop participants concluded could be achievable in the last milestone period (usually 2029, but may be earlier for measures that peak earlier).
- Achievable Potential in Terms of Applicable Participants (e.g., number of sites): These fields were calculated by the spreadsheet based on the participation rates provided by the participants.
- Participation Rates Relative to the Discussion Scenario: These fields were filled in during the workshops to provide guidance to the consulting team on how participation might differ in other regions or sub sectors, or for related or similar technologies.
- Other Parameters: These fields were filled in during the workshop to capture highlights of the discussion.

Step 4 Conduct Achievable Workshop

The most critical step in developing the estimates of Achievable Potential was a one-day Achievable Potential workshop that was held on April 22, 2015. Workshop participants consisted of core members of the consultant team, CDM program and technical personnel from the Utilities, industry representatives, and representatives of other stakeholders. Together, the participating personnel brought many years of experience to the workshop related to the technologies and markets.

The purpose of this workshop was to:

- Promote discussion regarding the technical and market constraints confronting the identified energy-efficiency opportunities
- Identify potential strategies for addressing the identified constraints, including potential partners and delivery channels
- Compile participant views related to how much of the identified economic savings could realistically be achieved over the study period.

Following a brief consultant presentation that summarized the Commercial sector study results to date, the workshop provided a structured assessment of each of the selected opportunities. Opportunity assessment consisted of a facilitated discussion of the key elements affecting successful promotion and implementation of the CDM opportunity. More specifically:

- What are the major constraints/challenges constraining customer adoption of the identified energy-efficiency opportunities?
 - How big is the "won't" portion of the market for this opportunity?
- Preferred strategies and potential partners for addressing identified constraints (high level only)

- Key criteria that determine customers' willingness to proceed
- Key potential channel partners
- Optimum intervention strategies e.g., push, pull, combination
- How sensitive is this opportunity to incentive levels?

Following discussion of market constraints and potential intervention strategies, the participants' views on potential participation rates were recorded. The process involved the following steps:

- The participation rate for the upper Achievable scenario in 2029 was estimated.
- The shape of the adoption curve was selected for the upper Achievable scenario. Rather than seek consensus on the specific values to be employed in each of the intervening years, workshop participants selected one of four curve shapes that best matched their view of the appropriate "ramp-up" rate for each opportunity (see Exhibit 65 below).
- The process was then repeated for the lower Achievable scenario.
- Once participation rates had been established for the specific technology, sub sector and service
 region selected for the opportunity discussion, workshop participants provided the consultants
 with guidelines for extrapolating the discussion results to the other sub sectors and service
 regions included in the opportunity, but not discussed in detail during the workshop. Where time
 permitted, participants also discussed how the adoption of similar, related technologies might
 differ from the technology being discussed.

Exhibit 65 Participation Rate "Ramp Up" Curves



Curve A represents a steady increase in the expected participation rate over the study period.

Curve B represents a relatively slow participation rate during the first half of the study period followed by a rapid growth in participation during the second half of the 20-year study period.

Curve C represents a rapid initial participation rate followed by a relatively slow growth in participation during the remainder of the study period.

Curve D represents a very rapid initial participation rate that results in virtual full saturation of the applicable market during the first half of the study period.

Step 5 Aggregate and Extend Opportunity Results

The final step involved aggregating the results of the individual opportunities to provide a view of the potential Achievable in both the Residential and Commercial sectors.

9.4 Achievable Workshop Results

The following sub-sections present a summary of the workshop discussions for each of the commercial opportunities listed in Exhibit 64 above. The adoption rates and curves selected by the participant are summarized in Section 0. Included for each opportunity are:

- Participation estimates (for 2029) made by workshop participants, with comments, where needed, about values assumed in the calculations (presented in Section 0).
- Where needed, additional participation estimates made after the workshop for the purposes of the calculations (presented in Section 0).
- Selected highlights that attempt to capture key discussion themes related to the opportunity.

Appendix H provides copies of the assessment worksheets used during the workshop.

9.4.1 LED Tubular Lamps

For this technology, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 70% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C in the upper Potential scenario and B in the lower potential scenario.

Barriers that tend to lower adoption included the high cost of implementation, the lack of proper incentives, limited customer awareness of LED replacements for fluorescent tubes and public tendering act limitations. Uptake of this technology is limited due to the current economic crunch and in a lot of cases the lowest cost technology must be selected in some facilities where the public tendering act limits the technology that will be implemented. Since LED tubular lamp replacements for fluorescent tubes have not been around for very long, there is limited customer awareness of this particular option while others are still waiting for the LED technology to mature. In addition, workshop participants indicated that it is difficult for utilities to get in touch with the right contacts at the commercial facilities and while the Government in the province may tend to adopt such technologies quickly, the private sector is lagging behind.

Participants suggested that financial barriers could be addressed by using non-energy benefits to help sell the technology and spreading the word through implementers and lighting distributors. With no incentives in place, there are currently a limited number of individuals going to the marketplace to make the case for LED tubular lamps. As such, incentives are key to the overall strategy and there is a high sensitivity to this. Participants believed some facilities may be overlit already, which allows for a deeper savings opportunity. Government agencies are also much more developed than they were 20 years ago and they can be an important partner in spreading the word. Participants believed that this technology is changing very rapidly and the cost is coming down quite quickly.

The initial discussion focused on large offices on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail sector, higher for the healthcare and education sectors and lower for warehouses and restaurants. Participants also discussed some of the other lighting measures. The adoption of LED Lamps, LED High Bay Fixtures and LED outdoor fixtures were expected to occur at a higher rate while reduced wattage T8 fixtures were expected to have a lower adoption rate. LED low bay fixtures were thought to be adopted at a similar rate.

9.4.2 High-Efficiency Air Source Heat Pumps

For this technology, achievable workshop participants provided 2029 participation rate estimates of 60% for the upper Achievable Potential scenario and 20% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve in both the upper scenario and lower scenarios would be Curve B.

Participants believed that this technology is fairly mature but that the existing infrastructure is fairly old. They also indicated that rooftop units (RTUs) are not very prevalent in large offices and the savings may not be as significant in some retail applications since lighting and internal loads create quite a bit of heat. As such, the heating systems don't need to work as hard as one might expect. Participants indicated that variable refrigerant technology may make more sense in certain applications and that there is about 15% penetration of air source heat pumps (ASHPs) currently, although this may be limited to smaller RTUs. In particular, participants indicated that restaurants are starting to adopt this technology.

Barriers that tend to lower adoption included infrastructure limitations in offices, high maintenance costs, lack of awareness and lack of a push for this technology from HVAC contractors. ASHP's are not practical for many offices since RTUs aren't too common and zoning would be required. In addition, due to most office buildings being leased it is likely that landlords would implement low cost equipment instead. Participants also believed that chains from other jurisdictions have natural gas space heating and may not be aware that there is an opportunity in electric space heating. Finally, participants indicated that many schools in the province are not allowed to be air conditioned. As such, air conditioning capabilities would need to be disabled in these applications.

The initial discussion focused on food retail facilities on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the non-food retail and school sectors, higher for the small office, large accommodations, and restaurant sectors and lower for large offices, small accommodations, healthcare, universities, and warehouses. Participants also discussed some of the other heating measures. The adoption of ductless mini-split heat pumps were expected to occur at a higher rate, while ground source heat pumps, high efficiency RTUs and high efficiency chillers were expected to have a lower adoption rate.

9.4.3 ECM Motors and Evaporator Fan Motor Controllers

For this technology, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 25% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve in both the upper and lower Achievable Potential scenarios would be B.

Participants noted that many larger facilities will already possess sophisticated equipment and have the support of qualified maintenance personnel. Smaller communities in Isolated regions have a lot of residential style equipment rather than centralised systems. Older equipment is also much less likely to be retrofitted.

Barriers that tend to lower adoption included implementation cost, especially in smaller facilities, long payback periods, and a lack of awareness of the technology. In addition, many smaller retailers lease space and landlords are unwilling to make the investments in improvements when tenants pay the energy bills. Existing service contracts for refrigeration systems can also restrict retrofits, and participants believe that the technology may not be as widely available as necessary. There may

also be a perception among retailers that modifications to refrigeration systems can increase the risk of food spoiling.

Participants identified the need for two different strategies, one tailored to large facilities and another for smaller businesses.

The initial discussion focused on the food retail sector on the Island grid. Participants believed that participation would be somewhat lower in Labrador and much lower in the Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be somewhat the same for large accommodations and universities, higher for warehouses, and lower for non-food retail and restaurants. Participants also discussed some of the related refrigeration measures. The adoption of LED refrigeration lighting and CEE rated fridges and freezers were expected to occur at a higher rate, while refrigerated display cases with doors, floating head pressure controls, defrost controllers, automatic door closers, and night covers were expected to be adopted more slowly. High efficiency compressors were expected to have a similar adoption rate to ECM Motors and Evaporator Fan Motor Controllers.

9.4.4 VFDs on HVAC Motors

For this technology, achievable workshop participants provided 2029 participation rate estimates of 70% for the upper Achievable Potential scenario and 5% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Participants report that awareness of this measure is quite high, and it is commonly implemented on both fan and pump systems. Implementation is straightforward in many facilities, but significant additional retrofits are required in some cases.

Barriers that tend to lower adoption include high implementation costs in certain situations, and landlords are less likely to make energy efficiency improvements in leased properties. Currently VFDs are only incented under the takeCHARGE Custom Program, which some contractors may not be aware of, and this may be slowing the adoption of VFDs.

Participants suggest that prescriptive incentives may make funding more accessible, but there are potential concerns with the variability of the savings. Other strategies for increasing adoption include working with contractors to drum up sales and awareness, bundling with other retrofit measures, and an increased number of energy audits in order to identify retrofit opportunities.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail sectors, lower for small offices, and higher for large accommodations, healthcare, schools, and universities. Participants also discussed some of the related HVAC measures. The adoption of high efficiency motors is expected to occur at a higher rate, while lower adoption rates are expected for demand controlled ventilation (DCV) and kitchen fume hood DCV.

9.4.5 Advanced Building Automation Systems

For this technology, achievable workshop participants provided 2029 participation rate estimates of 70% for the upper Achievable Potential scenario and 20% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Barriers that tend to lower adoption include a lack of familiarity and trust of the technology among building operators, a lack of training for operators in the use of sophisticated control systems, a negative perception of the technology due to improperly installed and operated systems, and a reluctance among building owners to sign up for service contracts with controls suppliers. Equipment can also be relatively easily overridden which both erodes savings from installed systems and discourages the adoption of the technology.

Strategies to mitigate these barriers include ensuring that equipment is being well maintained and that there is a service contract in place, increased education for both building operators and contractors, and improved commissioning and continuous optimisation. Participants suggested that advanced BAS controls can be bundled with a recommissioning program.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be similar in Labrador and lower in the Isolated regions because of the difficulty of finding materials and qualified installers in these communities. Participants also believed that participation would be similar for the retail, large accommodation and school sectors, higher for healthcare, lower for small offices and universities, and much lower for warehouses. Participants also discussed some of the related controls measures. The adoption of hotel occupancy controls is expected to occur at a lower rate, daylighting controls at the same rate, and higher adoption rates are expected for programmable thermostats, and indoor and outdoor lighting controls.

9.4.6 High Performance New Construction

For this measure, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 50% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C for the upper achievable scenario and A for the lower achievable scenario.

The primary barrier to implementation is the incremental cost of high performance new construction. Additionally, high performance building rating systems like LEED include many measures that don't improve energy efficiency. Participants also noted that if energy efficiency improvements are missed at the time of new construction, it represents a major lost opportunity.

Participants indicated that much of the recent new construction in the province has been for government buildings, and many of these are being built to high energy efficiency standards which is pushing the local industry to adopt better building standards overall. Strategies to encourage further adoption include presenting the non-energy benefits as part of the business case, including the ability to rent high performance buildings at a premium. Expert engineering consultants are considered key to successfully delivering projects, and increased training for building owners and the design community would help, particularly workshops on how to deal with the administrative burden of certification or strategies to implement energy efficiency outside of established rating systems.

The initial discussion focused on large offices on the Island grid. Participants believed participation would be similar in Labrador and lower in Isolated regions. Participants also believed that participation would be higher for schools and universities, but lower in all other sub sectors. The adoption of high performance new construction practices that result in energy efficiency that is 40%

better than code are expected to be adopted at a much lower rate than practices that are 25% better than code.

9.4.7 PC Power Management

For this measure, achievable workshop participants provided 2029 participation rate estimates of 50% for the upper Achievable Potential scenario and 10% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be B for both scenarios.

Barriers that tend to lower adoption included the potential for IT departments needing to make updates during off hours, individuals overriding power management settings, and the increased use of remote work computers limiting the proportion of computer equipment that can be shut down.

Strategies to encourage adoption include driving implementation through the IT department and educating users in order to ensure the persistence of savings. Holding competitions among users, for example between different floors of an office building, can encourage participation.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be somewhat lower in the Labrador and Isolated regions. Participants also believed that participation would be similar for small offices, schools, and universities while participation is expected to be lower for all other sub sectors. Participants also discussed some of the related behavioural measures. The adoption of ENERGY STAR® certified computers, office equipment, and servers is expected to be similar, while the use of task lighting, natural ventilation, and keeping doors closed is expected to be lower.

9.4.8 High Performance Glazing Systems

For this measure, achievable workshop participants provided 2029 participation rate estimates of 80% for the upper Achievable Potential scenario and 10% for the lower Achievable Potential scenario. Participants thought the most likely adoption curve would be C for the upper achievable scenario and B for the lower achievable scenario.

Barriers that tend to lower adoption include some presence of low quality products in the market, a lack of awareness about competitively priced high efficiency options, and a higher first cost. Landlords are also less likely to implement energy efficiency measures in leased buildings. Currently high performance glazing systems are only incented under the takeCHARGE Custom Program, which has seen a very low uptake to date.

Strategies to improve adoption include engaging architects and contractors as partners to promote high efficiency glazing options, ensuring that high efficiency glazing is specified during design, and promoting the non-energy benefits such as improved occupant comfort.

The initial discussion focused on the large office sector on the Island grid. Participants believed that participation would be higher in the Labrador and Isolated regions. Participants also believed that participation would be similar for large accommodations, higher for healthcare, schools, and universities, and lower for small offices, retail, small accommodations, warehouses, and restaurants. Participants also discussed some of the related whole building measures. The adoption of wall insulation and roof insulation is expected to be similar, while the penetration of recommissioning is expected to be higher.

9.4.9 Aggregate Results

Exhibit 66 summarizes the participant rate and "ramp up" curve assumptions discussed above.

	Lower Potentia	I Scenario	Upper Potential Scenario		
Technology	2029 Participation Factor	Adoption Curve	2029 Participation Factor	Adoption Curve	
C1: LED Tubular Lamps	70%	Curve B	80%	Curve C	
C2: High-Efficiency Air Source Heat Pumps	20%	Curve B	60%	Curve B	
C3: ECM Motors and Evaporator Fan Motor Controllers	25%	Curve B	80%	Curve B	
C4: VFDs on HVAC Motors	5%	Curve B	70%	Curve B	
C5: Advanced Building Automation Systems	20%	Curve B	70%	Curve B	
C6: High Performance New Construction	50%	Curve A	80%	Curve C	
C7: PC Power Management	10%	Curve B	50%	Curve B	
C8: High Performance Glazing Systems	10%	Curve B	80%	Curve C	

Exhibit 66 Summary of Achievable Potential Participation Rates and Curves

As noted earlier, it was not possible to fully address all opportunities in the one-day workshop. Consequently, the workshop focused on opportunities selected based on the criteria described in Step 1. Estimated participation rates for the remaining opportunities were extrapolated from the workshop results shown above and an aggregate set of results was prepared that included all of the eligible technologies.

The results shown in the attached appendices and in the following summary section incorporate the results of all these inputs.

9.5 Summary of Potential Electric Energy Savings

This section presents a summary of the electric energy savings for the upper and lower achievable potential scenarios. The summary is organized and presented in the following sub-sections:

- Overview and selected highlights
- Electric energy savings Upper Achievable scenario
- Electric energy savings Lower Achievable scenario.

It should be noted that measures are applied separately for each combination of region, sub sector, and milestone year. Some of the parameters that are used to assess measures in each circumstance can vary. For example, the potential savings or cost for a measure in one sub sector or region may be different from the savings or cost in another sub sector or region. In addition, the economic threshold value that is used to assess cost-effectiveness varies for each of the milestones. As such, measures that are marginally cost-effective, such as multi-split heat pumps, are only cost-effective in a subset of the regions, sub sectors, and milestone years being considered.

9.5.1 Overview and Selected Highlights

Exhibit 67 presents an overview of the results for the total Newfoundland service territory by milestone year, for three scenarios: Economic Potential, upper Achievable Potential and lower Achievable Potential.

	Economic Potential Scenario		Upper A Potentia	chievable I Scenario	Lower Achievable Potential Scenario		
Year	Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	Potential Savings (GWh/yr.) % Savings Relative to Reference Case		Potential Savings (GWh/yr.)	% Savings Relative to Reference Case	
2017	744	31%	56	2.3%	8	0.3%	
2020	789	32%	149	6.0%	32	1.3%	
2023	834	32%	280	11%	73	2.8%	
2026	892	34%	456	17%	137	5.2%	
2029	936	35%	640	24%	209	7.8%	

Exhibit 67 Electricity Savings by Milestone Year for Three Scenarios (GWh/yr.)

Selected Highlights – Potential Electric Energy Savings

Selected highlights of the potential electric energy savings for the upper and lower achievable potential scenarios shown in Exhibit 67 are summarized below. Further detail is provided in the following sub-sections and in the accompanying appendices.

Savings by Milestone Year

Savings in both Achievable scenarios are achieved somewhat more steadily throughout the period than in the Economic Potential scenario. In the upper Achievable Potential scenario, 23% of the 2029 savings would be achieved by 2020, rising to 44% in 2023 and 71% by 2026. In the lower Achievable Potential scenario, 15% of the 2029 savings would be achieved by 2020, rising to 35% in 2023 and 66% by 2026. Although there are some measures in both scenarios that can be implemented early in the study period, the majority are expected to follow an adoption curve that starts slowly and builds up towards 2029.

Savings by Sub Sector

Offices account for the largest portion of achievable savings with 21-23% of the achievable potential savings coming from this sector. Of this, large offices account for approximately 13% and 11% of the upper and lower Achievable Potential savings, respectively, and small offices account for 10% each of the upper and lower achievable potential savings. This reflects the larger market share of offices and their generally higher level of energy intensity. The retail sector accounts for 19-21% of the achievable potential savings with 6% of savings in large non-food retail for both scenarios, 7% savings in small non-food retail for both scenarios and 7% and 8% savings in food retail for the upper and lower scenarios respectively. Educational facilities also provide for a total of 16 -17% of achievable potential savings, respectively, and Universities and colleges accounting for 6% each of the upper and lower achievable potential savings.

Savings by Region

The Island Interconnected region accounts are expected to comprise 88% of potential savings in 2029. The Labrador Interconnected region accounts provides 11% of the savings, and the Isolated region provides 1% of the potential savings in 2029.

Savings by End Use

Savings in the HVAC major end use (which includes space heating, space cooling, and HVAC Fans and Pumps) account for 57% of the upper achievable savings and 38% of the lower achievable savings in 2029. Space heating is the biggest contributor, at 42% of the overall upper achievable savings and 29% of the overall lower Achievable Potential savings. HVAC Fans and Pumps savings account for 13% of the overall 2029 upper Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings and 8% of the overall lower Achievable Potential savings. The most significant measures that save HVAC include ductless minisplit heat pumps, building recommissioning, air source heat pumps, demand control ventilation, and programmable thermostats.

Although HVAC accounts for a very large percentage of the potential, the space heating savings potential is also a very large percentage of the reference case space heating consumption. Between 7% and 32% of HVAC consumption could potentially be saved, respectively, in the lower and upper Achievable Potential scenarios.

Lighting savings accounts for 32% of the upper achievable savings and 53% of the lower achievable savings. Of this, the General Lighting savings accounts for 22% of the upper Achievable Potential savings in 2029 and 32% of the lower Achievable Potential savings. The most significant lighting savings come from LED lighting measures, building recommissioning, lighting occupancy sensors, and T8 Fixtures. Secondary Lighting accounts for 4% of the upper Achievable Potential savings and 10% of the lower Achievable Potential savings in 2029. The most significant savings for secondary lighting come from LED lighting measures. Street Lighting accounts for 2% of the upper Achievable Potential savings and 6% of the lower Achievable Potential savings. The potential reduction for street lighting comes solely from the LED Street Lighting measure.

Refrigeration accounts for 5% of each of the 2029 upper Achievable Potential savings and lower Achievable Potential savings. The most significant refrigeration measures are the refrigerated display cases, high efficiency compressors and the evaporator fan upgrades measure (ECM Motors and Evaporator Fan Motor Controllers).

The remaining major end uses are all under 5% in both scenarios. There are savings available in three other major end uses, including Domestic Hot Water, Food Service, and Plug Loads. Together they account for 7% of upper Achievable Potential savings in 2029 and 4% of lower Achievable Potential savings in 2029.

Savings by Measure

The most significant savings in the Achievable Potential come from the following measures:

- **Building recommissioning**, which accounts for 20% of the upper Achievable Potential savings in 2029 and 9% of the lower Achievable Potential savings in 2029
- Ductless mini-split heat pumps, which account for 10% of the upper Achievable Potential savings in 2029 and 11% of the lower Achievable Potential savings in 2029
- Programmable Thermostats, which accounts for 6% of each of the upper Achievable Potential savings and lower Achievable Potential savings in 2029
- Air Source Heat Pumps, which accounts for 6% of the upper Achievable Potential savings in 2029 and 7% of the lower Achievable Potential savings in 2029
- Advanced BAS, which accounts for 6% of each of the upper Achievable Potential savings and lower Achievable Potential savings in 2029
- Lighting Occupancy sensors, which accounts for 5% of the upper Achievable Potential savings in 2029 and 4% of the lower Achievable Potential savings in 2029
- High performance new construction (25% better), which accounts for 5% of the upper Achievable Potential savings in 2029 and 8% of the lower Achievable Potential savings in 2029
- LED tubes (applied to general and secondary lighting), which accounts for 5% of the upper Achievable Potential savings in 2029 and 10% of the lower Achievable Potential savings in 2029
- LED lamps (applied to general and secondary lighting), which accounts for 4% of the upper Achievable Potential savings in 2029 and 11% of the lower Achievable Potential savings in 2029

There are numerous other smaller measures that contribute to the overall Achievable Potential results.

9.5.2 Electric Energy Savings – Upper Achievable Scenario

The following exhibits present the potential electricity savings³⁰ under the upper Achievable Potential scenario. The results shown are relative to the Reference Case. The results are broken down as follows:

- Exhibit 68 presents the results by region and by milestone year
- Exhibit 69 presents the results for the total NL service territory by sub sector and milestone year
- Exhibit 70 presents the results for the total NL service territory by end use and milestone year
- Exhibit 71 presents the results for the total NL service territory by technology and milestone year.

Region	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	Percentage of Total 2029 Savings
Island Interconnected	52,821	137,859	255,655	407,167	566,388	24%	88%
Labrador Interconnected	2,763	10,142	22,594	45,474	70,163	24%	11%
Isolated	634	1,384	2,185	3,027	3,890	17%	1%
Grand Total	56,218	149,386	280,435	455,668	640,441	24%	100%

Exhibit 68 Upper Achievable Electricity Savings by Region (MWh/yr.)

³⁰ Note: A value of "0" in the following exhibits means a relatively small number, not an absolute value of zero.

Sub Sector	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Large Office	5,972	16,935	33,303	56,863	80,714	25%	13%
Small Office	4,344	13,029	26,310	44,485	64,337	28%	10%
Large Non-food Retail	3,909	9,491	16,928	25,828	35,879	25%	6%
Small Non-food Retail	3,866	9,947	18,305	30,723	42,647	26%	7%
Food Retail	3,481	10,040	19,787	31,915	45,989	23%	7%
Large Accomodation	2,626	6,740	12,238	18,636	26,101	33%	4%
Small Accomodation	703	1,559	2,650	3,948	5,393	17%	1%
Healthcare	4,110	12,952	25,506	40,432	56,049	33%	9%
Schools	4,772	15,172	30,587	49,433	70,032	35%	11%
Universities and Colleges	3,683	9,793	18,078	28,355	39,881	30%	6%
Warehouse/Wholesale	2,324	5,191	8,925	13,422	18,393	20%	3%
Restaurants	1,473	3,655	6,850	10,856	15,287	12%	2%
Labrador Isolated C/I Buildings	581	1,270	2,008	2,783	3,579	17%	1%
Island Isolated C/I Buildings	53	114	178	244	311	16%	0%
Large Other Buildings	4,573	12,327	23,578	38,402	55,173	23%	9%
Small Other Buildings	3,294	8,581	16,430	28,921	41,187	21%	6%
Other Institutional	365	2,115	5,516	15,870	24,997	29%	4%
Street Lighting	6,088	10,474	13,256	14,552	14,491	40%	2%
Grand Total	56,218	149,386	280,435	455,668	640,441	26%	100%

Exhibit 69 Upper Achievable Electricity Savings by Sub sector and Milestone Year (MWh/yr.)

Note: Any difference in totals is due to rounding.

Exhibit 70 Upper Achievable Electricity Savings by End Use and Milestone Year (MWh/yr.)

End Use	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Space Heating	5,847	37,190	94,421	173,631	269,770	35%	42%
Space Cooling	353	1,455	3,340	5,909	9,053	19%	1%
Secondary Lighting	10,833	18,230	22,812	24,915	25,251	20%	4%
Refrigeration	1,310	5,087	11,544	20,102	30,448	15%	5%
Outdoor Lighting	3,029	8,494	15,338	21,245	23,345	49%	4%
Other Plug Loads	237	968	2,222	4,028	6,416	9%	1%
HVAC Fans & Pumps	3,337	13,675	31,083	55,554	85,286	25%	13%
General Lighting	23,528	47,516	73,094	112,552	140,673	33%	22%
Food Service Equipment	21	102	282	389	389	0%	0%
Domestic Hot Water	1,026	4,297	9,967	17,954	28,026	22%	4%
Computer Servers	28	107	115	130	153	1%	0%
Computer Equipment	581	1,791	2,959	4,709	7,139	6%	1%
Street Lighting	6,088	10,474	13,256	14,552	14,491	40%	2%
Grand Total	56,218	149,386	280,435	455,668	640,441	26%	100%

Note: Any difference in totals is due to rounding.

Exhibit 71 Upper Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.)

Мараниа	Year					Adoption	Weighted Average CCE		
measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Energy-Efficient Server Technologies	28	107	115	130	153	В	0.0	0.0	N/A
Use Natural Ventilation (Summer)	0	2	4	7	10	В	0.0	0.0	N/A
Activate PC Power Management	185	780	1,852	3,433	5,598	В	0.0	0.0	0.0
Use Task Light Instead of Ambient	16	62	128	185	254	В	0.0	0.0	N/A
Use Shades/Blinds (Summer)	1	3	7	12	19	В	0.0	0.0	N/A
Use Shades/Blinds (Winter)	8	32	68	108	145	В	0.0	0.0	0.0
Make Use of Daylighting	30	117	250	393	561	В	0.0	0.0	0.0
Keep Doors Closed (Summer)	0	1	2	3	5	В	0.0	0.0	N/A
Keep Doors Closed (Winter)	4	16	35	58	80	В	0.0	0.0	N/A
ENERGY STAR Computers	378	921	1,010	1,168	1,415	В	0.0	0.0	0.0
ENERGY STAR Office Equipment	18	90	97	108	125	В	0.0	0.0	0.0
Reduce Number of Fridges	7	28	68	126	207	В	0.0	0.0	N/A
Low-Flow Showerheads	170	678	1,516	2,663	4,088	В	0.1	0.1	0.1
Low-Flow Faucet Aerators	588	2,348	5,273	9,347	14,544	В	0.2	0.1	0.1
Lighting Controls (Outdoor)	458	1,551	2,769	3,819	5,378	В	0.4	0.4	0.7
Low-Flow Pre-Rinse Spray Valves	37	149	335	594	923	В	0.4	0.5	1.1
Cooler Night Covers	149	578	1,236	2,041	2,894	В	0.7	0.7	0.7
Automatic Door Closers (Walk-In Coolers & Freezers)	18	70	154	264	393	В	1.2	1.2	N/A
LED Screw-In Lamps	6,843	11,430	14,044	14,968	14,474	С	1.7	1.6	1.6
Programmable Thermostats	2,091	8,157	17,286	28,318	39,705	В	1.7	2.0	1.4
High-Efficiency Air Source Heat Pumps	978	4,514	11,628	23,109	39,600	В	2.0	0.9	9.1
LED Screw-In Lamps	5,507	9,166	11,224	11,922	11,491	С	2.2	2.2	2.1
Refrigerated Vending Machine Controllers	230	939	2,154	3,901	6,209	В	2.6	2.6	2.6
High Efficiency Compressors (Refrigeration)	342	1,352	2,988	5,176	7,817	В	2.7	2.7	N/A
Heat Pump Water Heaters	125	523	1,139	2,042	2,979	В	2.7	3.9	12.2
High-Efficiency Cooking Equipment	21	102	282	389	389	В	2.8	2.7	N/A
High Performance T8 Fixtures	908	1,581	2,038	2,279	2,323	С	3.0	3.0	3.3
LED Outdoor Fixtures	2,562	6,843	12,228	16,737	16,806	С	3.0	2.9	11.3
VFDs on HVAC Motors	772	3,087	6,946	12,361	19,315	В	3.0	3.1	3.1
New Construction (25% More Efficient)	232	2,664	8,851	17,383	29,530	С	3.1	3.0	3.8
Building Recommissioning	6,339	24,394	51,663	89,675	126,323	В	3.2	4.0	2.8
Wall Insulation	731	1,216	1,853	2,918	3,790	С	3.2	3.6	5.6
Roof Insulation	545	795	1,123	1,498	1,888	С	3.5	2.5	4.9
LED Exit Signs	170	251	266	233	173	С	3.8	3.8	3.8
Hotel Occupancy Sensors	72	267	550	885	1,188	В	3.9	2.9	N/A
Premium Efficiency Motors	25	132	360	765	1,397	В	4.0	4.2	4.3
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Exhibit 71 Upper Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.) (cont'd...)

Марания			Year			Adoption	Weigh	e CCE	
Measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
High Performance Glazing Systems	1,620	3,544	6,313	11,969	22,110	С	4.2	5.8	3.1
Demand Control Kitchen Ventilation (DCKV)	60	252	531	843	1,145	В	4.2	4.2	N/A
T5HO Fixtures	946	1,642	2,030	2,148	2,063	С	4.5	4.5	4.5
Refrigeration Controls	121	492	1,058	1,764	2,531	В	4.5	4.5	N/A
Occupancy Sensors (Lighting)	1,419	5,417	11,949	20,758	31,654	В	4.5	4.8	5.3
Drainwater Heat Recovery	13	73	199	423	773	В	4.5	4.5	4.5
ECM Motors and Evaporator Fan Motor Controllers	237	927	2,140	3,682	5,538	В	4.7	4.7	4.7
LED High Bay Fixtures	1,782	3,016	3,784	4,144	4,143	С	4.8	2.1	4.8
High Performance T8 Fixtures	4,967	9,019	11,633	13,012	13,259	С	4.8	4.2	4.2
T5HO Fixtures	317	525	662	701	673	С	5.0	4.3	3.6
ENERGY STAR Dishwashers	54	214	520	924	1,442	В	5.0	5.0	N/A
Ventilation Heat Recovery	570	2,636	5,932	10,545	16,477	В	5.2	4.2	4.1
LED High Bay Fixtures	504	848	1,058	1,156	1,156	С	5.2	3.6	3.8
New Construction (40% More Efficient)	106	807	3,037	6,827	11,360	С	5.3	2.6	7.1
Radiant Infrared Heaters	74	296	663	1,338	2,088	В	5.9	6.1	N/A
Demand Control Ventilation (DCV)	1,149	4,503	11,254	18,613	26,045	В	5.9	4.5	N/A
LED Tubular Lamps	2,078	3,435	4,205	4,482	4,598	С	6.0	3.5	6.8
Ground Source Heat Pumps	223	652	1,291	2,056	2,861	В	6.4	N/A	12.1
LED Tubular Lamps	6,452	9,659	11,469	25,145	25,694	С	7.1	N/A	8.7
LED Street Lighting	6,088	10,474	13,256	14,552	14,491	С	7.8	N/A	N/A
Advanced Building Automation Systems	1,960	7,531	15,931	25,891	36,727	В	8.1	4.3	N/A
Refrigeration Heat Recovery	18	71	158	277	429	В	8.2	N/A	N/A
CEE-Rated Refrigerators and Freezers	52	75	127	157	157	В	8.4	N/A	8.4
Ductless Mini-Split Heat Pump	2,651	10,777	23,888	42,741	66,022	В	8.9	2.4	6.0
High Efficiency Chillers	0	0	0	0	0	В	10.5	N/A	N/A
Refrigerated Cases with Doors	339	1,357	3,053	5,427	8,480	В	10.9	N/A	N/A
LED Refrigerated Display Case Lighting	35	42	52	66	82	В	11.5	N/A	16.0
Dimming Control (Daylighting)	2	10	22	39	62	В	N/A	N/A	18.6
Freezer Defrost Controllers	-	-	1	2	3	В	N/A	N/A	27.9
LED Troffers	8	22	41	62	66	С	N/A	N/A	19.3
HVAC Impact from Other Savings	(8,214)	(13,872)	(17,362)	(23,095)	(23,877)	N/A	N/A	N/A	N/A
Grand Total	56,218	149,386	280,435	455,668	640,441				

Note: Curves A and B in this exhibit are as presented in Exhibit 65. In the exhibit, a zero indicates a value that rounds off to zero (i.e., less than 0.5). A dash indicates a value that is actually zero.

9.5.3 Electric Energy Savings – Lower Achievable Scenario

The following exhibits present the potential electricity savings³¹ under the lower Achievable Potential scenario. The results shown are relative to the Reference Case. The results are broken down as follows:

- Exhibit 72 presents the results by supply system, by region and milestone year
- Exhibit 73 presents the results for the total NL by sub sector and milestone year
- Exhibit 74 presents the results for the total NL by end use and milestone year
- Exhibit 75 presents the results for the total NL by technology and milestone year.

Exhibit 72 Lower Achievable Electricity Savings by Region (MWh/yr.)

Region	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Island Interconnected	7,528	29,913	68,110	126,145	191,279	8%	91%
Labrador Interconnected	433	2,109	5,117	10,676	17,359	6%	8.3%
Isolated	14	77	172	311	498	2%	0.2%
Grand Total	7,974	32,099	73,399	137,132	209,136	8%	100%

³¹ A value of "0" in the following exhibits means a relatively small number, not an absolute value of zero.

Sub Sector	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Large Office	790	3,113	7,361	15,622	23,795	7%	11%
Small Office	769	3,053	7,010	13,560	20,838	9%	10%
Large Non-food Retail	530	2,126	4,851	8,507	12,901	9%	6%
Small Non-food Retail	534	2,133	4,874	9,821	14,585	9%	7%
Food Retail	656	2,596	5,889	10,313	15,696	8%	8%
Large Accomodation	389	1,536	3,447	5,974	9,225	12%	4%
Small Accomodation	90	360	825	1,468	2,252	7%	1%
Healthcare	638	2,611	5,934	10,561	16,027	9%	8%
Schools	829	3,385	7,779	13,863	21,251	11%	10%
Universities and Colleges	513	2,018	4,471	7,906	11,862	9%	6%
Warehouse/Wholesale	295	1,181	2,728	4,895	7,432	8%	4%
Restaurants	176	733	1,721	3,082	4,870	4%	2%
Labrador Isolated C/I Buildings	12	70	157	284	455	2%	0%
Island Isolated C/I Buildings	1	7	15	27	43	2%	0%
Large Other Buildings	625	2,555	5,895	10,792	16,736	7%	8%
Small Other Buildings	432	1,732	4,027	8,414	12,723	6%	6%
Other Institutional	97	576	1,393	3,470	5,637	7%	3%
Street Lighting	598	2,314	5,021	8,574	12,808	35%	6%
Grand Total	7,974	32,099	73,399	137,132	209,136	8%	100%

Exhibit 73 Lower Achievable Electricity Savings by Sub sector and Milestone Year (MWh/yr.)

Note: Any difference in totals is due to rounding.

Exhibit 74 Lower Achievable Electricity Savings by End Use and Milestone Year (MWh/yr.)

End Use	2017	2020	2023	2026	2029	2029 Savings Relative to Ref Case	% of Total 2029 Savings
Space Heating	1,763	7,874	19,308	35,251	60,300	8%	29%
Space Cooling	72	315	773	1,448	2,374	5%	1%
Secondary Lighting	1,079	4,102	8,770	14,713	21,848	17%	10%
Refrigeration	408	1,604	3,730	6,707	10,573	5%	5%
Outdoor Lighting	388	1,756	4,477	7,963	9,032	19%	4%
Other Plug Loads	66	271	621	1,126	1,793	3%	1%
HVAC Fans & Pumps	576	2,459	5,884	10,951	17,737	5%	8%
General Lighting	2,780	10,455	22,741	46,640	66,590	16%	32%
Food Service Equipment	7	34	94	130	130	0%	0%
Domestic Hot Water	115	536	1,363	2,658	4,486	4%	2%
Computer Servers	6	21	23	26	31	0%	0%
Computer Equipment	115	357	592	945	1,435	1%	1%
Street Lighting	598	2,314	5,021	8,574	12,808	35%	6%
Grand Total	7,974	32,099	73,399	137,132	209,136	9%	100%

Note: Any difference in totals is due to rounding.

Exhibit 75 Lower Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.)

Маранта			Year			Adoption	Weighted Average CCE (¢/kWh		
weasure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Energy-Efficient Server Technologies	6	21	23	26	31	В	0.0	0.0	N/A
Make Use of Daylighting	6	25	55	93	139	В	0.0	0.0	N/A
Keep Doors Closed (Summer)	0	0	0	1	1	В	0.0	0.0	N/A
Keep Doors Closed (Winter)	1	3	8	14	22	В	0.0	0.0	N/A
ENERGY STAR Computers	75	182	200	231	280	В	0.0	0.0	N/A
ENERGY STAR Office Equipment	3	18	19	21	25	В	0.0	0.0	N/A
Reduce Number of Fridges	1	6	14	25	41	В	0.0	0.0	N/A
Use Natural Ventilation (Summer)	0	0	1	2	2	В	0.0	0.0	N/A
Activate PC Power Management	37	157	373	692	1,130	В	0.0	0.0	0.0
Use Task Light Instead of Ambient	3	13	29	45	66	В	0.0	0.0	N/A
Use Shades/Blinds (Summer)	0	1	2	3	4	В	0.0	0.0	N/A
Use Shades/Blinds (Winter)	2	7	16	28	42	В	0.0	0.0	N/A
Low-Flow Showerheads	13	53	118	210	328	В	0.1	0.1	N/A
Low-Flow Faucet Aerators	43	173	390	693	1,083	В	0.2	0.1	N/A
Lighting Controls (Outdoor)	138	508	1,019	1,567	2,267	В	0.4	0.4	N/A
Low-Flow Pre-Rinse Spray Valves	3	11	25	44	69	В	0.4	0.5	N/A
Cooler Night Covers	46	184	408	709	1,076	В	0.7	0.7	N/A
Automatic Door Closers (Walk-In Coolers & Freezers)	6	22	50	87	134	В	1.2	1.2	N/A
Program mable Thermostats	610	2,418	5,269	9,022	13,483	В	1.6	2.0	N/A
LED Screw-In Lamps	682	2,564	5,401	8,953	12,985	В	1.7	1.6	N/A
Roof Insulation	8	15	33	64	113	В	2.0	2.5	N/A
High-Efficiency Air Source Heat Pumps	329	1,534	4,016	8,183	14,538	В	2.0	0.9	9.1
LED Screw-In Lamps	546	2,046	4,298	7,105	10,279	В	2.2	2.2	N/A
Refrigerated Vending Machine Controllers	65	265	608	1,101	1,751	В	2.6	2.6	N/A
Wall Insulation	10	26	60	149	259	В	2.6	3.6	N/A
High Efficiency Compressors (Refrigeration)	107	427	955	1,684	2,605	В	2.7	2.7	N/A
Heat Pump Water Heaters	42	180	412	793	1,287	В	2.7	3.8	N/A
High-Efficiency Cooking Equipment	7	34	94	130	130	В	2.8	2.7	N/A
High Performance T8 Fixtures	87	341	753	1,311	2,004	В	3.0	3.0	N/A
LED Outdoor Fixtures	247	1,210	3,313	6,067	6,135	В	3.0	2.9	N/A
VFDs on HVAC Motors	55	221	496	883	1,380	В	3.0	3.1	3.1
New Construction (25% More Efficient)	81	1,033	3,800	8,253	15,860	А	3.1	3.0	3.8
Building Recommissioning	821	3,253	7,153	13,099	19,702	В	3.2	4.0	N/A
LED Exit Signs	16	55	99	135	150	В	3.8	3.8	N/A

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Exhibit 75 Lower Achievable Electricity Savings by Technology and Milestone Year (MWh/yr.) (cont'd...)

Magazin			Year			Adoption	Weighted Average CCE (¢/kW		
Measure	2017	2020	2023	2026	2029	Curve	Island	Labrador	Isolated
Hotel Occupancy Sensors	22	84	181	304	436	В	3.9	2.9	N/A
Premium Efficiency Motors	2	10	26	56	102	В	4.0	4.2	N/A
Demand Control Kitchen Ventilation (DCKV)	4	19	41	70	105	В	4.2	4.2	N/A
High Performance Glazing Systems	23	83	233	707	1,980	В	4.4	5.9	3.1
T5HO Fixtures	91	358	758	1,247	1,797	В	4.5	4.5	N/A
Refrigeration Controls	38	157	349	609	929	В	4.5	4.5	N/A
Occupancy Sensors (Lighting)	420	1,635	3,614	6,243	9,234	В	4.5	4.8	N/A
Drainwater Heat Recovery	1	5	14	30	55	В	4.5	4.5	N/A
ECM Motors and Evaporator Fan Motor Controllers	74	292	680	1,183	1,807	В	4.7	4.7	4.7
LED High Bay Fixtures	179	685	1,472	2,489	3,686	В	4.8	2.1	N/A
High Performance T8 Fixtures	476	1,947	4,305	7,490	11,449	В	4.8	4.2	N/A
T5HO Fixtures	31	114	247	407	586	В	5.0	4.3	N/A
ENERGY STAR Dishwashers	4	15	37	66	103	В	5.0	5.0	N/A
Ventilation Heat Recovery	41	188	423	753	1,176	В	5.2	4.2	N/A
LED High Bay Fixtures	56	213	455	767	1,132	В	5.3	3.6	N/A
New Construction (40% More Efficient)	37	301	1,291	3,273	6,140	A	5.3	2.6	N/A
Demand Control Ventilation (DCV)	83	331	852	1,485	2,245	В	5.9	4.5	N/A
Radiant Infrared Heaters	25	99	223	449	702	В	5.9	6.1	N/A
LED Tubular Lamps	202	754	1,584	2,615	3,983	В	6.0	3.5	N/A
Ground Source Heat Pumps	75	229	480	829	1,281	В	6.4	N/A	N/A
LED Tubular Lamps	637	1,941	3,896	14,090	17,506	В	7.3	N/A	8.7
LED Street Lighting	598	2,314	5,021	8,574	12,808	В	7.8	N/A	N/A
Advanced Building Automation Systems	573	2,258	4,938	8,421	12,606	В	8.0	4.3	N/A
Refrigeration Heat Recovery	1	5	11	20	31	В	8.2	N/A	N/A
CEE-Rated Refrigerators and Freezers	14	14	14	14	14	В	8.4	N/A	N/A
Ductless Mini-Split Heat Pump	887	3,624	8,099	14,683	23,256	В	8.9	2.3	N/A
High Efficiency Chillers	0	0	0	0	0	В	10.5	N/A	N/A
Refrigerated Cases with Doors	106	424	954	1,696	2,650	В	10.9	N/A	N/A
LED Refrigerated Display Case Lighting	10	10	10	10	10	В	11.5	N/A	N/A
HVAC Impact from Other Savings	(832)	(3,017)	(6,319)	(12,875)	(18,078)	N/A	0.0	0.0	0.0
Grand Total	7,974	32,099	73,399	137,132	209,136				

Note: Curves A, B, and C in this exhibit are as presented in Exhibit 65.

9.6 Electric Peak Load Reductions from Energy Efficiency

Exhibit 76 presents a summary of the peak load reductions that would occur as a result of the electric energy savings contained in the Achievable Potential Forecast. The reductions are shown by milestone year, region and sub sector for both lower and upper achievable potential savings. In each case, the reductions are an average value over the peak period and are defined relative to the Reference Case presented previously in Sections 4 and 6. Exhibit 77 and Exhibit 78 show the lower and upper Achievable Potential savings by region, sub sector and principal end use for each milestone year.

Exhibit 76, Exhibit 77 and Exhibit 78 only approximate the potential demand impacts associated with the energy-efficiency measures because they are based on the assumption that the measures do not change the load shape of the end uses they affect. This is not always correct. For example, most of the heat pump measures will not produce any peak demand savings, because during the winter peak period the heat pumps and mini-splits will revert to back-up electric resistance heating.³² Therefore, there will be no net reduction in space heating peak demand for these measures. Accordingly, the demand reductions for the heat pump measures have been manually filtered out of the results presented in these exhibits.

Exhibit 79 shows the demand reductions associated with each electric energy savings measure contained in the Achievable Potential Forecast for the milestone year 2029. The heat pump measures are omitted from the exhibit, as with the previous two exhibits. One notable line item in the exhibit is "HVAC Impact from Other Savings" - the impact on peak space heating load resulting from the savings for other end uses within the sub sector. This is to capture the fact that in an electrically-heated building, savings of energy consuming equipment within the building will not reduce the winter peak demand. The impact of demand reductions for other end uses on the space heating demand can be seen graphically in Exhibit 77. As the demand impacts for many of the other end uses rise with time, the demand impacts for space heating actually decreases over time.

Electric peak load reductions related to capacity-only measures are presented separately in Section 9.7.

³² In fact, this is a conservative assumption for the Island Interconnected region. Although the demand peak occurs on the coldest winter days, in a climate such as that of St. John's the temperature is typically not very extreme on those peak days. Therefore, many heat pumps will continue to work in heat pump mode and not revert to electric resistance. In this study, we have retained the conservative assumption that they do not provide demand relief.

Labrador Island Milestone Grand Total Isolated **Sub Sector** Interconnected Interconnected Year Lower Upper Lower Upper Lower Upper Lower Upper 2017 0.1 1.1 0.0 0.0 0.0 0.0 0.1 1.1 2020 0.6 3.4 0.6 3.4 0.0 0.0 0.0 0.0 Large Office 2023 1.3 7.0 0.0 0.0 0.0 0.0 1.3 7.0 2026 2.6 11.7 0.0 0.0 0.0 0.0 2.6 11.7 2029 4.1 16.8 0.0 0.0 0.0 0.0 4.1 16.8 2017 0.1 0.7 0.0 0.0 0.0 0.0 0.1 0.7 2020 0.4 2.1 0.0 0.0 0.0 0.0 0.4 2.1 Small Office 2023 0.9 4.2 0.0 0.1 0.0 0.0 0.9 4.2 2026 6.8 0.0 0.1 0.0 0.0 1.7 1.7 6.7 2029 2.7 0.0 0.1 0.0 0.0 2.7 9.9 9.7 2017 0.1 0.5 0.0 0.0 0.0 0.0 0.1 0.5 2020 0.3 1.5 0.0 0.1 0.0 0.0 0.3 1.6 Large Non-food Retail 0.7 2023 2.9 0.0 0.1 0.0 0.0 0.8 3.0 2026 1.3 0.1 0.2 0.0 0.0 1.3 4.9 4.6 2029 1.9 0.0 6.9 6.5 0.1 0.4 0.0 2.0 2017 0.5 0.1 0.0 0.0 0.0 0.0 0.1 0.6 2020 0.3 1.5 0.0 0.2 0.0 0.0 0.3 1.6 Small Non-food Retail 2023 0.7 2.9 0.1 0.3 0.0 0.0 0.7 3.3 2026 1.3 5.0 0.1 0.6 0.0 0.0 1.4 5.6 2029 1.9 6.9 0.2 0.8 0.0 0.0 2.1 7.7 2017 0.1 0.4 0.0 0.0 0.0 0.0 0.1 0.4 2020 0.3 1.3 0.0 0.1 0.0 0.0 0.3 1.4 Food Retail 2023 0.7 2.7 0.1 0.2 0.0 0.0 0.8 3.0 2026 1.2 0.1 0.4 0.0 1.3 4.9 4.5 0.0 2029 1.9 6.4 0.1 0.6 0.0 0.0 2.0 7.0 0.1 0.4 2017 0.4 0.0 0.0 0.0 0.0 0.1 2020 0.2 1.1 0.0 0.1 0.0 0.0 0.2 1.2 Large Accomodation 2023 2.4 0.5 2.1 0.0 0.2 0.0 0.0 0.5 2026 0.8 0.0 0.9 3.8 3.4 0.1 0.4 0.0 2029 1.3 4.8 0.1 0.5 0.0 0.0 1.4 5.3 2017 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.1 2020 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 Small Accomodation 2023 0.1 0.3 0.0 0.0 0.0 0.0 0.1 0.3 2026 0.2 0.0 0.0 0.0 0.2 0.5 0.5 0.0 2029 0.3 0.7 0.0 0.0 0.0 0.0 0.3 0.7 2017 0.7 0.1 0.7 0.0 0.0 0.0 0.0 0.1 2020 0.4 0.0 0.1 0.0 0.0 0.4 2.4 2.3 Healthcare 2023 0.2 0.0 1.0 4.9 0.9 4.7 0.0 0.0 2026 1.7 7.5 0.1 0.4 0.0 0.0 1.7 7.8 2029 2.5 10.3 0.1 0.5 0.0 0.0 2.6 10.8 2017 0.1 0.9 0.0 0.0 0.0 0.0 0.1 0.9 2020 0.5 2.9 0.0 0.1 0.0 0.0 0.5 3.0 Schools 2023 1.2 5.8 0.1 0.3 0.0 0.0 1.3 6.1 2026 2.1 9.3 0.1 0.6 0.0 0.0 2.3 9.8 2029 3.3 12.9 0.2 0.8 0.0 0.0 3.5 13.7 2017 0.1 0.5 0.0 0.0 0.0 0.0 0.1 0.5 2020 0.3 1.5 0.0 0.0 0.0 0.0 0.3 1.5 Universities and 2023 0.7 2.8 0.0 0.1 0.0 0.0 0.7 2.9 Colleges 2026 1.2 0.0 0.1 0.0 0.0 1.2 4.7 4.6 2029 0.0 0.2 0.0 0.0 1.8 6.8 1.8 6.6 2017 0.1 0.0 0.0 0.0 0.1 0.4 0.4 0.0 2020 0.2 0.9 0.0 0.0 0.0 0.0 0.2 1.0 Warehouse/Wholesale 0.5 0.0 0.1 0.0 0.0 0.5 1.7 2023 1.6 2.6 2026 0.8 2.4 0.0 0.2 0.0 0.0 0.9 2029 1.3 3.2 0.3 0.0 0.0 1.3 3.5 0.1

Exhibit 76 Electric Peak Load Reductions from Lower and Upper Achievable Potential Energy Savings Measures by Milestone Year, Region and Subsector (MW)

Exhibit 76 Electric Peak Load Reductions from Lower and Upper Achievable Potential Energy Savings Measures by Milestone Year, Region and Subsector (MW) (cont'd...)

Sub Sector	Milestone	Isla	ind	Labr	ador	Isola	ated	Grand	Total
	Year	Lower	Unner	Lower	Unner	lower	Unner	Lower	Unner
	2017	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
	2020	0.1	0.6	0.0	0.0	0.0	0.0	0.1	0.7
Restaurants	2023	0.2	1.3	0.0	0.1	0.0	0.0	0.3	1.4
	2026	0.5	2.2	0.0	0.2	0.0	0.0	0.5	2.4
	2029	0.7	3.2	0.0	0.2	0.0	0.0	0.8	3.4
	2017	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Labrador Isolatod C/I	2020	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
Ruildings	2023	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Dunungs	2026	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.4
	2029	0.0	0.0	0.0	0.0	0.1	0.5	0.1	0.5
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Island Isolated C/I	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings	2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ge	2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2017	0.1	0.6	0.0	0.1	0.0	0.0	0.1	0.8
	2020	0.3	1.8	0.1	0.5	0.0	0.0	0.4	2.3
Large Other Buildings	2023	0.8	3.5	0.2	1.1	0.0	0.0	1.0	4.7
	2026	1.5	6.0	0.4	1.8	0.0	0.0	1.8	7.9
	2029	2.3	8.6	0.6	2.9	0.0	0.0	2.8	11.4
	2017	0.0	0.4	0.0	0.1	0.0	0.0	0.1	0.5
	2020	0.2	1.2	0.0	0.3	0.0	0.0	0.2	1.4
Small Other Buildings	2023	0.4	2.2	0.1	0.7	0.0	0.0	0.6	2.9
	2026	0.9	4.0	0.2	1.1	0.0	0.0	1.2	5.0
	2029	1.4	5.5	0.4	1.7	0.0	0.0	1.8	7.2
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2020	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.2
Other Institutional	2023	0.0	0.0	0.1	0.8	0.0	0.0	0.1	0.8
	2026	0.0	0.0	0.5	2.7	0.0	0.0	0.5	2.7
	2029	0.0	0.0	0.8	4.5	0.0	0.0	0.8	4.5
	2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nen Buildinge	2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Duildings	2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2026	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2017	0.1	0.9	0.0	0.0	0.0	0.0	0.1	0.9
Street Lighting	2020	0.3	1.5	0.0	0.0	0.0	0.0	0.3	1.5
Street Lighting	2023	0.7	1.9	0.0	0.0	0.0	0.0	0.7	1.9
	2020	1.2	2.0	0.0	0.0	0.0	0.0	1.2	2.0
	2029	1.8	2.0	0.0	0.0	0.0	0.0	1.8	2.0
	2017	1.1	0.3 00 7	0.1	0.5	0.0	0.1	1.2	0.0
Grand Total	2020	4.5	23.7	0.3	1.8	0.0	0.2	4.8	20.7
Grand Total	2025	10.3	40.1	0.8	4.3	0.0	0.3	20.7	00.7 82 6
	2029	20.1	104.2	27	0.0	0.0	0.4	20.7	118.2
	2023	29.1	104.2	2.1	13.4	0.1	0.0	31.0	110.2

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Exhibit 77 Electric Peak Load Reductions from Upper Achievable Potential Energy Savings Measures, by Milestone Year End Use and Sub sector, Winter Peak Period (MW)

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Exhibit 78 Electric Peak Load Reductions from Lower Achievable Potential Energy Savings Measures, by Milestone Year End Use and Sub sector, Winter Peak Period (MW) Exhibit 79 Electric Peak Load Reductions from Achievable Potential Energy Savings Measures, 2029 (MW)

	Isla	and	Labr	ador	Isol	ated	Grand Total		
Measure	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	
Building Recommissioning	4.0	24.9	0.8	5.1	0.0	0.2	4.8	30.1	
New Construction (25% More Efficient)	3.7	6.9	0.1	0.3	0.0	0.1	3.9	7.2	
Programmable Thermostats	3.1	8.8	0.6	1.9	0.0	0.0	3.7	10.7	
Advanced Building Automation Systems	3.0	8.6	0.0	0.1	0.0	0.0	3.1	8.7	
LED Tubular Lamps	2.9	4.3	0.0	0.0	0.1	0.1	2.9	4.3	
High Performance T8 Fixtures	1.9	2.1	0.1	0.1	0.0	0.0	2.0	2.3	
LED Screw-In Lamps	1.8	2.0	0.2	0.2	0.0	0.0	2.0	2.2	
LED Street Lighting	1.8	2.0	0.0	0.0	0.0	0.0	1.8	2.0	
Occupancy Sensors (Lighting)	1.6	5.3	0.1	0.5	0.0	0.0	1.7	5.8	
LED Screw-In Lamps	1.5	1.7	0.2	0.2	0.0	0.0	1.7	1.9	
New Construction (40% More Efficient)	1.4	2.6	0.0	0.0	0.0	0.0	1.4	2.7	
LED Outdoor Fixtures	0.8	2.1	0.1	0.2	0.0	0.0	0.9	2.4	
LED High Bay Fixtures	0.6	0.7	0.0	0.0	0.0	0.0	0.7	0.7	
Demand Control Ventilation (DCV)	0.6	7.3	0.1	1.3	0.0	0.0	0.7	8.6	
LED Tubular Lamps	0.6	0.7	0.0	0.0	0.0	0.0	0.6	0.7	
High Performance Glazing Systems	0.5	5.6	0.2	1.3	0.0	0.0	0.6	6.9	
Heat Pump Water Heaters	0.4	1.0	0.1	0.2	0.0	0.0	0.5	1.1	
Ground Source Heat Pumps	0.4	0.9	0.0	0.0	0.0	0.0	0.4	0.9	
Low-Flow Faucet Aerators	0.3	4.7	0.1	0.8	0.0	0.0	0.4	5.5	
Ventilation Heat Recovery	0.3	4.5	0.0	0.6	0.0	0.0	0.4	5.1	
Refrigerated Cases with Doors	0.3	1.0	0.0	0.0	0.0	0.0	0.3	1.0	
T5HO Fixtures	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.4	
High Efficiency Compressors (Refrigeration)	0.3	0.9	0.0	0.0	0.0	0.0	0.3	0.9	
Lighting Controls (Outdoor)	0.3	0.7	0.0	0.1	0.0	0.0	0.3	0.8	
High Performance T8 Fixtures	0.3	0.3	0.0	0.0	0.0	0.0	0.3	0.3	
Refrigerated Vending Machine Controllers	0.2	0.8	0.0	0.1	0.0	0.0	0.3	1.0	
Radiant Infrared Heaters	0.2	0.6	0.0	0.1	0.0	0.0	0.2	0.7	
ECM Motors and Evaporator Fan Motor Controllers	0.2	0.6	0.0	0.0	0.0	0.0	0.2	0.6	
VFDs on HVAC Motors	0.2	2.7	0.0	0.2	0.0	0.0	0.2	2.8	
LED High Bay Fixtures	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.2	
Activate PC Power Management	0.2	0.8	0.0	0.0	0.0	0.0	0.2	0.9	
Cooler Night Covers	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	
Low-Flow Showerheads	0.1	1.4	0.0	0.2	0.0	0.0	0.1	1.5	
Hotel Occupancy Sensors	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	
Refrigeration Controls	0.1	0.3	0.0	0.0	0.0	0.0	0.1	0.3	
T5HO Fixtures	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	
Wall Insulation	0.1	1.1	0.0	0.0	0.0	0.0	0.1	1.1	
High-Efficiency Cooking Equipment	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	
ENERGY STAR Computers	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2	
ENERGY STAR Dishwashers	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	
Roof Insulation	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.6	
Demand Control Kitchen Ventilation (DCKV)	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3	
Make Use of Daylighting	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	

Magazura	Isla	Ind	Labr	ador	Isola	ated	Grand	Total
Measure	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Low-Flow Pre-Rinse Spray Valves	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
Drainwater Heat Recovery	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.3
LED Exit Signs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Premium Efficiency Motors	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Automatic Door Closers (Walk-In Coolers & Freezers)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Shades/Blinds (Winter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Refrigeration Heat Recovery	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Use Task Light Instead of Ambient	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Keep Doors Closed (Winter)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reduce Number of Fridges	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Energy-Efficient Server Technologies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENERGY STAR Office Equipment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Shades/Blinds (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CEE-Rated Refrigerators and Freezers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LED Refrigerated Display Case Lighting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Use Natural Ventilation (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Keep Doors Closed (Summer)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
High Efficiency Chillers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Freezer Defrost Controllers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LED Troffers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dimming Control (Daylighting)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HVAC Impact from Other Savings	-5.8	-7.5	-0.3	-0.3	0.0	-0.1	-6.0	-8.0
Grand Total	29.1	104.2	2.7	13.4	0.1	0.6	31.8	118.2

Exhibit 79 Electric Peak Load Reductions from Achievable Potential Energy Savings Measures, 2029 (MW) (cont'd...)

9.7 Summary of Peak Load Reductions

This section presents a summary of the electric peak load reductions that would result from the application of peak demand measures. Exhibit 80 compares the Reference Case, Lower Achievable Potential and Upper Achievable Potential Peak Demand Forecast levels of winter peak demand.³³

As illustrated, under the Reference Case commercial peak demand would grow from the Base Year level of 520 MW to approximately 600 MW by 2029. This contrasts with the Lower Achievable Potential Forecast in which peak demand would decrease to approximately 570 MW for the same period, a difference of approximately 35 MW or about 6%. The Upper Achievable Potential forecasts peak demand at 480 MW, a difference of approximately 120 MW or 20%. The other two lines on the chart show the peak demand that would result if all the energy efficiency measures were applied but none of the demand reduction measures in each of the Lower and Upper Achievable Potential scenarios. As illustrated in the exhibit, approximately 97% of the reduction comes from the impact of energy efficiency measures in both the Upper Achievable Potential scenario and the Lower Achievable Potential scenario.



Exhibit 80 Peak Demand of Reference Case, Lower Achievable Potential and Upper Achievable Potential in Commercial Sector (MW)³⁴

³³ All results are reported at the customer's point-of-use and do not include line losses.

³⁴ Please note that all demand curtailment is accounted for in the Industrial sector analysis and reporting

9.7.1 Peak Demand Reduction

Further detail on the total potential peak demand reduction provided by the Upper and Lower Achievable Potential Forecast is provided in the following exhibits:³⁵

- Exhibit 81 presents the results by end use, sub sector and milestone year
- Exhibit 82 provides a further disaggregation of the peak demand reduction by technology and milestone year
- Exhibits 83 and 84 present peak demand reduction by major end use, milestone year and region
- Exhibits 85 and 86 present peak demand reduction by major end use, milestone year and sub sector
- Exhibit 87 and Exhibit 88 present 2029 peak demand reduction by major end use and vintage.

³⁵ MW reductions shown in the following exhibits are not incremental. For example, the space heating reductions in 2029 are not in addition to the space heating reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Lower or Upper Achievable Potential scenario are implemented.

Sub sector	Milestone	Domes Wa	tic Hot ter	HVAC I Pun	Fans & nps	Refrige	eration	Seco Ligh	ndary iting	Space I	Heating	Grand	Total
	rear	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
	2020	0.00	0.00	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12
Large Office	2023	0.00	0.00	0.07	0.27	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.28
	2026	0.00	0.00	0.13	0.46	0.00	0.00	0.00	0.01	0.00	0.01	0.14	0.48
	2029	0.00	0.00	0.21	0.69	0.00	0.00	0.00	0.01	0.00	0.02	0.22	0.72
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Small Office	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06	0.02	0.06
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.08	0.03	0.08
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large Non-food	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.06
Retail	2023	0.00	0.00	0.03	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.13
	2026	0.00	0.00	0.06	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.23
	2029	0.00	0.00	0.10	0.32	0.00	0.00	0.00	0.00	0.00	0.01	0.10	0.34
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Non-food	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Retail	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.01	0.02	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.07
Food Retail	2023	0.00	0.00	0.01	0.05	0.02	0.07	0.00	0.01	0.00	0.01	0.04	0.15
	2026	0.00	0.00	0.03	0.09	0.03	0.12	0.00	0.02	0.01	0.02	0.07	0.25
	2029	0.00	0.00	0.04	0.13	0.05	0.18	0.01	0.03	0.01	0.03	0.11	0.36
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large	2020	0.01	0.10	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.11
Accomodation	2023	0.03	0.21	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.25
	2026	0.06	0.34	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.40
	2029	0.09	0.46	0.03	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.12	0.57
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small	2020	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
Accomodation	2023	0.01	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.10
	2026	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.19
	2029	0.04	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.30

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW)

Sub sector	Milestone	Domes Wa	tic Hot Iter	HVAC I Pun	Fans & nps	Refrige	eration	Seco Ligh	ndary iting	Space I	Heating	Grand	Total
	Tear	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.08
Healthcare	2023	0.00	0.01	0.04	0.13	0.00	0.00	0.00	0.00	0.01	0.02	0.05	0.17
	2026	0.00	0.02	0.07	0.20	0.00	0.00	0.00	0.00	0.01	0.04	0.08	0.27
	2029	0.01	0.05	0.10	0.26	0.00	0.00	0.00	0.01	0.02	0.05	0.13	0.36
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.03
Schools	2023	0.00	0.00	0.01	0.04	0.00	0.00	0.01	0.03	0.00	0.01	0.02	0.07
	2026	0.00	0.00	0.02	0.07	0.00	0.00	0.01	0.05	0.00	0.01	0.03	0.12
	2029	0.00	0.00	0.03	0.10	0.00	0.00	0.02	0.07	0.00	0.02	0.05	0.19
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Universities and	2020	0.00	0.00	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.09
Colleges	2023	0.00	0.00	0.05	0.17	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.18
g	2026	0.00	0.00	0.09	0.27	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.29
	2029	0.00	0.00	0.13	0.35	0.00	0.01	0.00	0.00	0.00	0.02	0.14	0.38
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warehouse/	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Wholesale	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.03
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.04
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2020	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Restaurants	2023	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.04
	2026	0.01	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.07
	2029	0.01	0.08	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01	0.02	0.12
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Labrador Isolated	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C/I Buildings	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
J. J. J. J.	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Island Isolated C/I	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Buildings	2023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2026	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Sub sector	Milestone Year	Domes Wa	tic Hot ter	HVAC Fans & Pumps		Refrigeration		Secondary Lighting		Space Heating		Grand Total	
	rour	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Large Other	2020	0.00	0.00	0.02	0.06	0.00	0.00	0.01	0.02	0.00	0.00	0.02	0.09
Buildings	2023	0.00	0.01	0.04	0.14	0.00	0.00	0.01	0.04	0.00	0.00	0.05	0.19
Buildings	2026	0.00	0.03	0.07	0.23	0.00	0.00	0.02	0.07	0.00	0.01	0.09	0.33
	2029	0.01	0.05	0.11	0.34	0.00	0.00	0.03	0.10	0.00	0.01	0.14	0.50
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Othor	2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
Buildings	2023	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.01	0.04
Dunungs	2026	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.02	0.07
	2029	0.01	0.04	0.00	0.00	0.00	0.00	0.02	0.08	0.00	0.01	0.03	0.12
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	2020	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Institutional	2023	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
	2026	0.00	0.00	0.02	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07
	2029	0.00	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.01	0.03
	2020	0.02	0.15	0.12	0.46	0.01	0.04	0.01	0.05	0.01	0.06	0.18	0.76
Grand Total	2023	0.05	0.36	0.28	1.00	0.02	0.09	0.03	0.12	0.03	0.13	0.41	1.69
	2026	0.10	0.63	0.50	1.66	0.04	0.15	0.06	0.21	0.05	0.22	0.75	2.87
	2029	0.16	0.97	0.78	2.36	0.07	0.23	0.09	0.33	0.09	0.32	1.18	4.21

Exhibit 81 Total Lower and Upper Achievable Potential Peak Demand Reduction by End Use, Sub sector and Milestone Year (MW) (cont'd...)

Notes:

1) Results are measured at the customer's point-of-use and do not include line losses.

2) Any differences in totals are due to rounding.

3) In the above exhibit a value displays as 0 if it is between 0 and 0.5. Totals are calculated using the actual numerical value. 4) MW reductions are not incremental. The space heating reductions in 2029 are not in addition to the reductions from the previous milestone years. Rather, they are the difference between the Reference Case space heating peak demand in 2029 and the space heating peak demand if all the measures included in the Economic Potential scenario are implemented.

5) The values in this exhibit do not include peak demand reductions from energy efficiency measures.

6) Demand-specific measure savings will fluctuate based on the demand savings from conservation measures. The demand reference case to which demand-specific measures are applied already factors in the corresponding Upper or Lower Achievable demand savings from conservation measures. So the more peak demand reductions are generated through conservation measures, the less peak demand remains for demand-specific measures to reduce.

Measure	Lower A	chievabl Red	e Potenti luction (N	al Peak [1W)	Demand	Upper Achievable Potential Peak Demand Reduction (MW)				
	2017	2020	2023	2026	2029	2017	2020	2023	2026	2029
DHW Controls	0.00	0.02	0.05	0.10	0.16	0.00	0.15	0.36	0.63	0.97
Heating Controls	0.00	0.01	0.03	0.05	0.09	0.00	0.06	0.13	0.22	0.32
Lighting Demand Controls	0.01	0.01	0.03	0.06	0.09	0.03	0.05	0.12	0.21	0.33
Refrigeration Demand Controls	0.00	0.01	0.02	0.04	0.07	0.00	0.04	0.09	0.15	0.23
HVAC Demand Controls	0.00	0.12	0.28	0.50	0.78	0.00	0.46	1.00	1.66	2.36
Grand Total	0.01	0.18	0.41	0.75	1.18	0.03	0.76	1.69	2.87	4.21

Exhibit 82 Lower and Upper Achievable Potential Peak Demand Reduction by Measure and Milestone Year (MW)

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Exhibit 83 Lower Achievable Potential Peak Load Reduction by Major End Use, Year and Region (MW)





Exhibit 84 Upper Achievable Potential Peak Load Reduction by Major End Use, Year and Region (MW)

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Exhibit 85 Lower Achievable Potential Peak Demand Reduction by Major End Use, Year and Sub sector (MW)

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Exhibit 86 Upper Achievable Potential Peak Demand Reduction by Major End Use, Year and Sub sector (MW)

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Exhibit 87 Lower Achievable Potential Peak Load Reduction by Major End Use, Year and Vintage (MW)



Exhibit 88 Upper Achievable Potential Peak Load Reduction by Major End Use, Year and Vintage (MW)

9.7.2 Interpretation of Results

Highlights of the results presented in the preceding exhibits are summarized below:

Peak Demand Reduction by Milestone Year

The Lower Achievable Potential peak load reductions increase from 0.01 MW in 2017 to 1.18 MW in 2029. The Upper Achievable Potential peak load reductions increase from 0.03 MW in 2017 to 4.21 MW in 2029.

Peak Demand Reduction by Sub sector

The hospitality sector accounts for the largest peak load reduction potential with 23% of the peak load reduction from this sector. Of this, 13% of the achievable peak load reduction savings are from the large accommodations sub sector as a result of the higher achievable savings for DHW and HVAC in these facilities. Office buildings account for 19% of the potential peak load reductions; this reflects their large market share and their generally high level of electrical intensity. Peak load reductions in the retail facilities and other buildings each account for 17% of the potential savings; and educational facilities account for 14% of the potential savings. Healthcare facilities account for 9% of the peak load reductions. The other sub sectors each account for less than 1% of the potential peak load reductions.

Peak Demand Reduction by Region

The Island Interconnected region accounts for 91% of the potential peak load reductions. The Labrador Interconnected region accounts for 8% of the potential peak load reductions, and the Isolated region accounts for less than 1% of the potential peak load reductions.

Peak Demand Reduction by Existing Buildings versus New Construction

Peak load reductions in existing buildings account for almost all of the reduction potential at the beginning of the study period; as new homes are constructed, the load reduction potential associated with them occupies a progressively larger portion of the total. By 2029, peak load reductions from new construction accounts for 24% of the total potential.

Peak Demand Reduction by End Use

HVAC measures account for 68% of the total load reductions in the Upper Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this decreases by to 64% by 2029. HVAC measures account for just over 74% of the total load reductions in the Lower Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures. With less than 1% of a decrease, the load reduction from HVAC remains at almost 74% by 2029. Of the 64% of 2029 reductions that come from HVAC in the Upper Achievable Potential scenario, approximately 56% of it is from the HVAC Demand Controls measure and almost 8% is from the Heating Controls measure.

DHW measures account for approximately 20% of the total load reductions in the Upper Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this rises to 23% of the total by 2029. DHW measures account for approximately 12% of the total load reductions in the Lower Achievable Potential Forecast in 2020, not including load reductions from energy efficiency measures; this rises to 14% of the total by 2029. All of the potential savings come from the DHW controls measure.

Lighting and Refrigeration makes up a smaller portion of the total load reduction opportunity with Lighting demand controls accounting for 8% of the total 2029 upper achievable potential savings and refrigeration demand controls accounting for 5% of the 2029 upper achievable potential savings.

9.8 Sensitivity of the Results to Changes in Avoided Cost

The avoided costs used in the Achievable Potential model are varied by region and by milestone year. As with any forecast, the projected avoided costs are subject to uncertainty. Accordingly, the model has been re-run with avoided costs varied within a reasonable range. The lower end of this range is considered to be 10% below the current projection, for both energy cost and demand cost. The upper end of the range is considered to be 30% above the current projections for energy cost and 20% above the current projections for demand cost.

Exhibit 89 shows that the lower Achievable Potential results are sensitive to this range of avoided costs. By 2029, the exhibits show the following changes in achievable potential:

- The lower range of reasonableness produces lower Achievable Potential energy savings that are 1% higher in the Island Interconnected region, 5% lower in the Labrador region, and almost unchanged in the Isolated region.
- The lower range of reasonableness produces lower Achievable Potential peak demand reductions that are almost unchanged in the Island Interconnected and Isolated regions and 4% lower in the Labrador region.
- The upper range of reasonableness produces lower Achievable Potential energy savings that are 2% higher in both the Island Interconnected region and Labrador region and almost unchanged in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential peak demand reductions that are 4% higher in the Island Interconnected region, 2% higher in the Labrador region and almost unchanged in the Isolated region.

Exhibit 89 Sensitivity of the Lower Achievable Potential Energy Savings and Peak Demand Reduction to Avoided Cost

	Year	Lower R Reasona	ange of ableness	Base S	cenario	Upper Range of Reasonableness		
Region		Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	
	2017	7,466	1	7,528	1	7,665	1	
laland	2020	29,627	5	29,913	5	30,932	5	
Island Interconnected	2023	67,673	11	68,110	11	71,079	11	
	2026	120,163	19	126,145	20	127,373	20	
	2029	193,198	30	191,279	30	194,392	31	
	2017	416	0	433	0	507	0	
l abua dan	2020	1,979	0	2,109	0	2,580	0	
Labrador	2023	4,967	1	5,117	1	6,418	1	
	2026	9,969	2	10,676	2	11,532	2	
	2029	16,462	3	17,359	3	17,740	3	
	2017	14	0	14	0	14	0	
	2020	77	0	77	0	77	0	
Isolated	2023	172	0	172	0	172	0	
	2026	311	0	311	0	311	0	
	2029	498	0	498	0	498	0	

Exhibit 90 shows that the upper Achievable Potential results are sensitive to this range of avoided costs. By 2029, the exhibits show the following changes in achievable potential:

- The lower range of reasonableness produces lower Achievable Potential energy savings that are almost unchanged in the Island Interconnected region, 4% lower in the Labrador region, and 1% lower in the Isolated region.
- The lower range of reasonableness produces lower Achievable Potential peak demand reductions that are almost 1% lower in the Island Interconnected region, 4% lower in the Labrador region and 2% lower in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential energy savings that are 2% higher in the Island Interconnected region, 1% higher in the Labrador region and almost unchanged in the Isolated region.
- The upper range of reasonableness produces lower Achievable Potential peak demand reductions that are 3% higher in the Island Interconnected region, 1% higher in the Labrador region and almost unchanged in the Isolated region.

Exhibit 90 Sensitivity of the Upper Achievable Potential Energy Savings and Peak Demand Reduction to Avoided Cost

		Lower R Reasona	Range of ableness	Base So	cenario	Upper Range of Reasonableness		
Region	Year	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	Energy Savings (MWh/yr.)	Peak Demand Reduction (MW)	
	2017	52,454	8	52,821	8	53,297	9	
laland	2020	136,874	24	137,859	24	141,796	25	
Island Interconnected	2023	254,170	47	255,655	48	265,788	50	
linereen	2026	396,303	75	407,167	77	415,059	79	
	2029	563,888	107	566,388	108	577,793	112	
	2017	2,616	0	2,763	0	3,438	1	
l abaadaa	2020	9,342	2	10,142	2	13,357	3	
Labrador	2023	22,055	4	22,594	4	30,071	6	
	2026	43,418	9	45,474	9	49,237	10	
	2029	67,045	13	70,163	14	70,976	14	
	2017	626	0	634	0	639	0	
	2020	1,362	0	1,384	0	1,392	0	
Isolated	2023	2,146	0	2,185	0	2,195	0	
	2026	2,973	0	3,027	0	3,037	0	
	2029	3,837	1	3,890	1	3,901	1	

9.9 **Net-to-Gross**

Net-to-gross ratios are used to estimate the free-ridership occurring in CDM programs. Free riders are program participants who would have undertaken an efficiency or demand management measure naturally, even without the influence of the utility's program. A net-to-gross ratio is a factor that represents the net program impact divided by the gross program impact. The net impact can be found by multiplying the gross impact by the net-to-gross ratio.

Net-to-gross ratios have been estimated for many of the utility programs conducted in NL over the past several years. Though net-to-gross ratios are dependent on many factors, the estimates from previous programs were assumed to provide a reasonable approximation for the ratios in the near future. Where measures in the present study were not included in past programs, the net-to-gross ratio for the most similar program was used.

Sources

The following sources were used to estimate the measure net-to-gross ratios shown in the following exhibits:

- Net-to-gross ratios provided by Newfoundland Power, from evaluations of the CDM programs that have been run in the province.
- Ontario Energy Board TRC Guide recommendations.³⁶
- Performance Plus Impact and Process Evaluation, 2012, from the Efficiency Nova Scotia Corporation.³⁷
- Emera Maine Heat Pump Pilot Program Final Report, 2014.³⁸

Caveat

The estimates produced by the models in this study are not purely gross achievable potential estimates, because the reference case includes some naturally occurring savings. In order to calibrate the model's reference case to the Utilities' load forecast, it was essential to make reasonable assumptions about what efficiency improvements customers would make during the study period, in the absence of new utility programs. The economic, upper achievable, and lower achievable potentials were all calculated from this reference baseline that includes some naturally occurring savings. If the results are then adjusted for net-to-gross ratios, the following adjustments are both being made in the model:

- Naturally occurring savings, from customers who would adopt the efficiency measures in the absence of new utility programs, are being accounted for in the reference case
- Free-ridership, from customers who participate in a program but would have adopted the efficiency measures without its influence, are being accounted for in the net-to-gross ratio

It appears likely that there is some double-counting between naturally occurring savings and freeridership: some of the customers who would have adopted the measures naturally and some of the customers who would be free-riders in a program are actually the same people. Therefore, the exhibits shown below with net upper and lower achievable potential, are likely underestimates of the true net potential.

 ³⁶ Ontario Energy Board, *Total Resource Cost Guide*. October, 2006.
³⁷ Efficiency Nova Scotia Corporation, *Performance Plus Impact and Process Evaluation*, 2012. March, 2013.

³⁸ Emera Maine, *Heat Pump Pilot Program Final Report*. November, 2014.

Results

The net and gross achievable potential results are presented in the following four exhibits:

- Exhibit 91 shows the gross and net upper achievable potential for energy efficiency, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 92 shows the gross and net lower achievable potential for energy efficiency, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 93 shows the gross and net upper achievable potential for demand reduction, by measure and region for the year 2029, along with the net-to-gross ratios used
- Exhibit 94 shows the gross and net lower achievable potential for demand reduction, by measure and region for the year 2029, along with the net-to-gross ratios used

At this time, net-to-gross ratios were not available for demand reduction programs in NL. Because these measures offer no financial advantages to the customer where time of use rates are not in use, free-ridership is assumed to be zero for these measures. The net-to-gross ratios are therefore assumed to be 1.0, and the net potential is equal to the gross potential.

Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029

	Assumed	Island Inter	connected	Labr Intercor	ador nnected	Isolated		
Measure	Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	
Building Recommissioning	0.70	103,530	72,471	21,748	15,223	1,046	732	
Ductless Mini-Split Heat Pump	0.88	57,531	50,628	8,381	7,376	109	96	
Advanced Building Automation Systems	0.85	36,414	30,952	313	266	0	0	
High-Efficiency Air Source Heat Pumps	0.88	34,680	30,518	4,913	4,323	8	7	
Programmable Thermostats	0.85	32,186	27,358	7,457	6,338	63	53	
Occupancy Sensors (Lighting)	0.80	28,764	23,011	2,646	2,117	244	195	
New Construction (25% More Efficient)	0.76	27,945	21,238	1,158	880	427	325	
LED Tubular Lamps	0.95	25,296	24,032	0	0	398	378	
Demand Control Ventilation (DCV)	0.85	21,370	18,165	4,675	3,974	0	0	
VFDs on HVAC Motors	0.75	18,170	13,628	1,136	852	8	6	
High Performance Glazing Systems	0.50	17,405	8,703	4,686	2,343	18	9	
LED Outdoor Fixtures	0.90	14,742	13,268	1,747	1,572	316	285	
LED Street Lighting	0.90	14,491	13,042	0	0	0	0	
Ventilation Heat Recovery	0.85	14,225	12,091	2,238	1,902	14	12	
LED Screw-In Lamps	0.90	13,152	11,837	1,188	1,070	134	121	
High Performance T8 Fixtures	0.80	12,391	9,912	694	555	175	140	
Low-Flow Faucet Aerators	0.70	12,338	8,637	2,188	1,532	17	12	
New Construction (40% More Efficient)	0.76	11,165	8,485	11	8	184	140	
LED Screw-In Lamps	0.90	10,124	9,112	1,093	984	274	247	
Refrigerated Cases with Doors	0.70	8,480	5,936	0	0	0	0	
High Efficiency Compressors (Refrigeration)	0.90	7,497	6,747	320	288	0	0	
Refrigerated Vending Machine Controllers	0.85	5,533	4,703	580	493	96	82	
Activate PC Power Management	0.70	5,294	3,706	234	164	70	49	
ECM Motors and Evaporator Fan Motor Controllers	0.75	5,221	3,916	304	228	13	10	
Lighting Controls (Outdoor)	0.80	4,674	3,739	654	523	50	40	
LED Tubular Lamps	0.95	4,515	4,289	9	9	74	71	
LED High Bay Fixtures	0.70	4,091	2,864	30	21	22	15	

Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029 (cont'd...)

	Accumed	Island Inter	connected	Labr Intercor	ador nnected	Isolated		
Measure	Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	
Low-Flow Showerheads	0.70	3,596	2,517	490	343	2	1	
Wall Insulation	0.80	3,583	2,866	176	141	30	24	
Ground Source Heat Pumps	0.88	2,859	2,516	0	0	3	2	
Cooler Night Covers	0.70	2,739	1,917	121	85	34	24	
Heat Pump Water Heaters	0.88	2,558	2,251	416	366	5	5	
Refrigeration Controls	0.85	2,426	2,062	105	89	0	0	
High Performance T8 Fixtures	0.80	2,034	1,627	256	205	33	26	
T5HO Fixtures	0.60	1,930	1,158	123	74	9	5	
Radiant Infrared Heaters	0.70	1,837	1,286	252	176	0	0	
Roof Insulation	0.80	1,800	1,440	60	48	28	22	
ENERGY STAR Dishwashers	0.70	1,338	937	104	73	0	0	
ENERGY STAR Computers	0.70	1,316	921	84	58	15	11	
Premium Efficiency Motors	0.75	1,283	963	109	82	4	3	
LED High Bay Fixtures	0.70	1,099	770	50	35	7	5	
Demand Control Kitchen Ventilation (DCKV)	0.85	1,059	900	85	73	0	0	
Hotel Occupancy Sensors	0.80	1,030	824	158	126	0	0	
Low-Flow Pre-Rinse Spray Valves	0.70	823	576	99	69	1	1	
Drainwater Heat Recovery	0.85	709	602	64	54	0	0	
T5HO Fixtures	0.60	624	374	45	27	3	2	
Make Use of Daylighting	0.70	523	366	20	14	18	13	
Refrigeration Heat Recovery	0.85	429	365	0	0	0	0	
High-Efficiency Cooking Equipment	0.70	362	253	27	19	0	0	
Automatic Door Closers (Walk-In Coolers & Freezers)	0.70	354	248	39	28	0	0	
Use Task Light Instead of Ambient	0.70	251	176	3	2	0	0	
Reduce Number of Fridges	0.70	205	144	2	1	0	0	
Energy-Efficient Server Technologies	0.70	150	105	3	2	0	0	

Exhibit 91 Gross Versus Net Upper Achievable EE Potential by Measure and Region, 2029 (cont'd...)

	Assumed	Island Inter	connected	Labr Intercor	ador nnected	Isolated	
Measure	Net-to- Gross Ratio	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)	Gross Upper Achievable Potential (MWh/yr.)	Net Upper Achievable Potential (MWh/yr.)
LED Exit Signs	0.75	144	108	27	20	2	1
Use Shades/Blinds (Winter)	0.70	143	100	2	1	0	0
ENERGY STAR Office Equipment	0.70	118	82	6	4	1	1
Keep Doors Closed (Winter)	0.70	70	49	11	7	0	0
CEE-Rated Refrigerators and Freezers	0.70	46	32	0	0	111	78
LED Refrigerated Display Case Lighting	0.95	32	31	0	0	49	47
Use Shades/Blinds (Summer)	0.70	19	13	0	0	0	0
Use Natural Ventilation (Summer)	0.70	10	7	0	0	0	0
Keep Doors Closed (Summer)	0.70	4	3	0	0	0	0
High Efficiency Chillers	0.90	0	0	0	0	0	0
LED Troffers	1.00	0	0	0	0	66	59
Dimming Control (Daylighting)	1.00	0	0	0	0	62	50
Freezer Defrost Controllers	1.00	0	0	0	0	3	3
Grand Total	0.80	588,731	471,578	71,336	55,262	4,251	3,408

Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029

		Island Inter	connected	Labr Intercor	ador nnected	Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	
Ductless Mini-Split Heat Pump	0.88	20,295	17,860	2,961	2,605	0	0	
LED Tubular Lamps	0.95	17,149	16,291	0	0	357	339	
Building Recommissioning	0.70	16,308	11,416	3,393	2,375	0	0	
New Construction (25% More Efficient)	0.76	15,011	11,409	624	475	225	171	
LED Street Lighting	0.90	12,808	11,527	0	0	0	0	
High-Efficiency Air Source Heat Pumps	0.88	12,785	11,251	1,750	1,540	3	3	
Advanced Building Automation Systems	0.85	12,503	10,627	103	88	0	0	
LED Screw-In Lamps	0.90	11,943	10,749	1,042	938	0	0	
Programmable Thermostats	0.85	11,075	9,413	2,409	2,048	0	0	
High Performance T8 Fixtures	0.80	10,842	8,673	608	486	0	0	
LED Screw-In Lamps	0.90	9,321	8,389	958	862	0	0	
Occupancy Sensors (Lighting)	0.80	8,472	6,777	762	610	0	0	
New Construction (40% More Efficient)	0.76	6,134	4,662	6	4	0	0	
LED Outdoor Fixtures	0.90	5,475	4,928	660	594	0	0	
LED Tubular Lamps	0.95	3,980	3,781	3	2	0	0	
LED High Bay Fixtures	0.70	3,676	2,573	10	7	0	0	
Refrigerated Cases with Doors	0.70	2,650	1,855	0	0	0	0	
High Efficiency Compressors (Refrigeration)	0.90	2,505	2,255	100	90	0	0	
Lighting Controls (Outdoor)	0.80	2,005	1,604	263	210	0	0	
Demand Control Ventilation (DCV)	0.85	1,863	1,584	382	324	0	0	
High Performance T8 Fixtures	0.80	1,780	1,424	224	179	0	0	
ECM Motors and Evaporator Fan Motor Controllers	0.75	1,708	1,281	95	71	4	3	
T5HO Fixtures	0.60	1,689	1,013	108	65	0	0	
Refrigerated Vending Machine Controllers	0.85	1,585	1,347	166	141	0	0	
High Performance Glazing Systems	0.50	1,422	711	557	278	1	1	
VFDs on HVAC Motors	0.75	1,298	973	81	61	1	0	

Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029 (cont'd...)

		Island Inter	connected	Labr Intercor	ador nnected	Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	
Ground Source Heat Pumps	0.88	1,281	1,127	0	0	0	0	
Heat Pump Water Heaters	0.88	1,117	983	170	149	0	0	
LED High Bay Fixtures	0.70	1,089	762	44	30	0	0	
Activate PC Power Management	0.70	1,069	748	47	33	14	10	
Cooler Night Covers	0.70	1,034	724	42	30	0	0	
Ventilation Heat Recovery	0.85	1,016	864	160	136	0	0	
Low-Flow Faucet Aerators	0.70	927	649	157	110	0	0	
Refrigeration Controls	0.85	893	759	36	30	0	0	
Radiant Infrared Heaters	0.70	618	433	84	59	0	0	
T5HO Fixtures	0.60	546	328	40	24	0	0	
Hotel Occupancy Sensors	0.80	379	303	57	46	0	0	
Low-Flow Showerheads	0.70	293	205	36	25	0	0	
ENERGY STAR Computers	0.70	263	184	17	12	0	0	
Wall Insulation	0.80	243	194	16	13	0	0	
Make Use of Daylighting	0.70	134	94	5	3	0	0	
LED Exit Signs	0.75	127	95	23	18	0	0	
Automatic Door Closers (Walk-In Coolers & Freezers)	0.70	121	85	13	9	0	0	
High-Efficiency Cooking Equipment	0.70	121	84	9	6	0	0	
Roof Insulation	0.80	108	86	5	4	0	0	
Demand Control Kitchen Ventilation (DCKV)	0.85	98	83	8	6	0	0	
ENERGY STAR Dishwashers	0.70	96	67	7	5	0	0	
Premium Efficiency Motors	0.75	95	71	8	6	0	0	
Use Task Light Instead of Ambient	0.70	66	46	1	0	0	0	
Low-Flow Pre-Rinse Spray Valves	0.70	62	43	7	5	0	0	
Drainwater Heat Recovery	0.85	51	43	5	4	0	0	

Exhibit 92 Gross Versus Net Lower Achievable EE Potential by Measure and Region, 2029 (cont'd...)

		Island Inter	connected	Labr Intercor	ador nnected	Isolated	
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)	Gross Lower Achievable Potential (MWh/yr.)	Net Lower Achievable Potential (MWh/yr.)
Use Shades/Blinds (Winter)	0.70	42	29	0	0	0	0
Reduce Number of Fridges	0.70	41	29	0	0	0	0
Refrigeration Heat Recovery	0.85	31	26	0	0	0	0
Energy-Efficient Server Technologies	0.70	30	21	1	0	0	0
ENERGY STAR Office Equipment	0.70	24	16	1	1	0	0
Keep Doors Closed (Winter)	0.70	19	13	3	2	0	0
CEE-Rated Refrigerators and Freezers	0.70	14	10	0	0	0	0
LED Refrigerated Display Case Lighting	0.95	10	10	0	0	0	0
Use Shades/Blinds (Summer)	0.70	4	3	0	0	0	0
Use Natural Ventilation (Summer)	0.70	2	2	0	0	0	0
Keep Doors Closed (Summer)	0.70	1	1	0	0	0	0
High Efficiency Chillers	0.90	0	0	0	0	0	0
Grand Total	0.83	208,345	173,595	18,264	14,821	605	527

		Island Inter	connected	Labrador Int	erconnected	Isolated	
Measure	Assumed Net-to- Gross Ratio	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)	Gross Upper Achievable Potential (MW)	Net Upper Achievable Potential (MW)
DHW Controls	1.00	0.9	0.9	0.1	0.1	0.0	0.0
Heating Controls	1.00	0.3	0.3	0.0	0.0	0.0	0.0
HVAC Demand Controls	1.00	2.1	2.1	0.2	0.2	0.0	0.0
Lighting Demand Controls	1.00	0.3	0.3	0.1	0.1	0.0	0.0
Refrigeration Demand Controls	1.00	0.2	0.2	0.0	0.0	0.0	0.0
Grand Total	1.00	3.8	3.8	0.3	0.3	0.0	0.0

Exhibit 93 Gross Versus Net Upper Achievable Demand Reduction Potential by Measure and Region, 2029

Exhibit 94 Gross Versus Net Lower Achievable Demand Reduction Potential by Measure and Region, 2029

		Island Inter	connected	Labrador Int	erconnected	Isolated		
Measure	Assumed Net-to- Gross Ratio	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	Gross Lower Achievable Potential (MW)	Net Lower Achievable Potential (MW)	
DHW Controls	1.00	0.2	0.2	0.0	0.0	0.0	0.0	
Heating Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
HVAC Demand Controls	1.00	0.7	0.7	0.1	0.1	0.0	0.0	
Lighting Demand Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
Refrigeration Demand Controls	1.00	0.1	0.1	0.0	0.0	0.0	0.0	
Grand Total	1.00	1.1	1.1	0.1	0.1	0.0	0.0	
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11 Glossary

Achievable Potential:

The portion of the economic conservation potential that is achievable through utility interventions and programs given institutional, economic and market barriers.

Avoided Cost:

By reducing electricity consumption and capacity requirements through the implementation of conservation and demand management programs, the NL utilities avoid the cost of having to buy electricity on the open market, contract for long term supply, and/or build and run new generation facilities. This avoided cost is used to develop a benchmark against which the cost of energy efficiency measures can be compared.

Base Year:

The base year for the 2015 CDM potential assessment is the 2014 sales for the two utilities. This number is derived from 2014 sales and forecast 2014 electric energy and capacity requirements as is explained in each report.

Benchmark for Economic Analysis:

The study established benchmarks for the economic cut-off for new avoided electrical supply on each of the different supply systems in NL. These values were selected to provide the CDM potential assessment with a reasonably useful time horizon (life) to allow planners to examine options that may become more cost-effective over time. The following values were used:

	Avoid	ed Cost per kWh	
Year	Island Interconnected	Labrador Interconnected	Isolated
2014	\$0.11	\$0.04	\$0.21
2017	\$0.13	\$0.04	\$0.23
2020	\$0.05	\$0.05	\$0.26
2023	\$0.06	\$0.05	\$0.29
2026	\$0.07	\$0.06	\$0.34
2029	\$0.08	\$0.07	\$0.37

Cost of Conserved Energy (CCE):

The CCE is calculated for each energy-efficiency measure. The CCE is the annualized incremental capital and operating and maintenance (O&M) cost of the upgrade measure divided by the annual energy savings achieved, excluding any administrative or program costs. The CCE represents the cost of conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity.

Cost of Electric Peak Reduction (CEPR):

The CEPR for a peak load reduction measure is defined as the annualized incremental capital and O&M cost of the measure divided by the annual peak reduction achieved, excluding any administrative or program costs. The CEPR represents the cost of reducing one kW of electricity during a peak period; it can be compared to the cost of supplying one new kW of electric capacity during the same period.

Conservation and Demand Management (CDM):

CDM is the influencing of customers' electricity use to obtain desirable and quantifiable changes in that use. For example, CDM comprises such cooperative joint customer and utility initiatives as peak

clipping, valley filling, load shifting, strategic conservation, strategic load growth, flexible load shape, customer on-site generation and other similar activities.

Economic Potential:

The Economic Potential is the savings in electricity consumption due to energy efficient measures whose Cost of Conserved Energy (CCE) is less than or equal to the Benchmark for Economic Analysis.

Effective Measure Life (EML):

The estimated median number of years that the measures installed under a program are still in place and operable. EML incorporates: field conditions, obsolescence, building remodelling, renovation, demolition, and occupancy changes.

Electricity Audit:

An on-site inspection and cataloguing of electricity-using equipment/buildings, electricity consumption and the related end uses. The purpose is to provide information to the customer and the utility. Audits are useful for load research, for CDM program design, and identifying specific energy savings projects.

Electric Capacity:

The maximum electric power that a device or network is capable of producing or transferring.

Electricity Conservation:

Activities by utilities or electricity users that result in a reduction of electric energy use without adversely affecting the level or quality of energy service provided. Electricity conservation measures include substitution of high-efficiency motors for standard efficiency ones, occupancy sensors in office buildings, insulation in residences, etc.

Electricity Efficiency:

The ratio of the useful energy delivered by a dynamic system to the amount of electric energy supplied to it.

Electric Energy:

Energy in the form of electricity. Energy is the ability to perform work. Electric energy is different from electric power. Electric energy is measured in kilowatt-hours, megawatt-hours or gigawatt-hours.

Electricity Intensity:

Electric energy use measured per application or end use. Examples would include kilowatt-hours per square meter of lit office space per day, kilowatt-hours per tonne of pulp produced, and kilowatt-hours per year per residential refrigerator. Electricity intensity increases as electricity efficiency decreases.

Electric Power:

The rate at which electric energy is produced or transferred, usually measured in watts, kilowatts and megawatts.

End use:

The services of economic value to the users of energy. For example, office lighting is an end use, whereas electricity sold to the office tenant is of no value without the equipment (light fixtures, wiring, etc.) necessary to convert the electricity into visible light. End use is often used interchangeably with energy service.

Energy Service:

An amenity or service supplied jointly by energy and other components such as buildings, motors and lights. Examples of energy services include residential space heating, commercial refrigeration, paper production, and lighting. The same energy service can frequently be supplied with different mixes of equipment and energy.

Financial Incentive:

Certain financial features in the utility's conservation and demand management programs designed to motivate customer participation. These may include features designed to reduce a customer's net cash outlay, pay-back period or cost of finance to participate in a specific conservation and demand management measure or technology.

Flexible Load Shape:

This is utility action to present customers with variations in service quality in exchange for incentives. Programs involved may be variations of interruptible or curtailable load, concepts of pooled, integrated energy management systems, or individual customer load control devices offering service constraints.

Gigawatt-hour (GWh):

One gigawatt-hour is one million kilowatt-hours.

Integrated Planning or Integrated Resource Planning (IRP):

See Supply Planning.

Integrated Electricity Planning (IEP):

See Supply Planning.

Kilowatt (kW):

One thousand watts; the basic unit of measurement of electric energy. One kilowatt-hour represents the power of one thousand watts (one kilowatt) for a period of one hour. A typical non-electrically heated detached home in NL uses about 10,700 kWh per year. A four foot fluorescent lamp in an office might use about 100-200 kWh per year and a large coal-fired plant might produce about three billion kWh per year.

Levelized Cost of Conservation (LCC):

The LCC is calculated for each energy efficiency measure. The LCC is the annualized incremental capital and O&M cost of the measure divided by the annual energy conserved, excluding any administrative or program costs. The LCC represents the cost of generating or conserving one kWh of electricity; it can be compared directly to the cost of supplying one new kWh of electricity. In the context of commercial energy efficiency measures, it is essentially the same as the cost of conserved energy (CCE), which is the term used in this report.

Load Forecast:

This is a forecast of electricity demand over a specified time period. Long-term load forecasts usually pertain to a 10 to 20-year period. In the case of NL, the load forecast assumes a specific set of rates or prices for electricity and competing energy forms, as well as many other economic variables. In addition, forecasts of electricity conserved through CDM programs are incorporated into the Supply Planning process.

Load Research:

Research to disaggregate and analyze patterns of electricity consumption by various sub sectors and end uses is defined as load research. Load research supports the development of the load forecast and the design of conservation and demand management programs.

Load Shape:

The time pattern and magnitude of a utility's electrical demand.

Load Shifting:

Utility program activity to shift demand from peak to off-peak periods is defined as load shifting.

Measure Total Resource Cost (TRC):

The measure TRC calculates the net present value of energy savings that result from an investment in an energy-efficiency measure. The measure TRC is equal to its full or incremental capital cost (depending on application) plus any change (positive or negative) in the combined annual energy and O&M costs. This calculation includes, among others, the following inputs: the avoided electricity supply costs, the life of the technology, and the selected discount rate, which in this analysis has been set at 7%.

A measure with a positive measure TRC value is included in subsequent stages of the analysis, which consists of the Economic and Achievable Potential scenarios. A measure with a negative TRC value is not economically attractive and is therefore not included in subsequent stages of the analysis.

Megawatt (MW):

One thousand kilowatts.

Natural Change in Electricity Intensity:

The future change in electricity intensity in a given end use that is expected to occur in the absence of conservation and demand management programs. In developing an estimate of natural change in electricity intensity it is necessary to make an explicit assumption about the future prices of electricity and competing fuels.

Peak Clipping:

Utility program activity to reduce peak demand without reducing demand at other times of the day or year.

Peak Demand:

Peak demand is the maximum electric power required by a customer or electric system during a short time period, typically one hour. The peak is the time (usually of day or year) at which peak demand occurs. The peak period of interest in NL is from 7 a.m. to noon and 4 p.m. to 8 p.m. on the four coldest days of the winter, for a total of 36 hours.

Rate Structure:

The formulas used to calculate charges for the use of electricity. For example, the present rate structures for both NL utilities for most commercial customers consists of a fixed monthly charge and charges for both electric energy usage and monthly peak demand usage.

Reference Case:

Provides a forecast of electricity sales that includes natural conservation (that which would occur in the absence of CDM programs) but no impacts of utility CDM programs. The reference case for the study is based on the 2014 base year and the Utilities' Load Forecast.

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Sector:

A group of customers having a common type of economic activity. This CDM potential assessment includes the Residential, Commercial, and Industrial sectors.

Sub sectors:

A classification of customers within a sector by common features. Residential sub sectors are by type of home (single-family dwelling or apartment). Commercial sub sectors are generally by type of commercial service (retail and wholesale trade).

Supply Curves:

A graph that depicts the volume of energy at the appropriate screened price in ascending order of cost. Steps A through D below represent programs options, or technologies arranged as a supply curve.



Supply Planning:

The process of long-term planning of electricity generation and associated transmission facilities, in combination with supply reductions made possible through conservation and demand management, in order to meet forecast demands. Supply Planning in NL is done in a framework that recognizes economic, financial, environmental and social costs, risks, and impacts.

Technical Efficiency:

Efficiency of a system, process, or device in achieving a certain purpose, measured in terms of the physical inputs required to produce a given output. In the context of electricity conservation the relevant input is electric energy.

Technology-Based Potential:

Energy and or capacity/demand savings realized through the implementation of energy-efficiency technologies.

Watt:

The basic unit of measurement of electric power.

Appendix A Background-Section 3: Base Year Electricity Use

Introduction

This appendix provides additional detailed information related to the generation of the Commercial sector Base Year profile. The appendix discusses the following:

- Sub sector descriptions
- Sales data analysis
- Detailed Results
- CEEAM archetype summaries existing buildings

A.1 Sub Sector Descriptions

Exhibit 95 presents brief descriptions of the Commercial sub sectors. Detailed building archetype profiles for each sub sector are provided in Sections A.4 (Existing buildings) and C.4 (New buildings) of Appendices A and C, respectively.

Sub Sector	Definition	Examples of Building Types
Large Office	Buildings used for office or public administration, demand greater than 100 kW	Municipal office, government office building, private office buildings
Small Office	Buildings used for office or public administration, demand less than 100 kW	Municipal office, government office building, private office buildings
Food Retail	Retail store that primarily sells food items and has a significant refrigeration load	Supermarket
Large Non-Food Retail	Retail store which primarily sells non-food items, demand greater than 100 kW	"Big box" store, strip mall, enclosed mall unit
Small Non-Food Retail	Retail store which primarily sells non-food items, demand less than 100 kW	Convenience store, independent retailer
Large Accomodation	Large accomodations with common areas, food preparation, and amenities, demand greater than 100 kW	Hotel
Small Accomodation	Small accommodations with very few amenities, demand less than 100 kW	Motel, bed and breakfast
Healthcare	Buildings used for providing multiple accommodations for short- or long-term care residents	Hospital, nursing home, nursing station
Schools	Buildings whose primary function is education. Typically characterized by seasonably variable occupancy.	Elementary or secondary schools
Universities and Colleges	Buildings that make up a campus related to post-secondary education	University campus
Warehouse / Wholesale	Typically metal-clad building with high ceilings and predominantly high-bay lighting	
Restaurant	Full service or quick service restaurant	Family restaurant, franchise restaurant, diner
Large Other Building	Commercial, institutional, manufacturing or light industrial buildings which do not fit the above categories, demand greater than 100 kW	Municipal workshop, prisons, light manufacturing

Exhibit 95 Sub sector Descriptions

Sub Sector	Definition	Examples of Building Types
Small Other Building	Commercial, institutional, manufacturing or light industrial buildings which do not fit the above categories, demand less than 100 kW	Service garages, religious buildings, theaters, light manufacturing
Other Institutional	Buildings that form Canadian Forces Base Goose Bay	Barracks, mess halls, hangers, warehouses
Non-Building	Structures for which electricity is primarily used by unique equipment	Telephone exchange, microwave repeater station
Street Lighting	Street lighting	N/A
Island Isolated C/I Buildings	Buildings located in isolated regions on the Island of Newfoundland	Restaurants, schools, variety stores, medical clinics, multi-purpose garages and sheds
Labrador Isolated C/I Buildings	Buildings located in isolated regions in Labrador, including Lanse-Aux-Loup	Restaurants, schools, variety stores, medical clinics, multi-purpose garages and sheds

Exhibit 95 Sub sector Descriptions (cont'd...)

A.2 Sales Data Analysis

This section outlines the methodology for the allocation of the sales data provided by NLH and NLP to the Commercial sub sectors identified above.

Both NLH and NLP provided sales data to ICF. This data included monthly consumption for accounts grouped by sector, sub sector, and rate class. The sales data was aggregated into the sub sector categories defined by ICF, with the distinction between small and large sub sector building types being made at the 100 kW demand level. Because the three diesel regions of Island Isolated, Labrador Isolated, and Lanse-Aux-Loup have relatively few commercial accounts, it was agreed that instead of reporting at the sub sector level, data and results would be reported in the following aggregate categories: Island Isolated C/I Buildings, Labrador Isolated C/I Buildings, and Street Lighting.

Exhibit 96 Sales Data Subsector Assignments

Sub Sector	Description	CDM Potential Subsector Assignment
Accommodations	Other	Small/Large Accommodation
Accommodations	Restaurants	Restaurants
Education	Colleges and Universities	Universities and Colleges
Education	Other	Schools
Health Care	Hospitals	Health Care
Health Care	Other	Health Care
Non-Buildings		Non-Buildings
Office		Small/Large Office
Other Buildings		Small/Large Other Buildings
Other Buildings	DND	Other Institutional
Retail Trade	Food Stores	Food Retail
Retail Trade	Other	Small/Large Non-Food Retail
Wholesalers & Warehouse		Warehouse/Wholesale

Exhibit 96, above, describes how utility sub sectors were mapped to the sub sector definitions given above.

A.3 Detailed Results

This section of the appendix presents the base year electricity consumption for all three regions.

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Refrigeration	Secondary Lighting	Domestic Hot Water	Computer Equipment	Food Service Equipment	Other Plug Loads	Outdoor Lighting	Space Cooling	Street Lighting	Computer Servers	Elevator	Block Heaters	Grand Total
Large Office	94,614	53,893	46,186	2,666	1,067	15,973	5,999	24,326	1,067	7,386	4,524	10,209	-	4,319	1,033	-	273,262
Small Office	74,726	39,734	19,864	2,170	868	5,902	5,155	19,802		6,012	3,682	7,866	-	3,516	-	-	189,299
Large Non-food Retail	27,391	33,975	27,191	985	5,725	3,596	1,685	1,886	3,817	2,456	3,344	3,168	-	435	-	-	115,655
Small Non-food Retail	39,263	41,215	28,604	1,428	-	4,845	2,577	2,733		3,559	4,845	4,863	-	631	-	-	134,563
Food Retail	18,821	19,666	11,213	729	87,439	3,103	3,279	2,199	8,744	2,369	2,473	1,584	-	322	-	-	161,939
Large Accomodation	17,745	6,841	5,480	631	1,892	7,169	14,755	1,104	3,090	1,205	1,070	1,153	-	232	244	-	62,610
Small Accomodation	9,485	3,690	1,397	300	450	2,047	7,022	525	750	574	509	402	-	110	-	-	27,262
Healthcare	54,806	4,604	27,075	1,042	1,562	21,812	8,124	3,645	8,332	7,008	3,534	2,338	-	844	807	-	145,533
Schools	76,730	42,801	8,422	1,053	1,053	9,582	5,337	7,376	1,404	1,486	5,957	267	-	1,293		-	162,762
Universities and Colleges	11,328	39,550	35,395	1,908	3,816	4,996	1,193	9,870	2,862	4,804	3,237	1,316	-	702	739	-	121,717
Warehouse/Wholesale	24,251	19,171	4,292	1,310	7,861	3,812	1,958	1,742	-	4,212	2,223	108	-	579	-	-	71,518
Restaurants	11,925	2,352	3,434	256	16,672	7,540	18,743	410	33,431	545	435	989	-	113	-	-	96,846
Labrador Isolated C/I Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Island Isolated C/I Buildings	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large Other Buildings	42,605	28,123	21,288	1,335	16,038	9,791	7,707	6,633	7,918	3,972	3,382	2,667	-	1,116	356	-	152,930
Small Other Buildings	40,739	26,977	17,711	1,293	15,178	8,068	6,768	6,124	7,039	3,876	3,410	2,502	-	1,028	196	-	140,908
Other Institutional	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Buildings	-	-	-	199,788	-	-	-	-	-	-	-	-	-	-	-	-	199,788
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	34,828	-	-	-	34,828
Grand Total	544,430	362,591	257,551	216,895	159,621	108,235	90,302	88,376	78,454	49,463	42,624	39,433	34,828	15,241	3,375	-	2,091,418

Exhibit 97 Commercial Sector Base Year (2014) Consumption, Island Interconnected, by Sub Sector and End Use (MWh/yr.)*

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Sub Sector	Space Heating	General Lighting	HVAC Fans & Pumps	Secondary Lighting	Refrigeration	Domestic Hot Water	Food Service Equipment	Other Plug Loads	Miscellaneous Equipment	Computer Equipment	Outdoor Lighting	Street Lighting	Block Heaters	Space Cooling	Computer Servers	Elevator	Grand Total
Large Office	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small Office	1,793	793	189	118	-	108	-	120	22	395	74	-	22	62	70	-	3,766
Large Non-food Retail	2,699	2,234	1,154	248	410	134	273	176	35	135	239	-	35	56	31	-	7,860
Small Non-food Retail	6,716	4,295	1,163	478	-	258	-	338	68	260	460	-	68	121	60	-	14,283
Food Retail	4,669	1,031	309	133	4,105	205	493	133	21	124	139	-	21	25	5	-	11,414
Large Accomodation	2,803	585	466	687	181	1,572	302	116	30	90	103	-	30	57	22	-	7,044
Small Accomodation	438	98	38	55	12	208	20	15	4	12	14	-	4	9	3	-	929
Healthcare	3,057	654	3,671	3,099	222	1,924	1,184	996	74	518	502	-	222	108	120	57	16,408
Schools	6,374	2,331	933	481	21	363	76	81	29	402	324	-	29	12	70	-	11,527
Universities and Colleges	1,410	631	372	80	61	76	46	77	15	157	52	-	15	25	11	-	3,028
Warehouse/Wholesale	4,074	1,396	461	278	572	178	-	307	48	127	162	-	48	6	42	-	7,698
Restaurants	1,136	212	140	606	1,501	1,776	3,071	54	12	37	39	-	12	18	10	-	8,622
Labrador Isolated C/I Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Island Isolated C/I Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large Other Buildings	22,842	7,904	6,537	4,889	6,162	5,426	4,743	1,689	229	1,384	1,359	-	358	269	272	50	64,115
Small Other Buildings	16,047	6,188	3,936	2,881	3,513	2,757	2,645	1,147	157	1,099	955	-	238	209	212	31	42,015
Other Institutional	10,017	12,713	8,247	4,559	1,763	2,407	537	2,075	412	1,212	1,406	-	412	219	-	-	45,979
Non-Buildings	-	-	-	-	-	-	-	-	5,068	-	-	-	-	-	-	-	5,068
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	1,756	-	-	-	-	1,756
Grand Total	84,075	41,065	27,616	18,592	18,523	17,392	13,390	7,323	6,224	5,951	5,828	1,756	1,512	1,197	929	138	251,513
					-												

Exhibit 98 Commercial Sector Base Year (2014) Consumption, Labrador Interconnected, by Sub Sector and End Use (MW)*

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Exhibit 99 Commercial Sector Base Year (2014) Consumption, Isolated, by Sub Sector and End Use (MW)*

Sub Sector	General Lighting	Refrigeration	Secondary Lighting	HVAC Fans & Pumps	Computer Equipment	Outdoor Lighting	Other Plug Loads	Space Heating	Street Lighting	Food Service Equipment	Block Heaters	Domestic Hot Water	Miscellaneous Equipment	Elevator	Space Cooling	Computer Servers	Grand Total
Labrador Isolated C/I																	
Buildings	6,909	3,416	1,608	1,132	1,051	739	677	580	-	496	305	149	-	-	-	-	17,062
Island Isolated C/I																	
Buildings	649	321	151	106	99	69	64	-	-	47	-	-	-	-	-	-	1,505
Street Lighting	-	-	-	-	-	-	-	-	544	-	-	-	-	-	-	-	544
Grand Total	7,558	3,737	1,759	1,238	1,150	808	740	580	544	542	305	149	-	-	-	-	19,112

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

A.4 CEEAM Archetype Summaries – Existing Buildings

This section includes summary profiles of the twenty four existing building archetypes constructed for this study. Exhibit 100 presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Region	Sub Sector	Page #
Island Interconnected	Large Office	A – 8
Island Interconnected	Small Office	A – 13
Island Interconnected	Food Retail	A – 18
Island Interconnected	Small Non-food Retail	A – 23
Island Interconnected	Small Non-food Retail	A – 28
Island Interconnected	Large Accommodation	A – 33
Island Interconnected	Small Accommodation	A – 38
Island Interconnected	Healthcare	A – 43
Island Interconnected	Schools	A – 48
Island Interconnected	Universities and Colleges	A – 53
Island Interconnected	Warehouse / Wholesale	A – 58
Island Interconnected	Restaurant	A – 63
Labrador Interconnected	Large Office	A – 68
Labrador Interconnected	Small Office	A – 73
Labrador Interconnected	Food Retail	A – 78
Labrador Interconnected	Small Non-food Retail	A – 83
Labrador Interconnected	Small Non-food Retail	A – 88
Labrador Interconnected	Large Accommodation	A – 93
Labrador Interconnected	Small Accommodation	A – 98
Labrador Interconnected	Healthcare	A – 103
Labrador Interconnected	Schools	A – 108
Labrador Interconnected	Universities and Colleges	A – 113
Labrador Interconnected	Warehouse / Wholesale	A – 118
Labrador Interconnected	Restaurant	A – 123
N/A	Terms Used in Building Profiles	A – 128

Exhibit 100 Table of Contents - Existing CEEAM Building Profiles

		COMMERCIAL SECTOR BUIL	DING PROFILE
EXISTING BUILDINGS: Large Office	SIZE: > 100 kW	VINTAGE:	REGION: Island Interconnected
Baseline CONSTRUCTION			
	-		
Wall U value (W/m².°C) 0.71	W/m².°C	0.12 Btu/hr.ft².°F	Typical Building Size 3,717 m² 40,000 ft²
Roof U value (W/m².°C) 0.48	W/m².°C	0.09 Btu/hr.ft ² .°F	Typical Footprint (m²) 1,239 m² 13,333 ft²
Glazing U value (W/m ² .°C) 3.97	W/m².°C	0.70 Btu/hr.ft ² .°F	Pootprint Aspect Ratio (L:W) 1 Percent Conditioned Space 100%
	_		Percent Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.40 Shading Coefficient (SC) 0.58			Defined as Exterior Zone
			Floor to Floor Height (m) 3.7 m 12.0 ft
VENTILATION SYSTEM, BUILDING CONTRO	DLS & IND	OOR CONDITIONS	
Ventilation System Type		CAV CAVR DDM	Z DDMZVV VAV VAVR IU 100% O.A TOTAL
		System Present (%) 75%	25% 100%
		Min. Air Flow (%) (Minimum Throttled Air Volume as Percent of Full Flow)	60%
Occupancy or People Density Occupancy Schedule Occ. Period		26 m²/person 274 ft²/person	%OA <u>22.09%</u>
Occupancy Schedule Unocc. Period			
Fresh Air Requirements or Outside Air		20 L/s.person 42 CFM/pers	son
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fresh Air Control Type = "2" enter % FA. to t	ne right:
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fresh Air Control Type = "3" enter Make-up A	ir Ventilation and operation L/s.m ² CFM/ft ²
Sizing Factor		1.3	Uperation (76)
Total Air Circulation or Design Air Flow		3.55 L/s.m ² 0.70 CFM/ft ²	Separate Make-up air upit (100% OA)
Infiltration Rate		0.70 L/s.m ² 0.14 CFM/ft ²	Operation occupied period 50%
(air infiltration is assumed to occur during unocci	upied		Operation unoccupied period 50%
Economizer	Incidence	Enthalpy Based Dry-Bulb Based	Total
	Switchove	er Point KJ/kg. 18 °C	Peak Design Cooling Load 1,067,682
		Btu/lbm 64.4 °F	Peak Zone Sensible Load 462,384
Controls Type	System P	resent (%) HVAC Room	Discharge air enthalpy 23.2 Bution 23.4 Btu/lbm
		Equipment Controls	Specific volume of air at 55F & 100% R 13.2 ft³/lbm
	DDC/Pne	umatic	Total air circulation or Design air 3.55 //s.m ²
	All DDC	uld add-up to 100%)	
	rotal (ono		
Control mode	Control M	ode Proportional PI / PID Tota	d .
		Fixed Discharge Reset	
	Control St	rategy	
Indoor Design Conditions		Room	Supply Air
	Summer T	emperature 24 °C 75	2] °F 14 °C 57.2] °F
	Enthalpy	65.5 KJ/kg. 28.	2 Btu/lbm 54.5 KJ/kg. 23.4 Btu/lbm
	Winter Oc Winter Oc	c. Temperature 21 °C 69	8 °F 15 °C 59 °F
	Enthalpy	53 KJ/kg. 22.	3 Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm
	Winter Un	occ. Temperature 21 °C 69	8 °F
	Enthalpy	50 KJ/kg. 21.	5 Btu/lbm
			· · · · ·
Damper Maintenance		Incidence Frequency	
	O a set set 1 A a	(%) (years)	
	Lubricatio	n	
	Blade Sea	al Replacement	
Air Filter Cleaning	Changes/	Year	
	r	Incidence	of Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenance	e	1	
	Annual Ma	aintenance Tasks Incidence	Annual Maintenance Tasks Incidence
	Calibratio	(%)	(%)
	Calibration	n of Panel Gauges	Inspection of PE Switches
	Inspection	of Auxiliary Devices	Inspection of Auxiliary Devices
	Inspection		(Dampers, VAV Boxes)

EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW	COMME	RCIAL SECTOR BUILDING PROFILE VINTAGE:	REGION: Island Interconnected	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	550 Lux 51 0.90 14.8 W/m ² 1	.1 ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 95% 20%	Light Level (Lux) % Distribution Weighted Average	450 550 650 10% 80% 10	0%	Total 100% 550
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 112 20.0 0.7 0.7 0.0 20.0 0.65 0.65 0.65 0.1 15 50 1 10	18 HD 15H LED 0% 80.0%	101AL 100.0%
of Practice	Group Spot				EUI kWh/ft².yr 5.2 MJ/m².yr 202
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 32 0.10 31.0 W/m² 2	.5 ft-candles .9 W/ft²			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3400 5360 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 300 4 10% 40% 40	400 500 0% 10%	Total 100% 350
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 112 45% 45% 112 0.7 0.7 0 0.65 0.65 0.7 115 50 7	18 HID 15HO LED 5% 5% 5% 0.6 0.6 0.6 0.6 75 0.80 0.80 0.80 72 84 65 95 90	101AL 6 100.0% 6 100.0%
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 1.5
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²	Floor fr	raction check: should = 1.00 1.00]
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500 7	700 1000	Total
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL T 0.7 0.7 0.7 0.65 0.65 0.3 15 50	T12 T8 MH HP3 0.6 0.6 0.6 0.6 0.6 75 0.80 0.80 0.55 0.55 72 84 88 65 90	
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr
TOTAL LIGHTING				Overall LP 16.38 W/m ²	EUI TOTAL kWh/ft².yr 7 MJ/m².yr 262
OFFICE EQUIPMENT & PLUG LOA	DS				
Equipment Type	Computers	Monitors	Printers Copiers	Servers Plug Loads	-
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period	55 0.9 1.9 W/m ² 0.2 W/tt ² 80% 50%	51 0.9 1.8 W/m ² 0.2 W/ft ² 80% 50%	100 200 0.15 0.1 0.6 W/m² 0.8 W/m² 0.05 W/t² 0.7 W/t² 80% 50% 50% 50%	217 0.06 0.5 W/m ² 1.5 W/m ² 0.05 W/tt ² 100% 100% 50% 2000 2500	
Operation Unocc. Period (hrs./year)	6760	6760	<u> </u>	<u>2000</u> <u>2500</u> 6760 6260	
Total end-use load (occupied period) Total end-use load (unocc. period) Usage during occupied period	5.8 W/m ² 3.8 W/m ² 100%	0.5 W/ft ² 0.4 W/ft ²		Computer Server Computer Equipmer	s EUI kWh/ft².yr 0.42 MJ/m².yr 16.20 tt EUI kWh/ft².yr 2.36 MJ/m².yr 91.24
Usage during unoccupied period	66%			Plug Load	s EUI kWh/ft².yr 0.72 MJ/m².yr 27.70
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel	Sh	Electricity Fuel Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr 0.2 MJ/m².yr 6.0	All Electric EUI EUI kWh/ff2.yr 0.1 MJ/m2.yr 4.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant					EUI kWh/ft².yr 0.1 MJ/m².yr 4.0
BLOCK HEATERS & MISCELLANE	ous			Block Heater Miscellaneou	s EUI kWh/ft².yr <u>MJ/m².yr</u> s EUI kWh/ft².yr <u>0.3</u> MJ/m².yr 10

		COMME	RCIAL SECTO	r Buildin	G PROFI	LE						
EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW	,	VINTAGE:					REGION: Island Inte	rconnected	I		
SPACE HEATING												
Heating Plant Type			Fuel	Oil / Propar	ie		Ele	ctric				
			Boile Stan.	rs P Hiah	ackaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)	15%	80%	70%	1 70	3.00	4.50	85%	100%		
		Performance (1 / Eff.)	1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load	62.0 W/m ² 417 MJ/m ² .yr	19.7 Btu/hr.ft ² 10.8 kWh/ft ² .yr										
(Tertiary Load) Sizing Factor	1.00											
Electric Fuel Share	85.0%	Fuel Oil / Propage Fuel Sh 15.00		il Euel Shar			1			F	All Electric EUI	10.8
	85.0%			II Fuel Share	3		J				MJ/m².yr	417
Boiler Maintenance	Annual Ma	aintenance Tasks	(%)							Γ	Fuel Oil / Propane El	UI
	Fire Side Water Side	Inspection de Inspection for Scale Buildup	75% 100%								kWh/ft².yr MJ/m².yr	15.4 596
	Inspection	n of Controls & Safeties	100%								Market Composite Fl	
	Flue Gas	Analysis & Burner Set-up	90%							-	kWh/ft².yr	11.5
											WJ/TF.yt	444
SPACE COOLING												
A/C Plant Type		Centrifua	al Chillers	WSHP R	eciprocat	ina Chillers	Absorptio	n Chillers	Total			
		Standard Standard	HE		Open	DX	W. H.	CW	100.0%			
		COP 4	.7 5.4	3.5	3.5	80.0%	0.9	1	100.0%			
		Performance (1 / COP) 0.2 (kW/kW)	.1 0.19	0.29	0.29	0.38	1.11	1.00				
		Additional Refrigerant										
		Related mormation										
Control Mode		Incidence of Use Fixed	Reset									
		Chilled Water										
		Condenser Water										
Setpoint		Chilled Water		44.6°	F							
		Supply Air 14	.0°C	57.2 °	F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	84 W/m² 109.0 MJ/m².yr	27 Btu/hr.ft ² 450 2.8 kWh/ft ² .yr) ft²/Ton									
Sizing Factor	1.00	Operation (o	cc. period)	3000 h	rs/year	Note value	cannot be	less than 2,	900 hrs/yea	ır)		
A/C Saturation	85.0%											
(Incidence of A/C)												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel Sh										
Chiller Maintenance	Annual Ma	aintenance Tasks	Incidence F	requency								
	Inspect C	ontrol Safeties & Purge Unit	(%)	(years)								
	Inspect C	oupling, Shaft Sealing and Bearings										
	Condense	er Tube Cleaning										
	Vibration Eddy Cur	Analysis rent Testing										
	Spectroch	hemical Oil Analysis									All Electric EUI	4.0
											MJ/m².yr	45
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks	Incidence F	requency (vears)						Г	Fuel Oil / Propane El	JI
	Inspection	n/Clean Spray Nozzles	()*/	()							kWh/ft².yr	
	Megger N	Aotors									WJ/THyi	
	Inspect/V	erify Operation of Controls								-	Market Composite El kWh/ft².yr	UI 1.2
											MJ/m².yr	45
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue	el SHW Tank			Boiler				Fossil	E	Elec. Res.	
	System P Eff./COP	Present (%) 0.65			10% 0.75		Fuel Share Blended F	e fficiencv	10% 0.75	-	90% 0.91	
Service Hot Water load (MJ/m ² .yr)	22.8	1 0.001			00				5.10			
(Tentary Load)			All E	Electric EUI			Fuel	Oil / Propan	e EUI		Market Composite E	UI
Wetting Use Percentage	90%		kV M	Vh/ft².yr J/m².yr	0.6 25			kWh/ft².yr MJ/m².yr	0.8 30		kWh/ft².yr MJ/m².yr	0.7 25.5

		COMMER	CIAL SECTOR BUILDING PROFILE				
EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW	I Contraction of the second	VINTAGE:	REGION: Island Inte	rconnected		
HVAC FANS & PUMPS							
SUPPLY FANS			[Ventilation and Exhau	st Fan Operation & Conti	rol	
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency	3.6 L/s.m ² 750 Pa 750 Pa 52%	0.70 3.0 3.0 wg wg	Control Incidence of Use Operation	Fixed Variable Flow 75% 25% Continuou Scheduled	Fixed Variable Flow 100% Continuous Scheduled	-	
Sizing Factor Fan Design Load CAV Fan Design Load VAV	85% 1.00 0 6.0 W/m² 6.0 W/m²	0.56 W/ft ²	Incidence of Use Comments:	90% 10%	90% 10%		
EXHAUST FANS				1			
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wash 0.2 L/s.m² 0.1 L/s.m² 0.3 L/s.m² 250 Pa 40% 80% 1.0 V/m²	212 CFM/washro 0.03 CFM/ft² 0.02 CFM/ft² 0.05 CFM/ft² 1.0 wg	bom				
AUXILIARY COOLING EQUIPMENT	(Condenser Pump a	and Cooling Tower/Condenser Fans)					
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	0.020 kW/kW 1.65 W/m ²	0.07 0.15 W/ft ²				
Condenser Pump							
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.004 L/s.m ² 90 kPa 55% 90% 1.0 0.81 W/m ²	3.0 U.S. gpm/Ton 0.007 U.S. gpm/ft ² 30 ft 0.08 W/ft ²				
CIRCULATING PUMP (Heating & Co	oling)						
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	elta T	0.004 L/s.m ² 150 kPa 55% 90% 0.5 0.5 W/m ²	0.0053 U.S. gpm/ft ² 2.4	4]U.S. gpm/Ton			
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 45.1 kWh/m².yr					
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 1.7 kWh/m².yr					
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy	n gy Consumption	0.4 kWh/m².yr 0.6 kWh/m².yr					
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	1	5000 hrs./year 0.4 kWh/m².yr					
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/A	faintenance Tasks iervice Fans & Motors djust Belt Tension on Fan Belts	Incidence Frequency (%) (years)				
	Inspect/S	ervice Pump & Motors				EUI kWh/ft².yr MJ/m².yr	4.5 173.2

EXISTING BUILDINGS: Large Office Baseline	:	SIZE: > 100 kW	COMMERCIAL SECT VINTAGE:	OR BUILDI	NG PROFILE		REGION: Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		26.5 kWh/ft².yr 1,024.9 MJ/m².yr	Fuel Oil /	Propane:	2.4 kWh/ft ² .yr	92.5 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	5.2	202.1		kWh/ft2.yr	MJ/m ² .yr	kWh/ft2.yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING	1.5	59.9	SPACE HEATING	9.2	354.9	2.3	89.5	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	38.3			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	22.5	0.1	3.0	
HVAC FANS & PUMPS	4.5	173.2	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.1	4.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	2.4	91.2						
COMPUTER SERVERS	0.4	16.2						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

			со	MMERCIAL SI	ECTOR BUILD	ING PROF	ILE	
EXISTING BUILDINGS:	SIZE:			VINTA	GE:			REGION:
Small Office Baseline	< 100 KW							Island Interconnected
CONSTRUCTION								
	-							
Wall U value (W/m ² .°C) 0.38	3 W/m².°C		0.07 Btu/hr.	ft².°F		Typical B	uilding Size	1,859 m ² 20,000 ft ²
Roof U value (W/m ² .°C) 0.19	9 W/m².°C		0.03 Btu/hr.	ft².°F		Typical Fo	potprint (m ²)	929 m ² 10,000 ft ²
Glazing U value (W/m ² .°C) 3.97	W/m².°C		0.70 Btu/hr.	ft².°F		Footprint	Aspect Ratio (I	L:W) 1
						Percent C	onditioned Spa	ace 100%
Window/Wall Ratio (WIWAR) (%) 0.30)					Defined a	s Exterior Zone	
Shading Coefficient (SC) 0.58	3					Typical #	Stories	2
						Floor to F	loor Height (m	a) <u>3.7 m</u> <u>12.0 ft</u>
VENTILATION SYSTEM, BUILDING CONTROL	DLS & INDOOR	CONDITIONS						
Ventilation System Type	Svet	em Present (%)	100%	VR DDM.		VAV	VAVR IU 100% O.A TOTAL 100%
	Min.	Air Flow (%)	''	10070			60%	10070
	(Min	imum Throttled	Air Volume a	s Percent of Fu	ll Flow)			
Occurrency or Reento Density		26 m²	horson		74 ft2/porcon			9/ 04 22.479/
Occupancy Schedule Occ. Period		90%	person		14 It-person			760A 23.4776
Occupancy Schedule Unocc. Period								
Fresh Air Requirements or Outside Air		20 L/s	.person		42 CFM/pers	on		
Fresh Air Control Type */enter	a 1, 2 or 3)	1 If F	resh Air Contre	ol Type = "2" o	nter % FA to th	e right:		
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	lf F	resh Air Contro	ol Type = "3" e	nter Make-up A	ir Ventilatio	n and operatior	n L/s.m ² CFM/ft ²
								operation (%)
Sizing Factor Total Air Circulation or Design Air Flow		1.3 3 34 1/s	m ²) 66 CEM/ft2			
Total All Circulation of Design All Flow		5.54 1/3			0.00 01 10/11		Separate Mal	ke-up air unit (100% OA) L/s.m ² CFM/ft ²
Infiltration Rate		0.70 L/s	.m²	0	.14 CFM/ft ²		Op	peration occupied period 50%
(air infiltration is assumed to occur during unocc	upied						Op	beration unoccupied period 50%
nours only if the venuation system shuts down)								
Economizer			Enthalpy Bas	ed Dry	-Bulb Based	Total]	
	Incidence of Us	e		10	0%	100%	5 Su	Immary of Design Parameters
	Switchover Poi	nt	KJ/kg. Btu/lbn		18 °C	_	Pe	eak Design Cooling Load 520,257
			Dianon		1		Ro	pom air enthalpy 28.2 Btu/lbm
Controls Type	System Presen	t (%)	HV	AC Roo	m		Dis	scharge air enthalpy 23.4 Btu/lbm
	All Proumatio		Equi	oment Contr	ols		Spi	ecific volume of air at 55F & 100% R 13.2 ft ³ /lbm
	DDC/Pneumati						To	tal air circulation or Design air 3.34 Vs.m ²
	All DDC						L	<u>_</u>
	Total (should a	d-up to 100%)						
			Proportion	al PI/PI	D Tota	Π		
Control mode	Control Mode							
			Fixed Discha	rge Reset				
	Control Strateg	y						
Indoor Design Conditions				Room			Su	ipply Air
_	Summer Temp	erature		24 °C	75.	2 °F	14 °C	57.2 °F
	Summer Humic	ity (%)		50%	00.0	D1//b	98%	
	Enthalpy Winter Occ. Te	mperature		21 °C	28.2	Btu/iom 8°F	54.5 K	D/kg. 23.4 Btu/lom
	Winter Occ. Hu	midity		30%			45%	
	Enthalpy			53 KJ/kg.	22.8	Btu/lbm	45.5 K.	J/kg. 19.6 Btu/lbm
	Winter Unocc.	Cemperature		21 °C	69.	۶°F		
	Enthalpy	Turnituity		50 KJ/kg.	21.5	Btu/lbm		
Damper Maintenance			Incid	lence Freque	ncv			
Damper Mantenance			(9	%) (vea	rs)			
	Control Arm Ac	justment						
	Lubrication							
	Blade Seal Rep	lacement						
Air Filter Cleaning	Changes/Year							
					Incidence (of Annual R	oom Controls	Maintenance
Incidence of Annual HVAC Controls Maintenand	e				incluence (, , , , , , uai N	0010015	
							1-	
	Annual Mainten	ance Tasks	Incid	lence			Annual Mainte	enance Tasks Incidence
	Calibration of T	ransmitters	(9	/0)			Inspection/Ca	(%)
	Calibration of F	anel Gauges					Inspection of	PE Switches
	Inspection of A	uxiliary Devices	3				Inspection of	Auxiliary Devices
	Inspection of C	ontrol Devices					Inspection of	Control Devices (Valves,

EXISTING BUILDINGS: Small Office Baseline	SIZE: < 100 kW	COMMER	RCIAL SECTOR BUILDING PROFI VINTAGE:	E REGION: Island Int	erconnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	550 Lux 51 0.95 14.8 W/m ² 1	1 ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 20%	Light Level (Lux) % Distribution Weighted Average	450 550 10% 80%	650 10% T12 T8 HID	T5HO LED	Total 100% 550 TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0.65 0.65 15 50	20.0% 80.0% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				EI	UI kWh/ft².yr	4.7
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 32 0.05 31.0 W/m² 2	5 ft-candles 9 W/ft²				MJ/m².yr	183
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 300 10% 40%	400 500 40% 10%		Total 100% 350	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	45% 45% 0.7 0.7 0.65 0.65 15 50	112 10 100 0.6 0.6 0.6 0.6 0.75 0.80 0.80 72 84 65	1310 1210 5 5% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Loa	d X Hrs. X SF X GLFF	EU	UI kWh/ft².yr MJ/m².vr	0.7
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²	[Floor fraction check: should = '	1.00 1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500	700 1000 T12 T8	MH HPS		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LAM)	0.7 0.7 0.7 0.65 0.65 15 50	0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	0.6 0.6 0.55 0.55		
Relamping Strategy & Incidence of Practice	Group Spot				E	UI kWh/ft².yr	
TOTAL LIGHTING				Overall LF	P 15.57 W/m² EU	UI TOTAL kWh/ft².yr MJ/m².yr	5 210
OFFICE EQUIPMENT & PLUG LOA	ADS						
Equipment Type	Computers	Monitors	Printers Cop	iers Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period	55 0.9 1.9 W/m ² 0.2 W/ft ² 80% 50%	51 0.9 1.8 W/m ² 0.2 W/ft ² 80% 50%	100 200 0.15 0.1 0.6 W/m² 0.8 0.05 W/ft² 0.07 80% 80% 50%	217 0.06 W/m² 0.5 W/t² 0.05 W/t² 0.05 100% 100%	1.5 W/m ² 0.14 W/ft ² 80%		
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	2000 6760	2000 6760	2000 2000 6760 6760	2000 6760	2500 6260		
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m² 3.8 W/m²	0.5 W/ft ² 0.4 W/ft ²			Computer Servers El	UI kWh/ft².yr MJ/m².yr	0.42
Usage during occupied period Usage during unoccupied period	100% 66%				Plug Loads	UI KWh/ft².yr UI KWh/ft².yr MJ/m².yr	91.24 0.72 27.70
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel	Sh	Electricity Fuel Share: 100.0%	Fuel Oil / Propa EUI kWh/ft².yr MJ/m².yr	ne EUI 0.1 5.0	All Electric EL UI kWh/ft².yr MJ/m².yr	JI
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant					E	UI kWh/ft².yr MJ/m².yr	0.1 4.0
BLOCK HEATERS & MISCELLANE	ous				Block Heaters El	UI kWh/ft².yr MJ/m².yr UI kWh/ft².yr M.I/m².yr	0.3

		COMMER	CIAL SECT	or Buildi	NG PROFI	LE						
EXISTING BUILDINGS: Small Office Baseline	SIZE: < 100 kW	I	VINTAGE:					REGION: Island Inte	rconnected			
SPACE HEATING												
Heating Plant Type			Fue	el Oil / Propa	ne		Ele	ctric				
			Boi Stan	lers Hiah	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)	10%	g.:	700/	1 70	2.00	4.50	90%	100%		
		Performance (1 / Eff.)	1.43	1.25	1.43	0.59	0.33	4.50	1.00			
		(kW/kW)										
Peak Heating Load	49.9 W/m ² 383 M l/m ² vr	15.8 Btu/hr.ft ²										
(Tertiary Load)		<u></u>										
Sizing Factor	1.00		_				_				All Electric EUI	
Electric Fuel Share	90.0%	Fuel Oil / Propane Fuel Sh 10.0%	I	Oil Fuel Sha	re						kWh/ft².yr MJ/m².yr	9.9 383
Boiler Maintenance	Annual M	aintenance Tasks	Incidence								Eucl Oil / Bropopo El	
	Fire Side	Inspection	(%)							_	kWh/ft².yr	14.1
	Water Sid	de Inspection for Scale Buildup n of Controls & Safeties	100% 100%								MJ/m².yr	547
	Inspection Flue Gas	n of Burner Analysis & Burner Set-un	100%								Market Composite El	UI 10.3
	1.100000		0070								MJ/m².yr	399
SPACE COOLING												
A/C Plant Type												
		Centrifugal	Chillers HE	WSHP	Reciprocat	ing Chillers	s Absorptio W H	n Chillers	Total			
		System Present (%)			Open	100.0%	VV. FI.	CVV	100.0%			
		COP 4.7 Performance (1 / COP) 0.21	5.4 0.19	<u>3.5</u> 0.29	3.5 0.29	2.6	6 0.9 8 1.11	1.00				
		(kW/kW) Additional Refrigerant										
		Related Information										
Control Mode		Incidence of Use Fixed Setpoint	Reset									
		Chilled Water										
		Condenser Water										
Setpoint		Chilled Water 7]°C [44.6	°F							
		Condenser Water 30 Supply Air 14.0	°С С	86 57.2	°F °F							
			I U I	01.2								
Seasonal Cooling Load	111.0 MJ/m ² .yr	26 Btu/nr.tt² 461 2.9 kWh/ft².yr	π-/ I on									
(Tertiary Load)												
Sizing Factor	1.00	Operation (oc	c. period)	3000	hrs/year	Note value	e cannot be	less than 2	900 hrs/yea	ır)		
A/C Saturation	75.0%											
(Incidence of A/C)												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel Sh	Ι									
Chiller Maintenance	Annual M	aintenance Tasks	Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge Unit	(%)	(years)								
	Inspect C Megger N	oupling, Shaft Sealing and Bearings										
	Condense	er Tube Cleaning										
	Eddy Cur	rent Testing								-		
	Spectroc	hemical Oil Analysis								_	All Electric EUI kWh/ft².yr	1.2
Cooling Tower/Air Cooled Condense	ar Maintenan Annual M	aintenance Tasks	Incidence	Frequency							MJ/m².yr	48
			(%)	(years)						F	Fuel Oil / Propane El	JI
	Inspect/S	ervice Fan/Fan Motors									MJ/m².yr	
	Megger N Inspect/V	Notors erify Operation of Controls								Г	Market Composite E	UI
		<u> </u>									kWh/ft².yr M l/m² yr	1.2 48
DOMESTIC LICT MATTE											WO/IIE.yi	-10
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fu Svstem F	el SHW Tank Present (%)			Boiler 10%		Fuel Shar		Fossil 5%	ł	Elec. Res. 95%	
Service Hot Water load (M 1/m2	Eff./COP	0.65			0.75]	Blended E	fficiency	1.50		0.91	
(Tertiary Load)	22.0					1		0.1./-		_		
Wetting Use Percentage	90%		A	II Electric EL kWh/ft².yr	л 0.6		Fuel	Uil / Propan kWh/ft².yr	e EUI 0.4	-	Market Composite E kWh/ft².yr	UI 0.6
	·			MJ/m².yr	25			MJ/m².yr	15		MJ/m².yr	24.5

		COMME	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:	R	EGION:					
Small Office	< 100 kV	v		Is	sland Inte	rconnecte	ed			
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation a	ind Exhau	st Fan Ope	eration & Cont	rol		
				Ventilatio	on Fan	Exh	aust Fan			
System Design Air Flow	3.3 L/s.m ²	0.66 CFM/ft ²	Control	Fixed V	/ariable	Fixed	Variable	1		
System Static Pressure CAV	750 Pa	3.0 wg			Flow		Flow			
System Static Pressure VAV	750 Pa	3.0 wg	Incidence of Use	100%		100%		-		
Fan Efficiency	52%		Operation	Continuou	Scheduled	Continuou	sScheduled			
Fan Motor Efficiency	85%		la side se a state s	000/	4.00/	000/	400/	1		
Sizing Factor	0.50	0.20 10/62	Incidence of Use	90%	10%	90%	10%	'n		
Fan Design Load VAV	2.6 W/m ²	0.26 W/ft ²	Comments:							
Tan Design Edad With	2.0	0.20	ooninicitis.							
EXHAUST FANS				1				1		
Washroom Exhaust	100 L/s.wash	nroom 212 CFM/washr	oom							
Washroom Exhaust per gross unit area	0.2 L/s.m ²	0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²								
Total Building Exhaust	0.3 L/s.m ²	0.06 CFM/ft ²								
Exhaust System Static Pressure	250 Pa	1.0 wg								
Fan Efficiency	40%	· · · · · · · · · · · · · · · · · · ·								
Fan Motor Efficiency	80%									
Sizing Factor	0.5									
Exhaust Fan Connected Load	0.1 W/m ²	0.01 W/ft ²								
	<i>.</i>									
AUXILIARY COOLING EQUIPMENT	(Condenser Pump a	and Cooling Tower/Condenser Fans)								
Average Condenses For Bower Drow		0.020 100/000	0.07 100//Terr							
Average Condenser Fan Power Draw	Cooled Condenses)	0.020 KVV/KVV	0.07 KVV/10n							
(Cooling Tower/Evap. Condensel/ Air	Cooled Condensel)	1.61 W///14	0.15 \\\//12							
Condenser Rump										
Condenser Fump										
Pump Design Flow		0.053 L/s KW	30 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.004 L/s m ²	0.006 U.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5								
Pump Connected Load		0.40 W/m ²	0.04 W/ft ²							
CIRCULATING PUMP (Heating & Co	oling)									
Pump Design Flow @ 5 °C (10 °F) de	elta T	0.004 L/s.m ²	0.0052 U.S. gpm/ft ² 2.4	4 U.S. gpm/To	on					
Pump Head Pressure		150 kPa	50 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5	0.05 10/62							
Pump Connected Load		0.5 W/II-	0.05 \\//12							
Supply Fan Occ. Period		3500 hrs./vear								
Supply Fan Unocc. Period		5260 hrs./year								
Supply Fan Energy Consumption		23.3 kWh/m ² .vr								
3, 11, 11, 11, 11, 11, 11, 11, 11, 11, 1										
Exhaust Fan Occ. Period		3500 hrs./year								
Exhaust Fan Unocc. Period		5260 hrs./year								
Exhaust Fan Energy Consumption		1.0 kWh/m².yr								
Condenser Pump Energy Consumption	n	0.2 kWh/m².yr								
Cooling Tower /Condenser Fans Energy	gy Consumption	0.6 kWh/m ² .yr								
Circulating Pump Yearly Operation		5000 hrs./year								
Circulating Pump Energy Consumption	ı	0.3 kWh/m².yr								
Fans and Pumps Maintenance	Annual N	Vaintenance Tasks	Incidence Frequency							
		Consise Fore 9 Mater-	(%) (years)							
	Inspect/S									
	Inspect/9	Service Pump & Motors						EUI	kWh/ft² vr	24
	mopool/d								MJ/m ² .vr	91.5
ι								ــــــــــــــــــــــــــــــــــــــ		55

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
EXISTING BUILDINGS: Small Office Baseline	:	SIZE: < 100 kW	VINTAGE	:			REGION: Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		22.5 kWh/ft².yr 872.2 MJ/m².yr	Fuel Oil /	Propane:	1.4 kWh/ft².yr	55.4 MJ/m².yr	
END USE:	kWh/ft2.yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.7	183.1		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.7	27.2	SPACE HEATING	8.9	344.3	1.4	54.7	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	36.2			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	23.8	0.0	0.8	
HVAC FANS & PUMPS	2.4	91.5	FOOD SERVICE EQUIPMENT					
REFRIGERATION	0.1	4.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	2.4	91.2						
COMPUTER SERVERS	0.4	16.2						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

			COMMER	CIAL SECT	or Building	3 PROFIL	LE			
EXISTING BUILDINGS:	SIZE:			VINTAGE:				REGION:		
Food Retail Baseline	All							Island Interconnected		
CONSTRUCTION										
Wall U value (W/m ² .°C)	0.55 W/m ² .°C		0.10 Btu/hr.ft ² .°	F	T	vpical Bui	ilding Size	2,788 m ²	2 30,000 ft	2
Roof U value (W/m ² .°C)	0.40 W/m ² .°C		0.07 Btu/hr.ft ² .°	F	T	vpical Fo	otprint (m ²)	2.788 m	2 30.000 ft	2
	4.17 W/m2.°C	-	0.72 Btu/br ft2 9	E	· . E/	o otorint A	connect Rotio (L-M/)	2,700	00,000	
Giazing O value (W/III C)	4.17 W/IIF. C	L	0.73 Blumine.	F	P	ercent Co	anditioned Space	100%		
					P	ercent Co	onditioned Space	45%		
Window/Wall Ratio (WIWAR) (%)	0.06				D	efined as	Exterior Zone			
Shading Coefficient (SC)	0.69				T	ypical # S	Stories	1		
					FI	loor to Flo	oor Height (m)	4.6 m	15.0 ft	
VENTILATION SYSTEM, BUILDING	CONTROLS & IND	OOR CONDITION	IS							
Ventilation System Type			CAV	CAVR	DDMZ D	DMZVV	VAV VAVR	IU 100% O.A	TOTAL	
		System Present ((%) 100%	b			500/		100%	
		(Minimum Throttle	ed Air Volume as Pe	rcent of Full	Flow)		50%			
		(minimum millional			,					
Occupancy or People Density		30 n	n²/person	323	ft²/person			%OA 22.97%		
Occupancy Schedule Occ. Period		90%								
Occupancy Schedule Unocc. Period			1	10	0514/2000					
Fresh Air Requirements or Outside Air		20 L	/s.person	42	CFIM/person					
Fresh Air Control Type	*(enter a 1, 2 or 3)	1 lf	Fresh Air Control Ty	/pe = "2" ent	er % FA. to the	e right:				
(1 = mixed air control, 2 = Fixed fresh a	air, 3 100% fresh air)	lf	Fresh Air Control T	/pe = "3" ent	er Make-up Air	r Ventilati	on and operation	0.5 L/s.m ²	0.10 CFM/ft ²	
							-	50% operation (%))	
Sizing Factor		1.5								
Total Air Circulation or Design Air Flow	1	2.90 L	/s.m²	0.57	CFM/ft ²		Concrete Make un ei	t unit (1000(OA)	1/2 m2	OEM/#2
Infiltration Rate		0.70 1	/s m ²	0.14	CEM/ft ²		Operation	occupied period	50%	CFIWI/IL-
(air infiltration is assumed to occur duri	ng unoccupied	0.70	23.111	0.14	OF MILT		Operation	unoccupied period	50%	
hours only if the ventilation system shut	ts down)									
	-						r			
Economizer	Incidence	of Lloo	Enthalpy Based	Dry-Bu	b Based	Total	Cummon	of Design Deservators		
	Switchove	r Point	K I/ka	100%	°C	100%	Peak Des	ion Cooling Load	31 563	
	Owneriove	I I Olik	Btu/lbm	64.4	°F		Peak Zon	e Sensible Load 2	245.685	
						1	Room air	enthalpy	28.2 Btu/lbm	
Controls Type	System P	resent (%)	HVAC	Room			Discharge	air enthalpy	23.4 Btu/lbm	
			Equipmen	Controls			Specific volu	ume of air at 55F & 100% R	13.2 ft ³ /lbm	
	All Pneum	atic					Design CF	-M	11,429	
	All DDC	Induc					TOTALATIC	inculation of Design an	2.90 (/5.11-	
	Total (sho	uld add-up to 1009	%)							
		•								
			Proportional	PI / PID	Total					
Control mode	Control M	ode	Fixed Discharge	Posot						
	Control St	rategy	Tixed Discharge	Reser						
		57	I							
Indoor Design Conditions				Room			Supply Air	·		
	Summer T	emperature	2	2 °C	71.6 °	F	13 °C	55.4 °F		
	Summer F	iumidity (%)	50%	5 K I/ka	28.2 F	Stu/lbm	54.5 K l/kg	23.4 Btu/lbm		
	Winter Oc	c. Temperature	2	2 °C	71.6 °	F	16 °C	60.8 °F		
	Winter Oc	c. Humidity	30%	ò	-	ŀ	45%			
	Enthalpy		5	3 KJ/kg.	22.8 B	8tu/lbm	45.5 KJ/kg.	19.6 Btu/lbm		
	Winter Un	occ. Temperature	2	°C	69.8 °	F				
	Winter Un	DCC. Humidity	30%		21.5	tu/lbm				
	станру		5	/INJ/Kg.	21.0					
Damper Maintenance			Incidence	Frequency						
		- A -live to -i	(%)	(years)						
	Control Ar	m Adjustment								
	Blade Sea	Replacement								
				-						
Air Filter Cleaning	Changes/	rear								
					Incidence of A	nnual Ro	oom Controls Mainter	ance		
Incidence of Annual HVAC Controls Ma	aintenance	T								
		•		_						
	Annual Ma	intenance Tasks	Incidence				Annual Maintenance	Tasks In	cidence	
	Colleget	of Tronsmitter-	(%)	4			Inconcetion/Calibration	of Doom Thormostor	(%)	
	Calibration	of Panel Gauree		1			Inspection of PE Swi	tches		
	Inspection	of Auxiliary Devic	es	1			Inspection of Auxiliar	y Devices		
	Inspection	of Control Device	es]			Inspection of Control	Devices (Valves,		
							(Dampers, VAV Boxe	es)		

EXISTING BUILDINGS: Food Retail Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDING VINTAGE:	PROFILE	REGION: Island Interc	onnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	500 Lux 46.	5 ft-candles							
Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	14.5 W/m ² 1.	3 W/ft ² Light Level (Lux) % Distribution Weighted Average	300	500 700 100%	1000		Total 100% 500		
Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice	20%	System Present (%)	INC 3% 0.7	CFL T12 2% 15% 0.7 0.6	T8 HID 75% 5% 0.6 0.7 0.92 0.92	T5HO LED 0% 0% 0.6 0.6 0.00 0.00	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	0.85 0.75 50 72	88 65	95 90	EUI kWh	√ft².yr m² vr	7.0
ARCHITECTURAL LIGHTING (COF Light Level Floor Fraction (ALFF) Connected Load	State State <th< td=""><td>5 ft-candles 3 W/ft²</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	5 ft-candles 3 W/ft ²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5000 3760 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700 100%	1000		Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL T12 15% 0.7 0.6 0.65 0.75 50 72	T8 HID 75% 8% 0.6 0.6 0.80 0.80 88 65	T5HO LED 2% 0% 0.6 0.6 0.80 0.80 95 90	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		EU	I = Load X Hrs. X	SF X GLFF	i	EUI kWh MJ/i	/ft².yr m².yr	1.1 43
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27.	9 ft-candles 3 W/ft ²		Floor fraction	on check: should = 1.00	1.00]		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65	CFL T12 0% 0.7 0.6 0.65 0.75 0.7	T8 0.6 0.6 0.80 0.80 84 88	MH HPS 100% 0% 0.6 0.6 0.55 0.55 65 90	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI kWh MJ/I	√ft².yr m².yr	
TOTAL LIGHTING					Overall LP	14.38 W/m ²	EUI TOTAL kWh MJ/r	/ft².yr m².yr	8 312
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	}		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Ucc. Period (hrs./year) Operation Ucc. Period (hrs./year)	55 0.43 0.1 W/ft ² 90% 50% 2000 6760	51 0.43 0.7 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	100 0.01 0.00 W/m ² 0.00 W/ft ² 90% 50% 2000 6760	200 0.01 0.1 W/m ² 0.01 W/ft ² 90% 50% 2000 6760	217 0.02 0.1 W/m ² 0.01 W/ft ² 100% 100% 2600 6160	1.5 W/m ² 0.14 W/ft ² 90% 50% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.9 W/m ²	0.3 W/ft ² 0.2 W/ft ²	to see notes (cells with red	indicator in upper r	right corner, type "SHIFT	R2ömpter Servers	EUI kWh MJ/r	√ft².yr m².yr	0.11
Usage during occupied period Usage during unoccupied period	100% 58%				C	omputer Equipment Plug Loads	EUI kWh MJ/r EUI kWh MJ/r	/ft².yr n².yr /ft².yr m².yr	0.78 30.2 0.84 32.5
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share: 1	00.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI 2.6 100.0	All Elec EUI kWh MJ/r	:tric EUI √ft².yr m².yr	3.1 120.0
REFRIGERATION Provide description below: Commercial refrigeration display case)S]				EUI kWh MJ/r	/ft².yr m².yr 1:	31.0 200.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI kWh MJ/r EUI kWh	/ft².yr m².yr /ft².yr	0.3

EXISTING BUILDINGS: Food Retail Baseline	SIZE: All	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Island Interconr	ected
SPACE HEATING			
Heating Plant Type		Fuel Oil / Propane Electric	
		Boilers Packaged A/A HP W. S. HP H/R Chiller Resis	tanceTotal
		System Present (%) 15% 170 3.00 4.50	85% 100%
		Performance (1 / Eff.) 1.43 1.25 1.43 0.59 0.33 0.22	1.00
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	36.2 W/m ² 304 MJ/m ² .yr	11.5 Btu/hr.ft² 7.8 KWh/t².yr	
	1.00		
Electric Fuel Share	85.0% Fuel C	/ Propane Fuel Share 15.0% Oil Fuel Share	KVVh/tt².yr 7.8 MJ/m².yr 304
Boiler Maintenance	Annual Ma	ntenance Tasks Incidence (%)	Fuel Oil / Propane EUI
	Fire Side Water Side	Inspection 75%	kWh/ft².yr 11.2 M.I/m².yr 434
	Inspection	of Controls & Safeties 100%	Market Composite ELII
	Flue Gas	nalysis & Burner Set-up 90%	kWh/ft².yr 8.3
			MJ/m².yr 323
SPACE COOLING			
A/C Plant Type		Centrifugal Chillers Screw Reciprocating Chillers Absorption Chillers 1 System Present (%) HE Chillers Open DX W. H. CW COP 4.7 5.4 4.4 3.6 2.6 0.9 1 Performance (1 / COP) 0.21 0.19 0.23 0.28 0.38 1.11 1.00 (kW/kW) Additional Refrigerant Related Information Information Information Information	otal 1.0%
Control Mode		Incidence of Use Fixed Reset Setpoint Chilled Water Condenser Water	
Setpoint		Chilled Water 7 °C 44.6 °F Condenser Water 30 °C 86 °F Supply Air 13.0 °C 55.4 °F	
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	66 W/m² 75.2 MJ/m².yr	21 Btu/hr.ft² 570 ft²/Ton 1.9 kWh/tt².yr	
Sizing Factor	1.00	Operation (occ. period 4000 hrs/year Note value cannot be less than 2,900 h	rs/year)
A/C Saturation (Incidence of A/C)	65.0%		
Electric Fuel Share	100.0% Fuel C	/ Propane Fuel Share	
Chiller Maintenance	Annual Ma	ntenance Tasks Incidence Frequency	
	Inspect C	ntrol, Safeties & Purge Unit	
	Inspect C	upling, Shaft Sealing and Bearings	
	Condense	Tube Cleaning	
	Vibration Eddy Cur	nalysisnt Testing	
	Spectroch	mical Oil Analysis	All Electric EUI
		terrer Terle	MJ/m².yr 33
Cooling Tower/Air Cooled Condensi	- wantenantAnnual Ma	(%) (years)	Fuel Oil / Propane EUI
	Inspection Inspect/Section	Ciean Spray Nozzles	kWh/ft².yr MJ/m².yr
	Megger M	ify Operation of Controls	Market Composite EUI
	inopool v		kWh/ft².yr 0.9
			мәлік-уі 33
SERVICE HOT WATER			
Service Hot Water Plant Type	Fossil Fue Svstem P	SHW Avg. Tank Boiler For esent (%) 30% Fuel Share Fuel Share	sil Elec. Res. 10% 90%
Sonico Hot Water Lood (M 1/2-2)	Eff./COP	65.00 0.75 Blended Efficiency	2.25 0.91
(Tertiary Load)	40.5		
Wetting Use Percentage	90%	All Electric EUI Fuel Oil / Propane EUI kWh/t².yr 1.3 kWh/t².yr MJ/m².yr 50 MJ/m².yr	Market Composite EUI 0.5 kWh/ft².yr 1.2 20 MJ/m².yr 47.0

		COMMERC	CIAL SECTOR BUILDING PROFILE						
EXISTING BUILDINGS: Food Retail Baseline	SIZE: All		VINTAGE:		REGION: Island Inte	erconnecte	d		
HVAC FANS & PUMPS									
SUPPLY FANS				Ventilation	and Exhau	ist Fan Ope	ration & Co	ontrol	
System Design Air Flow 29	1/s m ² 0.57	CEM/ft ²	Control	Ventilat Fixed	ion Fan Variable	Exhau Fixed	ist Fan Variable		
System Static Pressure CAV 750) Pa 3.0	wg	Control	T IAGU	Flow	TIXEG	Flow		
System Static Pressure VAV 750) Pa 3.0	wg	Incidence of Use	100%	0 - 1 - 1 - 1	100%	0 - h - d d - d		
Fan Motor Efficiency 80%			Operation	Continuou	Scheduled	Continuous	Scheduled		
Sizing Factor 1.00		1	Incidence of Use	100%		100%			
Fan Design Load CAV 4.5	W/m ² 0.42 W/m ² 0.42	W/ft ² W/ft ²	Comments:						
	J 4								
EXHAUST FANS									
Washroom Exhaust 100	L/s.washroom	212 CFM/wash	room						
Washroom Exhaust per gross unit area 0.1 Other Exhaust (Smoking/Conference) 0.1	L/s.m ² L/s.m ²	0.01 CFM/ft ² 0.02 CFM/ft ²							
Total Building Exhaust 0.2	L/s.m ²	0.03 CFM/ft ²							
Exhaust System Static Pressure 250) Pa	1.0 wg							
Fan Motor Efficiency 75%	5								
Sizing Factor 1.0		1.44/6-0							
Exhaust Fan Connected Load 0.2	2 W/m ² 0.02	VV/ft ²							
AUXILIARY COOLING FOURMENT (Condens	as Dump and Casling Tax	ver/Condenser Fons)							
AUXILIART COOLING EQUIPMENT (Condens	er Pump and Cooling 10	ver/Condenser Fans)							
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	0.020 kW/kW 1.33 W/m ²	0.07 kW/Ton 0.12 W/ft ²						
Condenser Pump									
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton						
Pump Design Flow per unit floor area Pump Head Pressure		0.004 L/s.m ² kPa	0.005 U.S. gpm/ft ² ft						
Pump Efficiency		50%							
Pump Motor Efficiency Sizing Factor		80%							
Pump Connected Load		W/m ²	W/ft ²						
CIRCULATING PUMP (Heating & Cooling)									
Pump Design Flow @ 5 °C (10 °F) delta T	0.003	L/s.m ²	0.0042 U.S. gpm/ft ² 2.4	U.S. gpm/	Ton				
Pump Head Pressure Pump Efficiency	100	kPa	50 ft						
Pump Motor Efficiency	80%	-							
Sizing Factor	0.8	14//202	0.05 \W/62						
	0.0	W/III-	0.03						
Supply Fan Occ. Period	5000	hrs./vear							
Supply Fan Unocc. Period	3760	hrs./year							
Supply Fan Energy Consumption	39.7	kWh/m².yr							
Exhaust Fan Occ. Period	5000	hrs./year							
Exhaust Fan Unocc. Period	3760	hrs./year							
Exhaust Fan Energy Consumption	2.0	kvvh/m².yr							
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur	nption 0.4	kWh/m².yr kWh/m².yr							
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	7000 0.6	hrs./year kWh/m².yr							
Fans and Pumps Maintenance	Annual Maintenance Tasl	(S	Incidence Frequency						
	Inspect/Service Fans & M	otors	(%) (years)						
	Inspect/Adjust Belt Tensic	n on Fan Belts							
	Inspect/Service Pump & N	Notors						EUI kWh/ft².y MJ/m².v	/r 4.0 r 153.9

			COMMERCIAL SECT	OR BUILDI	IG PROFILE			
EXISTING BUILDINGS: Food Retail Baseline	:	SIZE: Ali	VINTAGE	:			REGION: Island Interconnected	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		57.4 kWh/ft².yr 2,222.4 MJ/m².yr	Fuel Oil /	Propane:	1.7 kWh/ft ² .yr	67.1 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	7.0	269.9		kWh/ft2.yr	MJ/m ² .yr	kWh/ft2.yr	MJ/m ² .yr	
ARCHITECTURAL LIGHTING (COR	: 1.1	42.6	SPACE HEATING	6.7	258.3	1.7	65.1	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	21.7			
OTHER PLUG LOADS	0.8	32.5	SERVICE HOT WATER	1.2	45.0	0.1	2.0	
HVAC FANS & PUMPS	4.0	153.9	FOOD SERVICE EQUIPMENT	3.1	120.0			
REFRIGERATION	31.0	1,200.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.8	30.2						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.9	33.9						

				COMMER	CIAL SEC	TOR BUILD	ING PROF	ILE					
EXISTING BUILDINGS:	SIZE:				VINTAGE					REGION:			
Large Non-Food Retail Baseline	> 100 KW									Island Interconnecte	a		
CONSTRUCTION													
				1							ı r		
Wall U value (W/m ² .°C)	0.55 W/m ² .°C		0.10	Btu/hr.ft ² .	Ϋ́F		Typical B	uilding Size		1,859	m²	20,000	ft ²
Roof U value (W/m ² .°C)	0.40 W/m ² .°C		0.07	Btu/hr.ft ² .	Ϋ́F		Typical Fo	potprint (m ²))	1,859	m²	20,000	ft ²
Glazing U value (W/m ² .°C)	4.17 W/m ² .°C		0.73	Btu/hr.ft ² .	F		Footprint	Aspect Rati	io (L:W)	5	1		
							Percent C	onditioned	Space	100%	I		
Window/Wall Ratio (W/IWAR) (%)	0.10						Defined a	s Exterior 7	one	40%			
Shading Coefficient (SC)	0.75						Typical #	Stories	.0110	1	I		
							Floor to F	loor Height	(m)	5.0	_I m [16.5	ft
VENTILATION SYSTEM, BUILDING	CONTROLS & INDO	OR CONDITION	S										
							1	1				r	
Ventilation System Type		System Brosent /	0/)	CAV	CAVR	DDMZ		VAV	VAVR	IU 100% O.A	TOTAL 100%	t i	
		Min. Air Flow (%)	70)	100 %				50%			100%	•	
		(Minimum Throttle	ed Air Vo	lume as Pe	ercent of F	ull Flow)	1				•		
O		05	-2/		000	42/				N OA 40.000	I		
Occupancy of People Density		25 m	1²/person		269	nt4/person				%UA 12.88%			
Occupancy Schedule Unocc. Period		5070											
Fresh Air Requirements or Outside A	ir	20 L	/s.persor	ı	42	CFM/perso	on						
Freeh Air Control Turne	*(optor c 1 2 c+ 0)	-	Eroch A:-	Control T	(no - "2" -	ntor 0/ EA	o tho simbly			249/		7	
(1 = mixed air control. 2 = Fixed fresh	(enter a 1, 2 or 3) air, 3 100% fresh air)	1 If	Fresh All	Control T	vpe = "2" e vpe = "3" e	nter ‰ ⊢A. t	o me right: o Air Ventil:	ation and or	peration	0.5 L/s.m ²	0.10	CFM/ft ²	
(,				/					50% operation	%)		
Sizing Factor		2				0.000							
I otal Air Circulation or Design Air Fid	W	6.21 L	/s.m²		1.22	CFM/ft ²		Separate I	Make-un ai	r unit (100% OA)		I/s m ²	CEM/ft ²
Infiltration Rate		L	/s.m²			CFM/ft ²		Copulato	Operation	occupied period	50%		
(air infiltration is assumed to occur du	ring unoccupied					_			Operation	unoccupied period	50%	1	
hours only if the ventilation system sh	uts down)												
Economizer			Enthalpy	/ Based	Dry-Bi	ulb Based	Total	T					
	Incidence	of Use			100%		100%	,	Summary	of Design Parameters			
	Switchove	r Point		KJ/kg.	18	°C			Peak Desi	ign Cooling Load	571,544		
				Btu/Ibm	64.4	۳F		1	Peak Zone Room air	e Sensible Load	262,842	Btu/lbm	
Controls Type	System Pr	esent (%)		HVAC	Room				Discharge	air enthalpy	23.4	Btu/lbm	
				Equipment	Controls				Specific volu	ume of air at 55F & 100% R	13.2	ft³/lbm	
	All Pneuma	atic							Design CF	FM insulation of Design sit	12,227	1/0 m2	
	All DDC	Induc							TUIALAILU	inculation of Design all	0.21	V5.III ⁻	
	Total (sho	uld add-up to 100%	6)										
			Drana	rtional	םום / חם	Total	7						
Control mode	Control Mo	ode	гюро	Itional		TOTAL							
Control mode	Control Inte		Fixed Di	scharge	Reset								
	Control Str	rategy											
Indoor Design Conditions					Room				Supply Air		ſ	ſ	
Indoor Design Conditions	Summer T	emperature		21	°C	69.8	°F	14	°C	57.2 °F		Î.	
	Summer H	umidity (%)		50%	-		-	100%				Î.	
	Enthalpy	-		65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4 Btu/lbm		1	
	Winter Oco	c. Temperature		21	°C	69.8	¶ °F	15 45%	°C	59 °F		Î.	
	Enthalpy	5. Truminity		53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6 Btu/lbm		Î.	
	Winter Und	occ. Temperature		21	°C	69.8	°F					1	
	Winter Und	occ. Humidity		30%			T					Î.	
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm					•	
Damper Maintenance				Incidence	Frequency	(
	Control Ar	m A divistment		(%)	(years)								
	Lubrication												
	Blade Sea	Replacement]							
Air Filter Cleaning	Changes/Y	'ear			1								
5	5.00				1						,		
Insidence of Appure UN/AC Contracts	Agintopopoc	1				Incidence o	f Annual R	oom Contro	ols Mainter	nance	ı.		
Incidence of Annual HVAC Controls I	viairilleriaNCe	l											
	Annual Ma	intenance Tasks		Incidence]			Annual Ma	intenance -	Tasks	Incidence	I	
				(%)				L			(%)	ł	
	Calibration	of Transmitters						Inspection	Calibration	n of Room Thermostat	I	t	
	Inspection	of Auxiliary Device	es					Inspection	of Auxilian	v Devices		İ	
	Inspection	of Control Device	s		1			Inspection	of Control	Devices (Valves,		I	
	<u> </u>				-			(Dampers,	VAV Boxe	es)		ι	

EXISTING BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMMERC	CIAL SECTO VINTAGE:	OR BUILDIN	g profil	E	F	REGION: sland Interc	connected				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46. 0.95 20.5 W/m ² 1.	5 ft-candles 9 W/ft ²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4280 95% 15%	Light Level (Lux) % Distribution Weighted Average		400 25%	500 50%	600 25%	1000		ТЕНО		Total 100% 500	2	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		10% 0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 88	0.6 0.80 65	0% 0.6 0.80 95	0% 0.6 0.80 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot									1	EUI	kWh/ft².yr MJ/m².yr	8.9 345
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46. 0.05 31.7 W/m² 2.	5 ft-candles 9 W/ft ²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 95% 50%	Light Level (Lux) % Distribution Weighted Average		300 30%	500 40%	700 30%	1000	нр	ТБНО	IED	Total 100% 500	<u> </u>	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		30% 0.7 0.65 15	5% 0.7 0.65 50	10% 0.6 0.75 72	50% 0.6 0.80 88	0.6 0.80 65	0% 0.6 0.80 95	5% 0.6 0.80 90	100.0%	2	
Relamping Strategy & Incidence of Practice	Group Spot			E	UI = Load	X Hrs. X S	SF X GLFF			1	EUI	kWh/ft².yr MJ/m².yr	0.9 36
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²			F	loor fractio	on check: s	hould = 1.0	0	1.00	[
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		300	500	700	1000		No. 1	1100	Total	-	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	0.6 0.55 90	TOTA	-	
Relamping Strategy & Incidence of Practice	Group Spot									ĺ	EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							C	Overall LP	21.07 W	/m²	EUI TOTAI	_ kWh/ft².yr MJ/m².yr	10 381
OFFICE EQUIPMENT & PLUG LOA	DS Computers	Monitors	Print	ers	Copie	ars	Serve	ers	Plug Lo:	ads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period	55 0.22 0.5 W/m ² 0.0 W/tt ² 90% 50%	51 0.22 0.4 W/m ² 0.0 W/ft ² 90% 50%	100 0.01 0.00 V 90% 50%	V/m²	200 0.01 0.1 W 0.01 W 90% 50%	V/m² V/ft²	217 0.02 0.1 V 0.01 V 100% 100%	V/m² V/ft²	1.15 W 0.11 W 90% 50%	//m² //ft²			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	2000 6760	2000 6760	2000 6760		2000 6760		2000 6760		4100 4660				
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m ² 1.2 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes	(cells with re	d indicator	in upper ri	ght corner,	type "SHIF	T Câmputer	Servers	EUI	kWh/ft².yr MJ/m².yr kWh/ft² yr	0.11 4.42 0.49
Usage during occupied period Usage during unoccupied period	100% 59%								Plu	g Loads	EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	19.14 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5	Electricity F	uel Share:	100.0%	E	Fuel Oi EUI k M	I / Propane Wh/ft².yr /IJ/m².yr	EUI		A EUI	II Electric EUI kWh/ft².yr MJ/m².yr	1.0 38.7
REFRIGERATION Provide description below:]								EUI	kWh/ft².yr MJ/m².yr	1.5 58.1
BLOCK HEATERS & MISCELLANE	ous								Block Misce	Heaters	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.3 0.3 10

EXISTING BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW		COMMER	CIAL SEC VINTAGE	for Buildi :	NG PROFI	LE	F	REGION: sland Inter	rconnecte	d		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elec	tric				
				Bo Stan	oilers High	Packaged Roofton	A/A HP	W. S. HP	I/R Chiller	Resistance	Total		
		System Present (%)		15%	riigii	Roonop				85%	100%		
		Eff./COP Performance (1 / Eff.)		70%	80% 1.25	70% 1.43	1.70 0.59	3.00	4.50 0.22	1.00 1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	54.5 W/m ² 327 MJ/m ² .yr	17.3 8.4	Btu/hr.ft² kWh/ft².yr								Г	All Electric EUI	
Electric Fuel Share	85.0% Fuel O	il / Propane Fuel Share	15.0%	þ	Oil Fuel Sha	re]				kWh/ft².yr	8.4
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence]						L	IVIS/TIF.yi	321
	Fire Side I	Inspection		(%) 75%	-						-	Fuel Oil / Propane EU kWh/ft².yr	l 12.1
	Water Sid	e Inspection for Scale Buil	ldup	100%	-						L	MJ/m².yr	467
	Inspection	of Burner		100%	-						F	Market Composite EU	11
	Flue Gas A	Analysis & Burner Set-up		90%								kWh/tt².yr MJ/m².yr	9.0 348
SPACE COOLING													
A/C Plant Type													
		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 10.0% 4.8 0.21	al Chillers HE 3 5.4 0.19	Screw Chillers 4.4 0.23	Reciprocat Open 5.0% 3.7 0.27	ing Chillers DX 85.0% 2.6 0.38	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset				<u> </u>					
Setpoint		Chilled Water Condenser Water Supply Air	7 30 14.0	ີ•C •C ງ•C	44.6 86 57.2	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	90 W/m ² 106.8 MJ/m ² .yr	29 Btu/hr.ft ² 2.8 kWh/ft ² .yr	420	_ft²/Ton									
Sizing Factor	1.00												
A/C Saturation (Incidence of A/C)	75.0%												
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share]									
Chiller Maintenance	Annual Ma Inspect Co Inspect Co Megger M	intenance Tasks ontrol, Safeties & Purge Ui pupling, Shaft Sealing and lotors	nit Bearings	Incidence (%)	Frequency (years)								
	Condense Vibration	r Tube Cleaning											
	Eddy Curr	ent Testing									F		
	Spectroch	emical Oil Analysis		1							-	All Electric EUI kWh/ft².yr	1.1
Cooling Tower/Air Cooled Condenser	Maintenan Annual Ma	intenance Tasks		Incidence	Frequency							MJ/m².yr	43
	Inspection Inspect/Se Megger M	/Clean Spray Nozzles ervice Fan/Fan Motors lotors		(%)	(years)						[Fuel Oil / Propane EU kWh/ft².yr MJ/m².yr	1
	Inspect/Ve	errry Operation of Controls	6	I							-	Market Composite EU kWh/ft².yr MJ/m².yr	ת 1.1 43
DOMESTIC HOT WATER													
1	Fossil Fue	ISHW Avg. Tan	k			Boiler				Fossil		Elec. Res.	
Service Hot Water Plant Type	System Pr	resent (%)	F			10%		Fuel Share	iniona	10%	-	90%	
Service Hot Water Plant Type Service Hot Water load (MJ/m².yr)	System Pr Eff./COP 17.3	resent (%)0.65	5			10% 0.75		Fuel Share Blended Eff	iciency	10% 0.75	-	90% 0.91	

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS: Large Non-Food Retail	SIZE: > 100 kW	VINTAGE:		REGION: Island Interconnected						
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	and Exhau	ist Fan Ope	ration & Co	ontrol		
System Design Air Flow	62 1/2 m ²	22 CEM/#2	Control	Ventilat Fixed	ion Fan	Exhau	st Fan]		
System Design Air Flow System Static Pressure CAV	750 Pa 3	.0 wg	Control	rixea	Flow	Fixed	Flow			
System Static Pressure VAV	750 Pa 3	.0 wg	Incidence of Use	100% Continuour	Scheduled	100% Continuous	Scheduled			
Fan Motor Efficiency	88%		Operation	Continuou	Scheduled	Continuous	Scheduled			
Sizing Factor 1 Fan Design Load, CAV	.00 8.8 W/m ² 0	82 W/ft2	Incidence of Use	90%	10%	90%	10%	1		
Fan Design Load VAV	8.8 W/m ² 0.	82 W/ft ²	Comments:							
EXHAUST FANS										
Washroom Exhaust	50 L/s.washroom	106 CFM/wa	shroom							
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.01 CFM/ft ²								
Total Building Exhaust	0.2 L/s.m ²	0.02 CFM/ft ²								
Exhaust System Static Pressure	250 Pa	1.0 wg								
Fan Motor Efficiency	75%									
Sizing Factor	1.0 0.2 W/m ² 0	02 W/ft2								
	0.2									
AUXILIARY COOLING EQUIPMENT (Cond	enser Pump and Cooling T	ower/Condenser Fans	;)							
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Coole	d Condenser)	1.80 W/m²	0.17 W/ft ²							
Condenser Pump										
Pump Design Flow		L/s.KW	U.S. gpm/Ton							
Pump Head Pressure		45 kPa	15 ft							
Pump Efficiency		50%								
Sizing Factor		1.0								
Pump Connected Load		W/m²	W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T	0.0	04 L/s.m ²	0.0057 U.S. gpm/ft ² 2.4	U.S. gpm/	Ton					
Pump Head Pressure	50	kPa	ft							
Pump Motor Efficiency	80	%								
Sizing Factor Pump Connected Load	0	.8 W/m ²	W/ft ²							
Supply Fan Occ. Period	550	0 hrs./year								
Supply Fan Unocc. Period Supply Fan Energy Consumption	32	60 hrs./year I.4 kWh/m².yr								
Exhaust Fan Occ. Period	550	10 brs /vear								
Exhaust Fan Unocc. Period	32	60 hrs./year								
Exhaust Fan Energy Consumption		.7 kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cor	nsumption (kWh/m².yr).5 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	700	0 hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual Maintenance Ta	asks	Incidence Frequency							
	Inspect/Service Fans &	Motors	(%) (years)							
	Inspect/Adjust Belt Ten	sion on Fan Belts						EUI	k\N/b/f+2 \r	71
	Inspect/Service Pump &		<u> </u>					EUI	MJ/m².yr	7.1 275.9

COMMERCIAL SECTOR BUILDING PROFILE											
EXISTING BUILDINGS: Large Non-Food Retail Baseline	SIZE: VI > 100 kW						REGION: Island Interconne	ected			
EUISUMMARY											
TOTAL ALL END-USES:	Electricity:		30.3 kWh/ft².yr 1,173.7 MJ/m².yr	Fuel Oil /	Propane:	1.9 kWh/ft².yr	72.4 MJ/m ² .	yr			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electricity		Fuel Oil /	Propane				
GENERAL LIGHTING	8.9	344.8	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr				
ARCHITECTURAL LIGHTING	0.9	36.5	SPACE HEATING	7.2	278.0	1.8	70.1				
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.8	32.2						
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.4	17.1	0.1	2.3				
HVAC FANS & PUMPS	7.1	275.9	FOOD SERVICE EQUIPMENT	1.0	38.7						
REFRIGERATION	1.5	58.1									
MISCELLANEOUS	0.3	10.0									
BLOCK HEATERS											
COMPUTER EQUIPMENT	0.5	19.1									
COMPUTER SERVERS	0.1	4.4									
ELEVATORS/ESCALATORS											
OUTDOOR LIGHTING	0.9	33.9									
			COMME	RCIAL SECT	OR BUILDING PROF	ILE					
---	---------------------------	--------------------	----------------------	----------------	--------------------------	--	---				
EXISTING BUILDINGS: Non-Food Retail	SIZE: < 100 kW			VINTAGE		REGION: Island Interco	nnected				
CONSTRUCTION											
Sonorikooriek											
Wall U value (W/m ² .°C)	0.43 W/m ² .°C		0.07 Btu/hr.ft	².°F	Typical Bu	ulding Size	929 m ² 10.000 ft ²				
Roof U value (W/m ² .°C)	0.19 W/m ² .°C		0.03 Btu/hr.ft	°.°F	Typical Fo	ootprint (m ²)	929 m ² 10,000 ft ²				
Glazing U value (W/m ² °C)	4 17 W/m ² °C		0.73 Btu/br ft	۰F	Footprint	Aspect Ratio (L·W)	5				
					Percent C	onditioned Space	100%				
					Percent C	onditioned Space	45%				
Window/Wall Ratio (WIWAR) (%)	0.10				Defined as	s Exterior Zone	1				
Shading Coefficient (SC)	0.75				Floor to Fl	oor Height (m)	5.0 m 16.5 ft				
			~								
VENTILATION SYSTEM, BUILDING C	ONTROLS & IND	OOR CONDITION	5								
Ventilation System Type			C/	V CAVR	DDMZ DDMZVV	VAV VAVR IU 100	% O.A TOTAL				
		System Present (%	%) 100	%			100%				
		Min. Air Flow (%)	d Air Volumo oo	Porcont of Fu	II Flow	50%					
			a All Volume as	Feicenii oi Fu	ii Flow)						
Occupancy or People Density		25 m	² /person	269	ft²/person	%OA 1	8.18%				
Occupancy Schedule Occ. Period		90%									
Eresh Air Requirements or Outside Air		20 1/	/s person	42	CFM/person						
			olpoioon		or miporoon						
Fresh Air Control Type	*(enter a 1, 2 or 3)	1 If F	Fresh Air Contro	Type = "2" e	nter % FA. to the right:	34%					
(1 = mixed air control, 2 = Fixed fresh ai	r, 3 100% fresh air)	IT F	Fresh Air Contro	Туре = "3" е	nter Make-up Air Ventila	ation and operation 0.5 L/s	.m ² 0.10 CFM/tt ²				
Sizing Factor		1.25									
Total Air Circulation or Design Air Flow		4.40 L/	/s.m²	0.87	CFM/ft ²						
Infiltration Rate		0.42 1/	/s m²	0.08	CFM/ft ²	Separate Make-up air unit (100% OA Operation occupied perio	d 50%				
(air infiltration is assumed to occur durin	g unoccupied	0.12	0.111	0.00	or mille	Operation unoccupied per	riod 50%				
hours only if the ventilation system shuts	s down)										
Economizor			Enthology Bacad	Dry Pu	h Rocod Total	T					
Economizer	Incidence	of Use	Entralpy Based	100%	100%	Summary of Design Para	meters				
	Switchove	r Point	KJ/kg.	18	°C	Peak Design Cooling Loa	d 303,354				
			Btu/lbm	64.4	°F	Peak Zone Sensible Load	149,003				
Controls Type	System P	resent (%)	HVAC	Room		Discharge air enthalpy	28.2 Btu/lbm 23.4 Btu/lbm				
	-,	(,,,)	Equipm	ent Controls		Specific volume of air at 55F &	100% R 13.2 ft³/lbm				
	All Pneum	atic				Design CFM	6,932				
	All DDC	Induc				Total all circulation of De	sigiraii 4.40 / S.III-				
	Total (sho	uld add-up to 100%	6)								
			Droportional		Tatal						
Control mode	Control M	ode	Fiopolitional	FI/FID	TOTAL						
			Fixed Discharge	Reset							
	Control St	rategy									
Indoor Design Conditions				Room		Supply Air					
	Summer T	emperature		21 °C	69.8 °F	14 °C 57.2 °F					
	Summer H	lumidity (%)	50	%		100%					
	Enthalpy Winter Oc		65	.5 KJ/kg.	28.2 Btu/lbm	54.5 KJ/kg. 23.4 Btt	<u>//lbm</u>				
	Winter Oc	c. Humidity	30	%	00.0	45%					
	Enthalpy			53 KJ/kg.	22.8 Btu/lbm	45.5 KJ/kg. 19.6 Bt	<i>ı</i> /lbm				
	Winter Un	occ. Temperature	20	21 °C	69.8 °F						
	Enthalpy	bee. Humany		50 KJ/kg.	21.5 Btu/lbm						
			÷								
Damper Maintenance			Inciden	Frequency							
Damper Maintenance			(%)	(years)							
	Control Ar	m Adjustment									
	Lubrication	1 I Deplessment									
	Diade Sea	ii Replacement									
				_							
Air Filter Cleaning	Changes/	rear									
					Incidence of Annual R	oom Controls Maintenance					
Incidence of Annual HVAC Controls Ma	intenance]									
	Annual Ma	intenance Tasks	Inciden	e		Annual Maintenance Tasks	Incidence				
			(%)				(%)				
	Calibration	of Transmitters				Inspection/Calibration of Room The	mostat				
	Calibration	of Auxilian Davis	20	-		Inspection of PE Switches	<u> </u>				
	Inspection	of Control Devices	s s			Inspection of Control Devices (Valve	JS,				
	mopoord		- 1			(Dampers, VAV Boxes)					

EXISTING BUILDINGS: Non-Food Retail Baseline	SIZE: < 100 kW	COMME	RCIAL SEC VINTAGE	FOR BUILDING	g profile	5	R	EGION: land Interd	connected				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 44 0.95 20.5 W/m ²	5.5 ft-candles											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 95% 15%	Light Level (Lux) % Distribution Weighted Average		400 25%	500 50%	600 25%	1000	НП	T5HO	LED	Total 100% 500))	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		10% 0.7 0.65 15	0.7 0.7 0.65 50	0.6 0.75 72	55% 0.6 0.80 88	5% 0.6 0.80 65	0% 0.6 0.80 95	0% 0.6 0.80 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr MJ/m².yr	7.5 289
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 44 0.05 31.7 W/m ²	6.5 ft-candles 2.9 W/ft ²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 95% 50%	Light Level (Lux) % Distribution Weighted Average		300 30%	500 40%	700 30%	1000		TELIO		Total 100% 500	2	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		30% 0.7 0.65 15	0.7 0.65 50	10% 0.6 0.75 72	50% 0.6 0.80 88	0.6 0.80 65	0% 0.6 0.80 95	0.6 0.80 90	100.0%	- 	
Relamping Strategy & Incidence of Practice	Group Spot			E	UI = Load	X Hrs. X S	SF X GLFF				EUI	kWh/ft².yr MJ/m².yr	0.9 34
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles			Fl	oor fractio	n check: sl	nould = 1.0	0	1.00	[
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 0% 100%	Light Level (Lux) % Distribution Weighted Average		300	500	700	1000		мы		Total	-	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	0.6		-	
Relamping Strategy & Incidence of Practice	Group Spot										EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							0	verall LP	21.07 W	//m²	EUI TOTAI	. kWh/ft².yr MJ/m².yr	8 323
OFFICE EQUIPMENT & PLUG LOA	DS Computers	Monitors	Dri	intere	Copie	re	Serve	re	Plug Lo	ade			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (Urs /vear)	55 0.22 0.5 W/m ² 0.0 W/t ² 90% 50% 2000	51 0.22 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000	100 0.01 0.00 90% 50% 2000	W/m ²	200 0.01 0.1 W 0.01 W 90% 50% 2000	//m² //ft²	217 0.02 0.1 W 0.01 W 100% 100% 2000	//m² //ft²	1.15 W 0.11 W 90% 50% 4100	//m² //ft²			
Operation Unocc. Period (hrs./year)	6760	6760	6760	es (cells with re	6760	in upper ri	6760	VDO "SHIE	4660	Sanjars	EUI	k\\/b/ft2.vr	0.11
Total end-use load (unocc. period) Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period	1.2 W/m ² 100% 59%	0.1 W/ft ²	10 366 101		unidicator	in opper n	gni corner, i	C	Computer Ec	quipment ug Loads	EUI	MJ/m ² .yr kWh/ft ² .yr MJ/m ² .yr kWh/ft ² .yr MJ/m ² .yr	0.11 4.42 0.49 19.14 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fue	I Sh	Electricity	Fuel Share:	100.0%	E	Fuel Oil	/ Propane Nh/ft².yr IJ/m².yr	EUI		A EUI	II Electric EUI kWh/ft².yr MJ/m².yr	
REFRIGERATION Provide description below:											EUI	kWh/ft².yr MJ/m².yr	
BLOCK HEATERS & MISCELLANE	ous								Block	d Heaters	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.3

		COMMERCI	AL SECTOR BUILDI	NG PROFILE					
EXISTING BUILDINGS: Non-Food Retail Baseline	SIZE: < 100 kW	v	INTAGE:		F	EGION: sland Interconnecte	d		
SPACE HEATING									
Heating Plant Type	System Prese Eff./COP Performance	nt (%)	Fuel Oil / Propa Boilers Stan. High 15%	ne A/A Packaged A/A Rooftop 70% 1.43	Elect A HP W. S. HP H 1.70 3.00 0.59 0.33	ric I/R Chiller Resistance 85% 4.50 1.00 0.22 1.00	Total		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	(kW/kW) 53.9 W/m ² 324 MJ/m ² .yr 1.00	17.1 Btu/hr.ft² 8.4 kWh/ft².yr					 		
Electric Fuel Share	85.0% Fuel Oil / Propane Fue	el Share 15.0%	Oil Fuel Shar	e				kWh/ft².yr	8.4
Boiler Maintenance	Annual Maintenance Task Fire Side Inspection Water Side Inspection for Inspection of Controls & 3 Inspection of Burner Flue Gas Analysis & Burn	s Ir Scale Buildup Safeties ver Set-up	ncidence (%) 75% 100% 100% 100% 90%					Fuel Oil / Propane EUI KWh/tf2.yr MJ/m ² .yr Market Composite EU KWh/tf2.yr MJ/m ² .yr	11.9 462 1 8.9 344
SPACE COOLING									
A/C Plant Type	System Prese COP Performance (kW/kW) Additional Ref Related Inform	Centrifugal C Standard (%) 4.8 (1 / COP) 0.21 rigerant lation	Chillers Screw HE Chillers 5.4 4.4 0.19 0.23	Reciprocating C Open [10 3.7 0.27	Chillers Absorption DX W. H. 00.0% 0.3 0.38 1.11	Chillers Total CW 100.0% 1 1.00	(
Control Mode	Incidence of U Chilled Water Condenser Wa	se Fixed R Setpoint	eset						
Setpoint	Chilled Water Condenser Wa Supply Air	7 °(ater <u>30</u> °(14.0 °(C 44.6 C 86 C 57.2	°F °F					
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	96 W/m² 30 120.2 MJ/m².yr 3.1	Btu/hr.ft ² 396 ft kWh/ft ² .yr	²/Ton						
Sizing Factor	1.00								
A/C Saturation (Incidence of A/C)	70.0%								
Electric Fuel Share	100.0% Fuel Oil / Propane Fue	el Share							
Chiller Maintenance	Annual Maintenance Task Inspect Control, Safeties Inspect Coupling, Shaft S Megger Motors Condenser Tube Cleaning Vibration Analysis Eddy Current Testing Spectrochemical Oil Anal	s Ir & Purge Unit ealing and Bearings	heidence Frequency (%) (years)				F	All Electric EUI kWt/rf2.yr	1.3
Cooling Tower/Air Cooled Condense	r Maintenan Annual Maintenance Task Inspection/Clean Spray N Inspect/Service Fan/Fan 1 Megger Motors Inspect/Verify Operation of	s Ir ozzles Motors of Controls	ncidence Frequency (%) (years)					MJ/m ² .yr Fuel Oil / Propane EUI kWh/ft2.yr MJ/m ² .yr Market Composite EU kWh/ft2.yr MJ/m ² .yr	49 1 1 1.3 49
DOMESTIC HOT WATER									
Service Hot Water Plant Type	Fossil Fuel SHW System Present (%) Eff./COP	Avg. Tank		Boiler 10% 0.75	Fuel Share Blended Eff	Fossil 5% iciency 1.50	EI	ec. Res. 95% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	17.3		All Electric EU		Fuel Oi	I / Propane EUI		Market Composite EU	1
vvening Use Percentage	90%		kWh/tt².yr MJ/m².yr	0.5 19	k N	vvn/tt².yr 0.3 1J/m².yr 12		kvvh/tt².yr MJ/m².yr	0.5 18.6

	COMME	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:	VINTAGE:	F	REGION:					
Non-Food Retail	< 100 kW		k	sland Inte	rconnecte	d			
Baseline									
HVAC FANS & PUMPS									
SUPPLY FANS			Ventilation a	and Exhau	st Fan Ope	ration & Co	ontrol		
			Ventilatio	on Fan	Exhau	ist Fan			
System Design Air Flow 4.4	4 L/s.m ² 0.87 CFM/tt ²	Control	Fixed \	/ariable	Fixed	Variable			
System Static Pressure CAV 75	0 Pa 3.0 wg			Flow		Flow			
System Static Pressure VAV 75	0 Pa 3.0 wg	Incidence of Use	100%		100%				
Fan Efficiency 60%	%	Operation	Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 88%	<u>/6</u>								
Sizing Factor 1.00		Incidence of Use	90%	10%	90%	10%	1		
Fan Design Load CAV 6.:	2 W/m ² 0.58 W/ft ²	-							
Fan Design Load VAV 6.2	2 W/m ² 0.58 W/ft ²	Comments:							
EXHAUST FANS									
Washes and Estavol									
vvasnroom Exnaust 50	106 CFIV/Va	ashroom							
Washroom Exhaust per gross unit area 0.1	1 L/s.m ² 0.02 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1	1 L/s.m ² 0.02 CFM/ft ²								
Total Building Exhaust 0.2	2 L/S.m ² 0.04 CFM/m ²								
Exhaust System Static Pressure 25	0 Pa 1.0 wg								
Fan Enrolency 25%	70 1/								
Circing Foster	<u>/0</u>								
Sizing Factor 1.0									
Exhaust Fan Connected Load 0.	3 W/m ² 0.03 W/ft ²								
AUXILIARY COOLING FOURPMENT (Condens	an Dump and Capling Towar/Candonson For	a)							
AUXILIART COULING EQUIPMENT (Condens	ser Pump and Cooling Tower/Condenser Pan	5)							
Autor Development Free Development	0.000 100/000	0.07 111/7-1							
Average Condenser Fan Power Draw	0.020 KW/KW	0.07 KVV/10n							
(Cooling Tower/Evap. Condenser/ Air Cooled C	vondenser) 1.91 W/m²	0.18 VV/ft²							
O and a set of Barrier									
Condenser Pump									
Pump Design Flow	L/s.KW	U.S. gpm/1on							
Pump Design Flow per unit floor area	L/s.m ²	U.S. gpm/ft ²							
Pump Head Pressure	45 kPa	15 ft							
Pump Efficiency	50%								
Pump Motor Efficiency	80%								
Sizing Factor	1.0	14///10							
Pump Connected Load	VV/m ²	VV/tt²							
CIRCULATING PUMP (Heating & Cooling)									
Pump Design Flow @ 5 °C (10 °F) delta T	0.004 L/s.m ²	0.0061 U.S. gpm/ft ² 2.4	10.S. gpm/T	on					
Pump Head Pressure	kPa	ft							
Pump Efficiency	50%								
Pump Motor Efficiency	80%								
Sizing Factor	0.8	14////2							
Fump Connected Load	W/m²	VV/It ²							
Sumply For One Derind	FF00 hm (10-7								
Supply Fall Occ. Pellod	2000 hrs./year								
Supply Fall Unocc. Pellod	5260 nrs./year								
Supply Fan Energy Consumption	52.7 KWh/m².yr								
Extravet For Oce, Deried	FF00 hm (10								
Exhaust Fan Ucc. Period	5500 hrs./year								
Exhaust Fan Unocc. Period	3260 hrs./year								
Exnaust Fan Energy Consumption	2.3 kWh/m².yr								
Condenses Dump Freeze Consumption	1410/16/2020								
Concenser Pump Energy Consumption	kWh/m².yr								
Cooling Tower /Condenser Fans Energy Consur	mption 0.6 kWh/m².yr								
Circulating Dump Veest Or and	7000 has to an								
Circulating Pump Yearly Operation	7000 hrs./year								
Circulating Pump Energy Consumption	kWh/m².yr								
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency							
		(%) (years)							
	Inspect/Service Fans & Motors								
	Inspect/Adjust Belt Tension on Fan Belts						E	134/1-10:0	= 0
	Inspect/Service Pump & Motors						EUI	KVVh/ft².yr	5.2
1							1	NI. I/m ² vr	200.3

			COMMERCIAL SECT	OR BUILD	ING PROFILE				
EXISTING BUILDINGS: Non-Food Retail Baseline		SIZE: < 100 kW	VINTAGE:				REGION: Island Interconnected	I	
EUISUMMARY									
TOTAL ALL END-USES:	Electricity:		24.3 kWh/ft².yr 942.4 MJ/m².yr	Fuel Oil	Propane:	1.8 kWh/ft ² .yr	69.9 MJ/m².yr		
END USE:	kWh/ft2.yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane		
GENERAL LIGHTING	7.5	288.7	-	kWh/ft².yr	MJ/m².yr	kWh/ft2.yr	MJ/m².yr		
ARCHITECTURAL LIGHTING	0.9	33.9	SPACE HEATING	7.1	275.0	1.8	69.3		
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	34.1				
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	18.1	0.0	0.6		
HVAC FANS & PUMPS	5.2	200.3	FOOD SERVICE EQUIPMENT						
REFRIGERATION									
MISCELLANEOUS	0.3	10.0							
BLOCK HEATERS									
COMPUTER EQUIPMENT	0.5	19.1							
COMPUTER SERVERS	0.1	4.4							
ELEVATORS/ESCALATORS									
OUTDOOR LIGHTING	0.9	33.9							



				COMMER	CIAL SEC	TOR BUIL	DING PROF	FILE						
EXISTING BUILDINGS:	SIZE:				VINTAGE	:				REGION	:			
Large Accommodation	> 100 kW									Island In	terconnect	ed		
CONSTRUCTION														
Wall U value (W/m ² .°C) 0.:	38 W/m².°C		0.07	Btu/hr.ft ² .	°F		Typical B	uilding Size			3,717	7 m²	40,000) ft ²
Roof U value (W/m ² .°C) 0.	38 W/m².°C		0.07	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²	2)		1.239) m²	13.333	3 ft ²
	84 W/m2 °C		0.68	Btu/br ft2	∘⊑		Footprint	Aspect Pat	/ tio (L·\\/\)		1,200	4	10,000	
	04 W/III C		0.00	Diaminit .	'		Percent C	Conditioned	Space		100%	*		
							Percent C	onditioned	Space		45%	%		
Window/Wall Ratio (WIWAR) (%) 0.2	28						Defined a	s Exterior Z	Zone					
Shading Coefficient (SC) 0.	57						Typical #	Stories				3		_
							Floor to F	loor Height	t (m)		3.7	′ m	12.0) ft
VENTILATION SYSTEM. BUILDING CONTR	ROLS & IND	OOR CONDITI	ONS											
,														
Ventilation System Type				CAV	CAVF	R DDM	Z DDMZVV	VAV	/ VAVR	. I	U 100% O.	A TOTA	AL.	
		System Preser	nt (%)	90%	•			10%	, b			100	%	
		Min. Air Flow (%) Mad Air V/	aluma aa D	areant of L			60%	b					
		(Minimum Thro		Jume as P	ercent or F	uli Flow)								
Occupancy or People Density		46	m²/perso	n	495	ft²/person				%OA	5.42%	%		
Occupancy Schedule Occ. Period		50%												
Occupancy Schedule Unocc. Period		80%				_								
Fresh Air Requirements or Outside Air		8	L/s.perso	n	16	CFM/pers	on							
Fresh Air Control Type	ara 1 2 ar 2)	4	If Freeh A	ir Control T	VDA = "2"	ontor 0/ EA	to the right			150	×.			-1
(enter (1 = mixed air control 2 - Fixed fresh air 3 10)	n d i,∠013) ∩% fresh sir\	1	If Fresh A	ir Control T	ype = "2" (ype = "3" (enter Make-	io the right:	ation and o	neration	15	5 I/s m ²	0.4	10 CEM/ft2	
	o /o nesnan)		II I I I I I I I I I I I I I I I I I I		ype = 5 t	Shiler Wake-u		alion and o	peration	509	6 operation	1(%)		
Sizing Factor		1.4	1							4	-1-6			
Total Air Circulation or Design Air Flow		3.01	L/s.m ²		0.59	9 CFM/ft ²								
			1			-		Separate	Make-up ai	r unit (100	% OA)		L/s.m ²	CFM/ft ²
Infiltration Rate	and a start	1.00	L/s.m ²		0.20	CFM/ft ²			Operation	occupied	period	50	%	
(air inflitration is assumed to occur during unoo	ccupiea								Operation	unoccupi	ea perioa	50	%	
nours only if the ventilation system shuts down	9													
Economizer			Enthalp	y Based	Dry-B	ulb Based	Total	T						
	Incidence	of Use			100%	ó	100%	b	Summary	of Design	Parameter	s		7
	Switchov	er Point		KJ/kg.	18	в℃		1	Peak Des	ign Coolin	g Load	492,85	1	
				Btu/lbm	64.4	4 °F		1	Peak Zon	e Sensible	Load	363,67	2	
	Suctom E	Procent (9/)			Boom	٦			Room air	enthalpy	2	28.	2 Btu/lbm 4 Btu/lbm	
Controls Type	System F	Tesenii (76)		Equipmen	t Controls				Specific volu	me of air at	55F & 100%	R 13	2 ft ³ /lbm	
	All Pneum	natic		Lquipmen	001111013				Design CF	FM	551 G 100%	16.91	8	
	DDC/Pne	umatic							Total air c	irculation	or Design a	ir 3.01	l/s.m ²	
	All DDC													
	Total (sho	ould add-up to 10	0%)											
			Prop	ortional	PI / PID	Tota	ī							
Control mode	Control N	lode	Tiop	Jitional	11/110	1010								
			Fixed D	ischarge	Reset									
	Control S	trategy												
					_								-	
Indoor Design Conditions	Summor	Tomporatura		22	Room	71	e or	13	Supply All		4 ∘⊏	٦		
	Summer	Humidity (%)		50%		/1.		100%		55.	4 . L			
	Enthalpy	furnitary (70)		65.5	KJ/ka.	28.2	Btu/lbm	54.5	5 KJ/ka.	23.4	Btu/lbm			
	Winter Oc	cc. Temperature		21	°C	69.	8 °F	15	5 °C	5	9 °F			
	Winter Oo	cc. Humidity		30%	,		_	45%	Ď		_			
	Enthalpy			53	KJ/kg.	22.8	B Btu/lbm	45.5	5 KJ/kg.	19.6	Btu/lbm			
	Winter Ur	nocc. Temperatu	re	18	C C	64.	4_°⊢							
	Enthalov	IOCC. Humidity		50%	K I/ka	21 5	Btu/lbm							
	Entrapy			00	rto/kg.	21.0	Diarionn					-		
Damper Maintenance				Incidence	Frequency	У								
				(%)	(years)									
	Control A	rm Adjustment				_								
	Blade Se	al Replacement												
	Didde Oct	arreplacement		1										
Air Filter Cleaning	Changes/	Year												
												-		
Insidence of Appund HV/AC Controls Mainten		7				Incidence	ot Annual R	oom Contr	rols Mainter	nance				
Incluence of Annual HVAC Controls Maintenal	ice	_												
	Annual M	aintenance Task	s	Incidence	1			Annual Ma	aintenance	Tasks		Incidenc	e	
			-	(%)								(%)		
	Calibratio	n of Transmitter	S]			Inspection	n/Calibration	n of Room	Thermosta	at		
	Calibratio	n of Panel Gaug	es					Inspection	n of PE Swi	tches				
	Inspection	n of Auxiliary De	vices		4			Inspection	n of Auxiliar	y Devices		+	_	
	Inspection	n of Control Dev	ICES	1				Inspection (Dampero	n of Control	Devices (valves,			
								Loampers	, VAV DUX	<i>,</i> 07				

EXISTING BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	COMMERCIAL SECT VINTAGE	OR BUILDING PROF	FILE RE ISI	GION: and Interconnected			
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 11 0.75 14.3 W/m ²	.6 ft-candles						
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	2500 6260 50%	Light Level (Lux) % Distribution Weighted Average	100 125 25% 50%	5 150 300 5 25%		Total 100% 125		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	INC CFL 70% 20% 0.7 0.7 0.65 0.65	T12 T8 5% 5% 0.6 0.6 0.75 0.80	HID T5HO LED 0% 0% 0.6 0.6 0.6 0.80 0.80 0.80) TOTAL) 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Emcacy (L/W)	15 50	12 88	65 95 90	EUI KW	/h/ft².yr 2	.8
LOBBY, BALLROOMS, CORRIDOR Light Level Floor Fraction (ALFF) Connected Load	S, BACK OF HOUSE OTHER 300 Lux 27 0.25 23.3 W/m ²	.9 ft-candles				<u> </u>	<u>/m².yr 10</u>	18
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 50%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	700 1000		Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 40% 10% 0.7 0.7 0.65 0.65 15 50	112 18 35% 10% 0.6 0.6 0.75 0.80 72 88	HID 15HO LED 0% 5% 0.6 0.6 0.6 0.80 0.80 0.80 65 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Lo	ad X Hrs. X SF X GLFF		EUI kW	/h/ft².yr 2. J/m².yr 11	.9 14
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27 14.0 W/m ²			Floor fraction check: sh	puld = 1.00 1.00	I		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	D 700 1000		Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 0% 0% 0.7 0.7 0.65 0.65 15 50	112 18 0.6 0.6 0.75 0.80 72 84	MH HPS 100% 0% 0.6 0.6 0.6 0.80 0.55 0.55 88 65 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot					EUI kW MJ	/h/ft².yr J/m².yr	
TOTAL LIGHTING				Ov	erall LP 16.52 W/m ²	EUI TOTAL kW M.	/h/ft².yr J/m².yr 22	6 22
OFFICE EQUIPMENT & PLUG LOA	DS							
Equipment Type	Computers	Monitors Pri	nters Co	piers Server	s Plug Loads]		
Density (device/occupant) Connected Load Diversity Occupied Period	0.3 0.4 W/m ² 0.0 W/ft ² 90%	0.3 0.05 0.3 W/m² 0.1 0.0 W/ft² 0.01 90% 90%	0.033 W/m ² 0.1 W/ft ² 0.01	217 3 0.02 W/m² 0.1 W/ W/ft² 0.01 W/ 100% 100%	m ² 1.5 W/m ² ft ² 0.14 W/ft ² 70%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 50% 2000 2000 6760 6760	50% 2000 6760	100% 2500 6260	25% 3000 5760			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.0 W/m ² 1.0 W/m ²	0.2 W/ft ² to see note 0.1 W/ft ²	es (cells with red indicat	tor in upper right corner, ty	pe "SHIFT Ga mputer Servers	EUI KW	/h/ft².yr 0. l/m².yr 3.u	10 68 45
Usage during occupied period Usage during unoccupied period	100% 48%				Plug Loads	EUI KW	/m².yr 17.: /h/ft².yr 0.: J/m².yr 19.	51 49 .12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel	Sh 2.0% Electricity	Fuel Share: 98.0%	EUI kW	Propane EUI /h/ft².yr 2.6 //m².yr 100.0	All Ele EUI kW MJ	ectric EUI /h/ft².yr 1. J/m².yr 50	.3
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet ca	ISES				EUI kW	/h/ft².yr 0. I/m².yr 30	.8
BLOCK HEATERS & MISCELLANE	ous				Block Heaters Miscellaneous	s EUI KW MJ s EUI KV Mu	/h/ft².yr 0. I/m².yr /h/ft².yr 0 I/m².yr 1	.3

			COMMER	CIAL SECT	OR BUILDI	NG PROF	ILE						
EXISTING BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW			VINTAGE	:				REGION: Island Inte	rconnecte	d		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elec	tric				
				Bo Stan.	ilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)		10%	80%	70%	1 70	3.00	4 50	90%	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	59.8 W/m ² 313 MJ/m ² .yr	19 8	.0 Btu/hr.ft ² .1 kWh/ft ² .yr	r									
Electric Fuel Share	90.0% Euel Oi	I / Propage Fuel Share	10.0%	6	Oil Fuel Sha	æ						All Electric EUI	81
Boiler Maintenance	Annual Ma	intenance Tasks		Incidence		-						MJ/m².yr	313
	Fire Side I			(%)							F	Fuel Oil / Propane El	UI 44.5
	Water Side	e Inspection for Scale B	uildup	100%							L	MJ/m².yr	447
	Inspection Inspection Flue Gas A	of Controls & Safeties of Burner malysis & Burner Set-u	р	100% 100% 90%							F	Market Composite El kWh/ft².yr	UI 8.4
SPACE COOLING												MJ/m².yr	326
A/C Plant Type			Contrifue	al Chillero	Screw	Reciproce		Absorption	Chillera	Total	T		
			Standard	HE	Chillers	Open	DX	W. H.	Chillers	Iotai	-		
		System Present (%) COP	30.0%	6 7 5.4	4.4	3.6	70.0%	0.9	1	100.0%	I		
		Performance (1 / COP (kW/kW)) 0.21	1 0.19	0.23	0.28	0.38	1.11	1.00				
		Additional Refrigerant									İ		
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint										
		Condenser Water											
Satagiat			7		44.6	°C							
Sepon		Condenser Water	30	÷Č	86	°F							
		Supply Air	13.0	oj°C	55.4	۳F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	33 W/m ² 66.7 MJ/m ² .yr	10 Btu/hr.f 1.7 kWh/ft²	¹² 1146 yr	ft²/Ton									
Sizing Factor	0.85		Operatior	n (occ. perio	3000	hrs/year	Note value	cannot be	less than 2,	900 hrs/ye	ear)		
A/C Saturation	75.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel Oi	I / Propane Fuel Share											
Chiller Maintenance	Annual Ma	intenance Tasks		Incidence	Frequency								
	Inspect Co	ntrol, Safeties & Purge	Unit	(%)	(years)								
	Inspect Co Megger Mo	upling, Shaft Sealing ar otors	d Bearings										
	Condenser Vibration A	Tube Cleaning											
	Eddy Curre	ent Testing									F		
	Spectroche	emical Oil Analysis									-	All Electric EUI kWh/ft².yr	0.6
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks		Incidence	Frequency							MJ/m².yr	24
	Inspection	Clean Spray Nozzlos		(%)	(years)						F	Fuel Oil / Propane El	UI
	Inspect/Se	rvice Fan/Fan Motors										MJ/m².yr	
	Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger Megger	otors rify Operation of Contro	ols								Г	Market Composite E	UI
												kWh/ft².yr MJ/m².yr	0.6 24
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fuel	SHW Avg. Ta	ank			Boiler	I			Fossil		Elec. Res.	
	System Pr Eff./COP	esent (%)	65			10%		Fuel Share Blended Ff	ficiencv	10%	-	<u>90%</u> 0.91	
Service Hot Water load (MJ/m ² .yr)	236.6				. I		ı				·		
				A	II Electric EU	I]	Fuel C)il / Propan	e EUI		Market Composite E	UI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	6.7 260			kWh/ft².yr MJ/m².yr	8.1 315		kWh/ft².yr MJ/m².yr	6.9 265.5



EXISTING BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW		COMMER	CIAL SECT VINTAGE:	or Building Pr	OFILE		REGION: Island Inte	erconnecte	d			
HVAC FANS & PUMPS													
SUPPLY FANS							Ventilation	and Exhau	ist Fan Ope	ration & Co	ntrol		
System Design Air Flow 3.0) L/s.m ²	0.59	CFM/ft ²	Control			Ventilat Fixed	ion Fan Variable	Exhau Fixed	st Fan Variable			
System Static Pressure CAV 33 System Static Pressure VAV 33	8 Pa 8 Pa	1.4	wg	Incidence	fllso		100%	Flow	100%	Flow			
Fan Efficiency 45%	6	1.4	ng	Operation	030		Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 809 Sizing Factor 1.00	6)			Incidence of	f Use		75%	25%	75%	25%			
Fan Design Load CAV 2. Fan Design Load VAV 2.6	8 W/m ² 8 W/m ²	0.26	W/ft ² W/ft ²		Comm	ents:							
EXHAUST FANS													
Washroom Exhaust 100 Washroom Exhaust per gross unit area 0.2 Other Exhaust (Smoking/Conference) 0.1 Total Building Exhaust 0.3 Exhaust System Static Pressure 259 Fan Efficiency 259 Fan Motor Efficiency 759 Sizing Factor 1.0 Exhaust Fan Connected Load 0.0	 L/s.washr L/s.m² L/s.m² L/s.m² L/s.m² D/s.m² 0 6 6 3 W/m² 	oom	212 CFM/was 0.03 CFM/tt2 0.02 CFM/tt2 0.05 CFM/tt2 1.0 wg	hroom									
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump ar	nd Cooling Tow	er/Condenser Fans)										
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)		0.024 kW/kW 0.78 W/m ²		0.08 kW/Tor 0.07 W/ft ²	ı							
Condenser Pump													
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load			0.053 L/s.KW 0.002 L/s.m ² kPa 50% 80% 1.0 W/m ²	[3.0 U.S. gp 0.003 U.S. gp ft W/ft ²	om/Ton om/ft²							
CIRCULATING PUMP (Heating & Cooling)													
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.001 100 50% 80% 0.8 0.3	L/s.m² kPa W/m²	0.0021 33 0.03	U.S. gpm/ft ² ft W/ft ²	2.4	U.S. gpm/	ſon					
Supply Fan Occ. Period		3500	hrs./year										
Supply Fan Unocc. Period Supply Fan Energy Consumption		5260 21.0	hrs./year kWh/m².yr										
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 5260 2.6	hrs./year hrs./year kWh/m².yr										
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	mption	0.4	kWh/m².yr kWh/m².yr										
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		5000 0.1	hrs./year kWh/m².yr										
Fans and Pumps Maintenance	Annual Ma Inspect/Se Inspect/Ad Inspect/Se	aintenance Task ervice Fans & Mo djust Belt Tensior ervice Pump & M	s otors n on Fan Belts lotors	Incidence (%)	Frequency (years)					[EUI	kWh/ft².yr M.l/m² yr	2.2

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
EXISTING BUILDINGS: Large Accommodation Baseline	:	SIZE: > 100 kW	VINTAGE:				REGION: Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 993.0 MJ/m².yr	Fuel Oil /	Propane:	2.0 kWh/ft ² .yr	78.2 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	2.8	108.5		kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr	
LOBBY, BALLROOMS, CORRIDORS	2.9	113.7	SPACE HEATING	7.3	281.4	1.2	44.7	
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.5	18.3			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.0	234.0	0.8	31.5	
HVAC FANS & PUMPS	2.2	86.9	FOOD SERVICE EQUIPMENT	1.3	49.0	0.1	2.0	
REFRIGERATION	0.8	30.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	17.5						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						



			COMMER	CIAL SECTOR BUILD		FILE
EXISTING BUILDINGS:	SIZE:			VINTAGE:		REGION:
Small Accommodation Baseline	< 100 KW					Island Interconnected
CONSTRUCTION						
	.		_			
Wall U value (W/m².°C) 0.38	W/m².°C	0.0	7 Btu/hr.ft ² .	.°F	Typical Bu	3uilding Size 1,859 m ² 20,000 ft ²
Roof U value (W/m ² .°C) 0.19	W/m².°C	0.0	3 Btu/hr.ft ² .	.°F	Typical Fo	Footprint (m²) 929 m² 10,000 ft²
Glazing U value (W/m ^{2.°} C) 3.84	W/m².°C	0.6	8 Btu/hr.ft ² .	°F	Percent C	t Aspect Ratio (L:W) 4 Conditioned Space 100%
					Percent C	Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.28					Defined a	as Exterior Zone
Shading Coefficient (SC) 0.57					Typical # :	f Stories 2 Floor Height (m) 37 m 120 ft
					11001101	
· · · · · · · · · · · · · · · · · · ·						
VENTILATION SYSTEM, BUILDING CONTRO	OLS & IND	OOR CONDITIONS				
Ventilation System Type			CAV	CAVR DDM	Z DDMZVV	V VAV VAVR IU 100% O.A TOTAL
		System Present (%)	100%	ó		100%
		Min. Air Flow (%) (Minimum Throttled Air)	/olume as P	ercent of Full Flow)		60%
			volume as i	ercent of Full Flow)		
Occupancy or People Density		46 m ² /pers	on	495 ft²/person		%OA 5.24%
Occupancy Schedule Upocc, Period		50%				
Fresh Air Requirements or Outside Air		8 L/s.pers	on	16 CFM/pers	on	
Fresh Air Control Type *(enter	a 1, 2 or 3) % freeb air)	1 If Fresh	Air Control T	Type = "2" enter % FA. 1	to the right:	: 15%
(1 = fixed all control, 2 = fixed fiest all, 3 for	/o iresirair)	ii riesii	All Control I	ype = 3 enter make-u		50% operation (%)
Sizing Factor		1.4				
Total Air Circulation or Design Air Flow		3.11 L/s.m ²		0.61 CFM/ft ²		Concercto Males un aix unit (1000/ OA)
Infiltration Bate		1.00 L/s.m ²		0.20 CFM/ft ²		Operation occupied period 50%
(air infiltration is assumed to occur during unocc	upied					Operation unoccupied period 50%
hours only if the ventilation system shuts down)						
Economizer		Entha	lov Based	Drv-Bulb Based	Total	
	Incidence	of Use		100%	100%	% Summary of Design Parameters
	Switchove	er Point	KJ/kg.	18 °C		Peak Design Cooling Load 252,853
			Btu/Ibm	64.4 °F		Peak Zone Sensible Load 188,263
Controls Type	System P	resent (%)	HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
			Equipmer	t Controls		Specific volume of air at 55F & 100% R 13.2 ft3/lbm
	All Pneum DDC/Pne	umatic				Design CFM 8,758 Total air circulation or Design air 3,11 l/s.m ²
	All DDC					
	Total (sho	ould add-up to 100%)				
		Pro	portional	PL/PID Tota	I	
Control mode	Control M	ode				
	O a set set o	Fixed	Discharge	Reset		
	Control S	trategy				
Indoor Design Conditions				Room	-	Supply Air
	Summer	Femperature	22	2 °C 71.0	6 °F	13 °C 55.4 °F
	Enthalov	Humidity (%)	50% 65.f	5 KJ/ka. 28.2	Btu/lbm	54.5 K.l/kg. 23.4 Btu/bm
	Winter Oc	c. Temperature	21	1 °C 69.8	8 °F	15 °C 59 °F
	Winter Oc	c. Humidity	30%		D4://bas	45%
	Enthalpy Winter Ur	occ. Temperature	18	3 KJ/Kg. 22.8 3 °C 64.4	4 °F	45.5 KJ/kg. 19.6 Btu/lbm
	Winter Un	occ. Humidity	30%	6		
	Enthalpy		50	0 KJ/kg. 21.5	Btu/lbm	
Damper Maintenance			Incidence	Frequency		
	O a set as 1.4	A diverter and	(%)	(years)		
	Lubricatio	nn Adjustment n				
	Blade Sea	al Replacement				
Air Filter Cleaning	Changes/	Year		1		
	g		L			
Insidence of Annual UNAC Constants Mail in	a.	7		Incidence of	of Annual R	Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenance	e	L				
	Annual Ma	aintenance Tasks	Incidence	9		Annual Maintenance Tasks Incidence
	0.17	· -	(%)	4		(%)
	Calibratio	n or Transmitters	_	-		Inspection/Calibration of Koom Thermostat
	Inspection	of Auxiliary Devices		1		Inspection of Auxiliary Devices
	Inspection	of Control Devices				Inspection of Control Devices (Valves,
						(Dampers, VAV Boxes)

EXISTING BUILDINGS: Small Accommodation Baseline		SIZE: < 100 kW		COMMER	CIAL SECT VINTAGE:	or Buildin	g profile	E	R Is	EGION: land Intero	connected				
Light Level Floor Fraction (GLFF)	125 0.85	Lux	11.6	ft-candles											
Connected Load	14.3	W/m ²	1.3	W/ft ²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	2500 6260 50%			Light Level (Lux) % Distribution Weighted Average		100 25%	125 50%	150 25%	300				Total 100% 12	6 5	
Usage During Unoccupied Period	25%					INC	CFL	T12	Т8	HID	T5HO	LED	TOTA	L	
Fixture Cleaning: Incidence of Practice Interval		years		CU LLF Efficacy (LAM)		70% 0.7 0.65	20% 0.7 0.65	5% 0.6 0.75 72	5% 0.6 0.80	0.6	0% 0.6 0.80	0% 0.6 0.80	100.0%	<u>6</u>	
Relamping Strategy & Incidence of Practice	Group	Spot				10	00	12		00	55	30	EUI	kWh/ft².yr	3.2 123
LOBBY, BALLROOMS, CORRIDOR Light Level Floor Fraction (ALFF) Connected Load	S, BACK O 300 0.15 23.3	F HOUSE OT Lux	27.9 2.2	ft-candles								1		wom y	120
Occ. Period(Hrs./vr.)	3000			Light Level (Lux)		300	500	700	1000				Total	٦	
Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5760 85% 50%			% Distribution Weighted Average		100%							100% 30	6 0	
Fixture Cleaning: Incidence of Practice		vooro		System Present (%)		INC 40% 0.7	CFL 10% 0.7	T12 35% 0.6	T8 10% 0.6	0.6	T5HO 0% 0.6	LED 5% 0.6	100.0%		
Relamping Strategy & Incidence	Group	Spot		Efficacy (L/W)		15	50	72	88	65	95	90			
of Practice	Gibup	Opor				F	III – Load	X Hrs X S				[EUI	kWh/ft².yr	1.8
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF)	300.00	Lux	27.9	ft-candles		L	FI	oor fractior	check: st	nould = 1.0	0	1.00		100/111.yr	00
Connected Load	14.0	W/m²	1.3	W/ft ²										_	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 0% 100%			Light Level (Lux) % Distribution Weighted Average		300 100%	500	700	1000				Total 100% 30	6 0	
Fixture Cleaning: Incidence of Practice Interval		vears		System Present (%) CU LLF		0.7 0.65	CFL 0% 0.7 0.65	T12 0.6 0.75	T8 0.6 0.80	0.6	MH 100% 0.6 0.55	HPS 0% 0.6 0.55	TOTA 100.0%	6	
Relamping Strategy & Incidence of Practice	Group	Spot		Efficacy (L/W)		15	50	72	84	88	65	90	EUI	kWh/ft².yr	
TOTAL LIGHTING									0	verall LP	15.62 W/	m²	EUI TOTA	MJ/m².yr	5
OFFICE EQUIPMENT & PLUG LOA	ADS													MJ/m².yr	191
Equipment Type		Computers		Monitors	Pri	nters	Copie	rs	Serve	rs	Plug Loa	ds			
Measured Power (W/device) Density (device/occupant) Connected Load		55 0.3 0.4 W/	/m²	51 0.3 0.3 W/m²	100 0.05 0.1	W/m²	200 0.033 0.1 W	//m²	217 0.02 0.1 W	//m²	1.5 W/	m²			
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)		0.0 W/ 90% 50% 2000 6760	/ft²	0.0 W/ft ² 90% 50% 2000 6760	0.01 90% 50% 2000 6760	W/ft ²	0.01 W 90% 50% 2000 6760	//ft ²	0.01 W 100% 100% 2500 6260	//ft²	0.14 W/ 70% 25% 3000 5760	ft²			
Total end-use load (occupied period) Total end-use load (unocc. period)		2.0 W/ 1.0 W/	/m² /m²	0.2 W/ft ² 0.1 W/ft ²	to see note	es (cells with re	d indicator	in upper rig	ht corner, t	ype "SHIF	T @@inputer \$	Servers	EUI	kWh/ft².yr MJ/m².yr	0.10 3.68
Usage during occupied period Usage during unoccupied period		100% 48%								C	computer Equ	Loads	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.45 17.51 0.49 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil /	Propane Fuel	Share:		Electricity I	Fuel Share:	100.0%	E	Fuel Oil UI k\	/ Propane Nh/ft².yr	EUI 2.6	-	, EUI	All Electric EUI kWh/ft².yr	0.6
REFRIGERATION									М	J/m².yr	100.0			MJ/m².yr	25.0
Provide description below: Walk-in coolers/freezers, reach-in coo	olers/freezer	s, refrigerated	l buffet cases	8]							[EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	OUS											-			
											Block H Miscell	leaters		kWh/ft².yr MJ/m².yr kWh/ft².vr	0.3
													- 21	MJ/m².yr	10

		cc	MMERCIAL SECT	OR BUILDIN	G PROFI	LE						
EXISTING BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW		VINTAGE:					REGION: Island Inte	rconnecte	ed		
SPACE HEATING												
Heating Plant Type			Fue	el Oil / Propan)		Elec	ctric				
			Boi	ilers P	ackaged	A/A HP	W. S. HP	H/R Chiller	Resistanc	Total		
	Syster	n Present (%)	10%	riigit	Offic				90%	100%		
	Eff./Co Perfor	DP mance (1 / Eff.)	70%	80% 1.25	70% 1.43	1.70	3.00 0.33	4.50 0.22	1.00	þ		
	(KW/k)	V)										
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	64.7 W/m ² 351 MJ/m ² .yr	20.5 9.1 kW	ı∕hr.ft² /h/ft².yr									
Electric Euel Share	90.0% Euel Oil / Pror	ane Fuel Share	10.0%	Oil Fuel Share	Г		1			-	All Electric EUI kWb/ft ² vr	91
Boiler Maintananaa			Insidence		L]				MJ/m².yr	351
bolier maintenance	Annual Maintenar	Ce Tasks	(%)							L	Fuel Oil / Propane E	UI
	Fire Side Inspecti Water Side Inspe	on ction for Scale Buildup	75% 100%								kWh/ft².yr MJ/m².yr	13.0 502
	Inspection of Cor	trols & Safeties	100%							Г	Market Composite F	
	Flue Gas Analysis	& Burner Set-up	90%							_	kWh/ft².yr	9.5
											MJ/m².yr	366
SPACE COOLING												
A/C Plant Type	[ntrifugal Chillers	Screw R	ciprocati	na Chillers	Absorption	Chillers	Total	Т		
		Sta	andard HE	Chillers	Open	DX	W. H.	CW	100.000			
	Syster COP	n Present (%)	4.7 5.4	4.4	3.6	100.0%	0.9	1	100.0%			
	Perfor (kW/k)	mance (1 / COP)	0.21 0.19	0.23	0.28	0.38	1.11	1.00				
	Additio	nal Refrigerant								1		
	Relate	d Information										
Control Mode	Incider	ce of Use Fix	ed Reset									
	Chilled	Se	tpoint									
	Conde	nser Water										
Setpoint	Chilled	Water	7 °C	44.6 °F	-							
	Supply	Air	13.0 °C	55.4 °F	-							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	34 W/m² 65.3 MJ/m².yr	11 Btu/hr.ft ² 1.7 kWh/ft ² .yr	1117 ft²/Ton									
Sizing Factor	0.85	Op	eration (occ. perio	3000 hi	s/year	Note value	cannot be	less than 2	,900 hrs/ye	ear)		
A/C Saturation	50.0%											
(Incidence of A/C)												
Electric Fuel Share	100.0% Fuel Oil / Prop	ane Fuel Share										
Chiller Maintenance	Annual Maintenar	ce Tasks	Incidence	Frequency								
	Inspect Control, S	afeties & Purge Unit	(%)	(years)								
	Inspect Coupling, Meager Motors	Shaft Sealing and Bea	rings									
	Condenser Tube	Cleaning										
	Vibration Analysis Eddy Current Tes	ting										
	Spectrochemical	Oil Analysis								F	All Electric EUI	0.7
			I								MJ/m².yr	27
Cooling Tower/Air Cooled Condense	er Maintenan Annual Maintenar	ce Tasks	Incidence (%)	Frequency (years)						Γ	Fuel Oil / Propane E	UI
	Inspection/Clean	Spray Nozzles									kWh/ft².yr M.I/m² vr	
	Megger Motors									L	Mart 10	
	Inspect/verify Op	eration of Controls								F	kWh/ft².yr	0.7
											MJ/m².yr	27
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fuel SHW	Avg. Tank			Boiler				Fossil		Elec. Res.	
	System Present (Eff./COP	%) 0.65			10%		Fuel Share Blended F	ficiency	10%		90% 0.91	
Service Hot Water load (MJ/m ² .yr)	236.6	0.00	I	I	2.70				50	• I		
			A	Il Electric EUI			Fuel C)il / Propan	e EUI] [Market Composite E	UI
Wetting Use Percentage	90%			кvvh/tt².yr MJ/m².yr	6.7 260			кWh/ft².yr MJ/m².yr	8.1 315		kWh/ft².yr MJ/m².yr	6.9 265.5

	COMME	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:	VINTAGE:	RE	GION:					
Small Accommodation	< 100 kW		Isla	and Inter	connecte	d			
Baseline									
HVAC FANS & PUMPS									
SUPPLY FANS			Ventilation and	d Evhaus	t Fan One	ration & Co	ontrol		
SOFTETTANS			Ventilation	Fan	Exhau	st Fan	Jillion		
System Design Air Flow 3.1	1 L/s.m ² 0.61 CFM/ft ²	Control	Fixed Var	riable	Fixed	Variable			
System Static Pressure CAV 33	38 Pa 1.4 wg		F	Flow		Flow			
System Static Pressure VAV 33	88 Pa 1.4 wg	Incidence of Use	100%		100%				
Fan Efficiency 45%	%	Operation	Continuou: Sch	heduledC	Continuous	Scheduled			
Fan Motor Efficiency 80%	%								
Sizing Factor 0.50	0	Incidence of Use	75%	25%	75%	25%			
Fan Design Load CAV 1.	.5 W/m ² 0.14 W/ft ²								
Fan Design Load VAV 1.5	5 W/m ² 0.14 W/ft ²	Comments:							
EXHAUST FANS									
Washes and Estavol									
Washroom Exhaust 100	U L/s.washroom 212 CFM/W	asnroom							
Other Exhaust (Smeking/Conference) 0.1	2 L/S.III- 0.04 CFM/III	-							
Total Building Exhaust 0.3	1 L/S.III- 0.02 CFM/IC	2							
Exhaust System Static Pressure 25	50 Pa 1.0 wg								
Exhaust System Static Tressure 259	%								
Fan Motor Efficiency 75%	%								
Sizing Factor 0.5	5								
Exhaust Fan Connected Load 0.	.2 W/m ² 0.02 W/ft ²								
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump and Cooling Tower/Condenser Far	is)							
Average Condenser Fan Power Draw	0.024 kW/kW	0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser) 0.80 W/m ²	0.07 W/ft ²							
Condenser Pump									
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area	0.002 L/s.m ²	0.003 U.S. gpm/ft ²							
Pump Head Pressure	kPa south	tt							
Pump Efficiency	50%								
Pump Motor Efficiency	80%								
Sizing Factor	0.5	10//642							
Pump Connected Load	VV/III-	VV/It-							
CIRCULATING PLIMP (Heating & Cooling)									
ontoolearnito i onni (ricating a coomig)									
Pump Design Flow @ 5 °C (10 °F) delta T	0.001 L/s.m ²	0.0021 U.S. gpm/ft ² 2.4	U.S. apm/Ton	h					
Pump Head Pressure	100 kPa	33 ft							
Pump Efficiency	50%								
Pump Motor Efficiency	80%								
Sizing Factor	0.5								
Pump Connected Load	0.2 W/m ²	0.02 W/ft ²							
Supply Fan Occ. Period	3500 hrs./year								
Supply Fan Unocc. Period	5260 hrs./year								
Supply Fan Energy Consumption	10.9 kWh/m².yr								
	0500 1 /								
Exnaust Fan Occ. Period	3500 hrs./year								
Exhaust Fan Unocc. Period	5260 hrs./year								
Exhaust Fan Energy Consumption	1.6 kWh/m².yr								
Condensor Rump Energy Consumption	13A/la /m2								
Continenser Pump Energy Consumption	motion 0.4 kWb/m2.vr								
County Tower /Condenser Fans Energy Consul	unpuon 0.4 KWn/m².yr								
Circulating Pump Yearly Operation	5000 bre /vear								
Circulating Pump Energy Consumption	0.1 k\/h/m².vr								
chosed ing i drip Energy Consumption	0.1 (WWWW								
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency							
		(%) (vears)							
	Inspect/Service Fans & Motors								
	Inspect/Adjust Belt Tension on Fan Belts								
	Inspect/Service Pump & Motors						EUI	kWh/ft².yr	1.2
	· · ·	· · · ·						MJ/m².vr	46.5

	COMMERCIAL SECTOR BUILDING PROFILE									
EXISTING BUILDINGS: Small Accommodation Baseline		SIZE: < 100 kW	VINTAGE:				REGION: Island Interconnected	1		
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	Γ	23.5 kWh/ft².yr 908.5 MJ/m².yr	Fuel Oil /	Propane:	2.1 kWh/ft ² .yr	81.7 MJ/m ² .yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING (SUITES)	3.2	123.0	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr			
LOBBY, BALLROOMS, CORRIDORS SPECIAL PURPOSE LIGHTING	5 1.8	68.2	SPACE HEATING SPACE COOLING	8.2 0.3	316.1 13.4	1.3	50.2			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.0	234.0	0.8	31.5			
HVAC FANS & PUMPS	1.2	46.5	FOOD SERVICE EQUIPMENT	0.6	25.0					
REFRIGERATION	0.4	15.0								
MISCELLANEOUS BLOCK HEATERS	0.3	10.0								
COMPUTER EQUIPMENT	0.5	17.5								
COMPUTER SERVERS ELEVATORS	0.1	3.7								
OUTDOOR LIGHTING	0.4	17.0								



			COMMER	CIAL SECTOR B	UILDING PROFILE	
	SIZE:			VINTAGE:		REGION:
Health Care Baseline	All					Island Interconnected
CONSTRUCTION						
Wall U value (W/m ² .°C)	0.38 W/m ² .°C		0.07 Btu/hr.ft ² .	°F	Typical Building Size	8,829 m ² 95,000 ft ²
Roof U value (W/m ² .°C)	0.38 W/m ² .°C		0.07 Btu/hr.ft ² .	°F	Typical Footprint (m ²)	1,750 m ² 18,830 ft ²
Glazing U value (W/m ² .°C)	3.84 W/m ² .°C		0.68 Btu/hr.ft ² .	°F	Footprint Aspect Ratio (L:W	() 2
					Percent Conditioned Space	100%
Window/Wall Ratio (WIWAR) (%)	0.15				Defined as Exterior Zone	45%
Shading Coefficient (SC)	0.65				Typical # Stories	3
					Floor to Floor Height (m)	3.7 m 12.0 ft
VENTILATION SYSTEM, BUILDING COM	ITROLS & IND	OOR CONDITIONS				
Mantilation Oceana Tona			0.01/	041/0		
Ventilation System Type		System Present (%)	80%	CAVR DI		10100% O.A 101AL
		Min. Air Flow (%)	0070		50%	10070
		(Minimum Throttled A	Air Volume as Pe	ercent of Full Flow)		
Occurancy or Reople Density		30 m²/n	erson	323 ft2/pers	20n	%04 34.02%
Occupancy Schedule Occ. Period		90%	erson	323 11/pera	5011	760A 34.0276
Occupancy Schedule Unocc. Period		75%		·		
Fresh Air Requirements or Outside Air		45 L/s.p	erson	95 CFM/p	erson	
Fresh Air Control Type *(e	enter a 1. 2 or 3)	1 If Fre	sh Air Control T	vpe = "2" enter % F	A, to the right:	15%
(1 = mixed air control, 2 = Fixed fresh air, 3	100% fresh air)	If Fre	sh Air Control T	ype = "3" enter Mal	ke-up Air Ventilation and operatio	n 0.5 L/s.m ² 0.10 CFM/ft ²
Ciping Easter						50% operation (%)
Sizing Factor Total Air Circulation or Design Air Flow		4.41 L/s.r	n²	0.87 CFM/f	2	
· · · · · · · · · · · · · · · · · · ·			-		Separate Make-u	up air unit (100% OA) L/s.m ² CFM/ft ²
Infiltration Rate		0.70 L/s.r	n²	0.14 CFM/ft	t ² Opera	ation occupied period 50%
(air infiltration is assumed to occur during u	noccupied				Opera	ation unoccupied period 50%
	,					
Economizer		Er	thalpy Based	Dry-Bulb Base	d Total	
	Incidence	of Use	K I/ka	100%	100% Summ	hary of Design Parameters
	Switchove		Btu/lbm	64.4 °F	Peak	Zone Sensible Load 443,312
	-				Room	air enthalpy 28.2 Btu/lbm
Controls Type	System P	resent (%)	HVAC	Room	Disch	arge air enthalpy 23.4 Btu/lbm
	All Pneum	atic	Equipment	CONTRIONS	Desig	n CFM 20,623
	DDC/Pneu	umatic			Total	air circulation or Design air fk 4.41 //s.m ²
	All DDC	uld add up to 100%)				
	10181 (3110					
		F	Proportional	PI/PID T	otal	
Control mode	Control M	ode	ed Discharge	Reset		
	Control St	rategy	eu Discharge	Resei		
Indoor Design Conditions	Summer T	emperature	24	Room	75.2 °F 14 °C	y Air 57.2l °E
	Summer H	lumidity (%)	50%		100%	57.2
	Enthalpy		65.5	KJ/kg. 2	28.2 Btu/lbm 54.5 KJ/kg	g. 23.4 Btu/lbm
	Winter Oc	c. Temperature	24	°C	75.2 °F 16.5 °C	61.7 °F
	Winter Oc Enthaloy	c. Humidity	30%	K I/ka	45% 22.8 Btu/lbm 45.5 K l/kc	19.6 Btu/lbm
	Winter Un	occ. Temperature	24	°C 2	75.2 °F	. 13.0 Dianom
	Winter Un	occ. Humidity	30%			
	Enthalpy		50	KJ/kg. 2	21.5 Btu/lbm	
Damper Maintenance			Incidence	Frequency		
	Control Ar	m Adjustment	(%)	(years)		
	Lubrication	n				
	Blade Sea	I Replacement				
Air Filter Cleaning	Changes/	rear		T		
Ū.	Ū			1		
Incidence of Annual HVAC Controls Mainta	inance	1		Inciden	ce of Annual Room Controls Mai	intenance
Incluence of Annual HVAC Controls Mainte	anal ICC	L				
	Annual Ma	intenance Tasks	Incidence		Annual Maintena	nce Tasks Incidence
	0-86	of Transa-111	(%)			(%)
	Calibration	of Panel Gauges			Inspection/Calibr	Switches
	Inspection	of Auxiliary Devices			Inspection of Au	ciliary Devices
	Inspection	of Control Devices]	Inspection of Con	ntrol Devices (Valves,
					(Dampers, VAV I	Boxes)
1						

EXISTING BUILDINGS: Health Care Baseline	SIZE: All	COM	VERCIAL SECTOR BUILD VINTAGE:	ING PROFILE	REGION: Island Interco	nnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	250 0.40 8.8 W/m ²	23.2 ft-candles						
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 40%	Light Level (Lux) % Distribution Weighted Average	9 INC	100 200 50%	300 50%	T5HO LED	Total 100% 250 TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (* CU LLF Efficacy (L/W)	%) 5% 0.7 0.65 15	5% 45% 0.7 0.6 0.65 0.75 50 72	45% 0.6 0.6 0.80 0.80 88 65	0% 0% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot						EUI kWh/ft².y	r 1.1
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 0.60 17.0 W/m ²	46.5 ft-candles					wome.y	44
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 65% 20%	Light Level (Lux) % Distribution Weighted Average	300 e	500 600 100%			Total 100% 500	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (* CU LLF Efficacy (L/W)	%) 4% 0.7 0.65 15	5% 50% 0.7 0.6 0.65 0.75 50 72	18 HD 40%	13HO LED 0% 1% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot			- I oad X Hrs X	(SE X GLEE		EUI kWh/ft².y	r 5.4
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	250.00 Lux 11.9 W/m ²	23.2 ft-candles		Floor fract	tion check: should = 1.00	1.00	wom y	203
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 100%	Light Level (Lux) % Distribution Weighted Average	200 50%	300 500 50%	700 T8	MH HPS	Total 100% 250	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (* CU LLF Efficacy (LAV)	%) 15% 0.7 0.65	012 112 15% 20% 0.7 0.6 0.65 0.75 50 72	50% 0.6 0.6 0.80 0.80 88 88	0.6 0.6 0.55 0.55	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot	Enidady (EW)	10	00 12			EUI kWh/ft².y	r
TOTAL LIGHTING					Overall LPD	13.72 W/m²	EUI TOTAL kWh/ft².y MJ/m².yi	r 7 254
OFFICE EQUIPMENT & PLUG LOA	DS							
Equipment Type	Compute	ers Monitors	Printers	Copiers	Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load	54.55 0.48 0.9 0.1	51 0.48 W/m ² 0.8 W/m ² W/t ² 0.1 W/t ²	100 0.02 0.1 W/m ² 0.01 W/ft ²	200 0.02 0.1 W/m ² 0.01 W/ft ²	217 0.04 0.3 W/m ² 0.02 W/ft ²	3.85 W/m² 0.36 W/ft²		
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 50% 2000 6760	90% 50% 2000 6760	90% 50% 2000 6760	100% 100% 2600 6160	90% 25% 4100 4660		
Total end-use load (occupied period) Total end-use load (unocc. period)	5.4	W/m² 0.5 W/ft² W/m² 0.2 W/ft²	to see notes (cells with r	ed indicator in upper	right corner, type "SHIFT	F2Compter Servers	EUI kWh/ft².y MJ/m².yi	r 0.2 8.10
Usage during occupied period Usage during unoccupied period	100% 40%					Computer Equipment Plug Loads	EUI KWh/ft².y MJ/m².yı EUI kWh/ft².y MJ/m².yı	r 0.9 35.0 r 1.7 67.3
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Fuel Oil / Propane Fu	uel Share:	Electricity Fuel Share:	100.0%	Fuel Oil / Propane I EUI kWh/ft².yr MJ/m².yr	EUI 3.1 120.0	All Electric EUI kWh/ft².y MJ/m².yı	EUI r 2.1 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	olers/freezers, refrigerat	ted buffet cases					EUI kWh/ft².y	r <u>0.4</u>
BLOCK HEATERS & MISCELLANE	OUS						MJ/m².yı	15.0
						Block Heaters Miscellaneous	EUI kWh/ft².yı MJ/m².yı EUI kWh/ft².yı MJ/m².yı	r 0.3 r 0.3

EXISTING BUILDINGS: Health Care Baseline	SIZE: All		COMME	RCIAL SEC VINTAGE	TOR BUIL	DING PRO	FILE		REGION: Island Intere	connected		
SPACE HEATING												
Heating Plant Type				Fu	el Oil / Propa	ane		El	ectric			
				Bo	ilers High	Packaged	A/A HP	W. S. HP	H/R Chiller	Resistanc	Total	
		System Present (%)		50%	- Ingri	-	4 70		1.50	50%	100%	
		Performance (1 / Eff.)		70%	80%	70%	1.70	3.00 0.33	4.50	1.00 1.00		
		(kW/kW)										
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	36.6 W/m ² 1052 MJ/m ² .yr	11.6 27.2	Btu/hr.ft² kWh/ft².yr									All Electric EUI
Electric Fuel Share	50.0%	Fuel Oil / Propane Fuel Sh	50.0%]	Oil Fuel Sha	re						kWh/ft².yr 27.2 M l/m² yr 1052
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence								5 10%/D 51%
	Fire Side Water Sid Inspection Inspection Flue Gas	Inspection e Inspection for Scale Build of Controls & Safeties of Burner Analysis & Burner Set-up	lup	(%) 75% 100% 100% 100% 90%								Fuel OI// Propane EUI kWh/ft2.yr 38.8 MJ/m².yr 1503 Market Composite EUI kWh/ft2.yr 33.0 MJ/m².yr 1278
SPACE COOLING												
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 70.0% 4.7 0.21	Al Chillers HE 5.4 0.19	Screw Chillers 4.4 0.23	Reciprocal Open 3.6 0.28	ting Chillers DX 30.0% 2.7 0.37	Absorption	n Chillers CW 1 1.00	Total		
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset								
Setpoint		Chilled Water Condenser Water Supply Air	7 30 14.0	ာ င ာ	44.6 86 57.2	°F °F °F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	67 W/m² 110.4 MJ/m².yr	21 Btu/hr.ft ² 2.9 kWh/ft ² .yr	562	ft²/Ton								
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2,9	100 hrs/yea	r)	
A/C Saturation (Incidence of A/C)	60.0%											
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		T								
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence	Frequency	1						
	Inspect Cr Inspect Cr Megger M Condense Vibration Eddy Curr Spectroch	ontrol, Safeties & Purge Un oupling, Shaft Sealing and E lotors r Tube Cleaning Analysis ent Testing emical Oil Analysis	it Bearings	(%)	(years)							All Electric EUI kWh/tf2.yr 1.0
Cooling Tower/Air Cooled Condense	r Maintenan(Annual Ma Inspectior Inspect/St Megger N Inspect/Ve	intenance Tasks VClean Spray Nozzles arvice Far/Fan Motors lotors rify Operation of Controls		Incidence (%)	Frequency (years)							MJ/m².yr 37 Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr MJ/m².yr Market Composite EUI kWh/ft².yr kWh/ft².yr 1.0 MJ/m².yr 37
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Avg. Tank resent (%) 0.65				Boiler 40% 0.75		Fuel Share Blended E	e fficiency	Fossil 40% 0.75	-	Elec. Res. 60% 0.91
(Tertiary Load) Wetting Use Percentage	90%			A	II Electric EL kWh/ft ² .vr	JI 3.4]	Fuel	Oil / Propan	e EUI 4.1		Market Composite EUI kWh/ft2 vr 3.6
in the second se	0070				MJ/m².yr	130			MJ/m².yr	158		MJ/m².yr 141.1

		COMM	IERCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:		REGION:					
Health Care	All				Island Interd	connected				
Baseline										
HVAC FANS & FUMFS										
SUPPLY FANS				Ventilation	and Exhaust	Fan Opera	ation & Contro	ol -		
System Design Air Flow	4.4 L/s.m ²	0.87 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure VAV	875 Pa	3.5 wg	Incidence of Use	80%	20%	100%	FIUW			
Fan Efficiency	52%		Operation	Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency	85%		Insidence of Lice	809/	200/	909/	209/			
Fan Design Load CAV	8.7 W/m ²	0.81 W/ft ²	Incidence of Ose	00%	20%	00%	20%			
Fan Design Load VAV	8.7 W/m ²	0.81 W/ft ²	Comments:							
EVHALIST FANS										
EXHAUST FANS										
Washroom Exhaust	100 L/s.wa	shroom 212 CFM/w	ashroom							
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.02 CFM/ft	2							
Other Exhaust (Smoking/Conference)	0.5 L/s.m ²	0.10 CFM/ft	2							
Total Building Exhaust	0.6 L/s.m ²	0.12 CFM/ft	2							
Fan Efficiency	250 Pa	1.0 wg								
Fan Motor Efficiency	75%									
Sizing Factor	1.0									
Exhaust Fan Connected Load	0.8 W/m ²	0.08 W/ft ²								
AUXILIARY COOLING EQUIPMENT	(Condenser Pum	and Cooling Tower/Condenser Fa	ns)							
	(,							
Average Condenser Fan Power Draw		0.024 kW/kW	0.09 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air	Cooled Condense	r) 1.63 W/m ²	0.15 W/ft ²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.004 L/s.m ²	0.005 U.S. gpm/ft ²							
Pump Head Pressure		100 kPa	33 ft							
Pump Motor Efficiency		80%								
Sizing Factor		1.0								
Pump Connected Load		0.89 W/m ²	0.08 W/ft ²							
CIRCULATING PUMP (Heating & Co	oling)									
	Nto T	0.002 1/0 m2	0.0042 11 S. apm/#2	ALLS an-	Ton					
Pump Head Pressure		100 kPa	33 ft 2.4	+j0.5. gpm/	ron					
Pump Efficiency		50%								
Pump Motor Efficiency		80%								
Sizing Factor		0.8								
Pump Connected Load		0.6 W/m²	0.05 W/ft ²							
Supply Fan Occ. Period		4000 hrs./year								
Supply Fan Unocc. Period		4760 hrs./year								
Supply Fan Energy Consumption		62.0 kWh/m².yr								
Exhaust Fan Occ. Period		4000 hrs./vear								
Exhaust Fan Unocc. Period		4760 hrs./year								
Exhaust Fan Energy Consumption		6.4 kWh/m².yr								
Condensor Rump France Consumation	2	4.4 134/6/2023								
Cooling Tower (Condenser Fans Energy	u av Consumption	1.1 KWh/m².yr 0.7 k\/\/b/m².yr								
	g, consumption	0.7 КМИНЕ.УГ								
Circulating Pump Yearly Operation		7000 hrs./year								
Circulating Pump Energy Consumption	ו	2.0 kWh/m².yr								
Fans and Pumps Maintenance	Appus	Maintenance Tasks								
ו מהס מווע ד עוווףס ויומוונפוומוונפ	Annual	wantendite i asks	(%) (vears)							
	Inspect	/Service Fans & Motors								
	Inspect	Adjust Belt Tension on Fan Belts					_			
	Inspect	Service Pump & Motors					E	UI kW	√ft².yr	6.7
1								MJ/	m².yr	260.0

			COMMERCIAL SEC	TOR BUILD	ING PROFIL	.E		
EXISTING BUILDINGS: Health Care Baseline	:	SIZE: All	VINTAGE:				REGION: Island Interconnected	
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		36.1 kWh/ft².yr 1,397.3 MJ/m².yr	Fuel Oil /	Propane:	21.0 kWh/ft ² .yr	814.8 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	1.1	44.2	-	kWh/ft².yr	MJ/m².yr	kWh/ft2.yr	MJ/m².yr	
SECONDARY LIGHTING	5.4	209.4	SPACE HEATING	13.6	526.2	19.4	751.7	
TERTIARY LIGHTING			SPACE COOLING	0.6	22.4			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	2.0	78.0	1.6	63.1	
HVAC FANS & PUMPS	6.7	260.0	FOOD SERVICE EQUIPMENT	2.1	80.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.9	35.0						
COMPUTER SERVERS	0.2	8.1						
ELEVATORS	0.2	7.7						
OUTDOOR LIGHTING	0.9	33.9						

			COMMER	CIAL SECT	OR BUILD	ING PROF	ILE						
EXISTING BUILDINGS:	SIZE:			VINTAGE	:				REGION				
Schools Baseline	All								Island Int	erconnected	1		
CONSTRUCTION													
	_												
Wall U value (W/m ² .°C) 0.3	B W/m².°C	(0.07 Btu/hr.ft ² .	°F		Typical Bu	uilding Size			3,717	m²	40,000	ft ²
Roof U value (W/m ² .°C) 0.3	B_W/m².°C	(0.07 Btu/hr.ft ² .	°F		Typical Fo	ootprint (m ²)		3,717	m²	40,000	ft²
Glazing U value (W/m ² .°C) 3.84	4 W/m ² .°C	(0.68 Btu/hr.ft ² .	°F		Footprint /	Aspect Rati	io (L:W)		5			
						Percent C	onditioned	Space		50%			
Window/Wall Ratio (WIWAR) (%) 0.13	3					Defined as	s Exterior Z	one					
Shading Coefficient (SC) 0.6	5					Typical # \$	Stories			1		10.0	
						Floor to Fl	loor Height	(m)		3.7	m	12.0	rt
VENTILATION SYSTEM, BUILDING CONTROL	OLS & IND	OOR CONDITIONS											
Ventilation System Type			CAV	CAVR			VAV				τοται		
ventilation bystem Type		System Present (%)	100%	0/111	DDWZ	DDMLVV		0/1011		10070 0.70	100%		
		Min. Air Flow (%)					50%						
		(Minimum Throttled A	Air Volume as P	ercent of Fu	III Flow)								
Occupancy or People Density		10 m²/pe	erson	108	ft²/person				%OA	10.15%			
Occupancy Schedule Occ. Period		90%											
Occupancy Schedule Unocc. Period		2 1/0 0	07000	6	CEM/porce								
Fiesh Air Requirements of Outside Air			erson	0	CFIW/persu								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Free	sh Air Control T	ype = "2" e	nter % FA. to	o the right:			34%	5]	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fre	sh Air Control T	ype = "3" e	nter Make-up	o Air Ventila	ation and op	peration	0.5	5 L/s.m ²	0.10 C	FM/ft ²	
Sizing Factor		1.3							50%	operation (%)	l	
Total Air Circulation or Design Air Flow		2.96 L/s.m	n²	0.58	CFM/ft ²					_		_	
		<u> </u>			0.000		Separate I	Make-up air	unit (100%	% OA)	L	/s.m²	CFM/ft ²
air infiltration Rate	upied	0.42 L/s.m	n²	0.08	CFM/ft ²			Operation	unoccupied	d period	50% 50%		
hours only if the ventilation system shuts down)	apioa							oporation	anooodpro	aponoa	0070		
							т						
Economizer	Incidence	of Use	thalpy Based	Dry-Bu 100%	Ib Based	1 otal 100%	-	Summary	of Design	Parameters			
	Switchove	er Point	KJ/kg.	18	°C	10070		Peak Desi	gn Cooling	J Load	689,051		
			Btu/lbm	64.4	°F		1	Peak Zone	Sensible	Load	385,006		
Controls Type	System P	Present (%)	HVAC	Room	1			Room air e	enthalpy air enthalr	W	28.2 Bt	u/lbm	
Controls Type	System	resent (70)	Equipmen	Controls				Specific volu	me of air at:	55F & 100% R	13.2 ft ³	/lbm	
	All Pneum	natic						Design CF	M		17,910		
	DDC/Pne	umatic						Total air ci	rculation o	r Design air	2.96 1/s	s.m²	
	Total (sho	ould add-up to 100%)											
					, 	1							
Control mode	Control M	F Iode	Proportional	PI / PID	Total								
Control mode	Control IV	Fix	ed Discharge	Reset		1							
	Control S	trategy				J							
Indoor Design Conditions				Room			1	Supply Air					
Indoor Design Conditions	Summer -	Temperature	21	°C	69.8	°F	13	°C	55.4	1 °F			
	Summer I	Humidity (%)	50%		с	-	100%						
	Enthalpy	Tamparatura	65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm			
	Winter Od	c. Humidity	30%	C C	69.8	1 -	45%		55	2 -			
	Enthalpy		53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm			
	Winter Ur	nocc. Temperature	18.8	°C	65.84	°F							
	Enthalpy	IOCC. Humidity	50%	KJ/ka.	21.5	Btu/lbm							
											I		
Dompor Maintenance			Insides	Froguest	ı								
Damper Maintenance			(%)	(vears)									
	Control A	rm Adjustment	() • /	()									
	Lubricatio	n - Dealessant											
	Blade Sea	ai replacement		1	J								
				-									
Air Filter Cleaning	Changes/	Year]									
					Incidence of	f Annual R	oom Contre	ols Mainten	ance				
Incidence of Annual HVAC Controls Maintenand	ce						- 5 00110	2.5 man (6)		L]			
	A		1	1			A		I		ta stata - T		
	Annual M	aintenance Tasks	Incidence				Annual Ma	aintenance 7	asks		(%)		
	Calibratio	n of Transmitters	(/0)	1			Inspection	/Calibration	of Room	Thermostat	(/0)		
	Calibratio	n of Panel Gauges		4			Inspection	of PE Swit	ches				
	Inspection	n of Auxiliary Devices		+			Inspection	of Auxiliary	Devices	/alves			
	Inspection	TO CONTO DEVICES		L			(Dampers	, VAV Boxe	Devices (valves,			
									1				

EXISTING BUILDINGS: Schools Baseline	SIZE: All	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Island Interconne	icted	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	500 Lux 46] ft-candles		
Connected Load Occ. Period(Hrs./yr.)	14.7 W/m ² 1	W/ft² Light Level (Lux) 300 500 700 1000 % Distribution 100% 100% 100%	Total	
Usage During Occupied Period Usage During Unoccupied Period	85% 15%	Weighted Average INC CFL T12 T8 HID T5	500 HO LED TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 70% 30% CU 0.7 0.7 0.6 0.6 0 LLF 0.65 0.65 0.80 0.80 0 Efficient (LMD) 15 50 72 89 55	0% 0% 100.0% 0.6 0.6 80 0.80 05 00	
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 3.1 M.//m².yr 122	
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	400 Lux 37 0.15 18.0 W/m ² 1	ft-candles		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 15%	Light Level (Lux) 400 500 700 1000 % Distribution 100%	Total 100% 400	
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL 112 T0 T12 T0 T12 T0 T12 T0 T12 T0 T0 T12 T0 T0 <th co<="" td=""><td>HO LED IOTAL 0% 3% 100.0% 0.6 0.6 80 0.80 95 90</td></th>	<td>HO LED IOTAL 0% 3% 100.0% 0.6 0.6 80 0.80 95 90</td>	HO LED IOTAL 0% 3% 100.0% 0.6 0.6 80 0.80 95 90
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF X GLFF	EUI kWh/ft².yr 0.7 MJ/m².yr 27	
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27	ft-candles Floor fraction check: should = 1.00 W/tt ²	1.00	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 10%	Light Level (Lux) 300 500 700 1000 % Distribution 100%	Total 100% 300	
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL 112 18 1 CU 0.7 0.7 0.6 0.6 0 LLF 0.65 0.65 0.75 0.80 0.80 0 Fifticacy (I/W) 15 50 72 84 88 8	MH HPS TOTAL 2.6 0.6 .55 0.55 65 90	
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING		Overall LP 15	i.17 W/m² EUI TOTAL kWh/ft².yr 4 MJ/m².yr 149	
OFFICE EQUIPMENT & PLUG LOA	DS			
Equipment Type	Computers	Monitors Printers Copiers Servers P	lug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.05 0.3 W/m ² 0.0 W/ft ²	51 100 200 217 0.05 0.02 0.01 0.01 0.3 W/m² 0.2 W/m² 0.4 W/m² 0.1 W/m² 0.00 W/tt² 0.02 W/tt² 0.04 W/tt² 0.01 W/tt²	0.2)W/m ² .02)W/ft ²	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 90% 90% 100% 10 50% 50% 50% 100% 5 2000 2000 2000 2000 33 6760 6760 6760 5760 5760 <td>0% 0% 000 760</td>	0% 0% 000 760	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.3 W/m ² 0.8 W/m ²	0.1 W/ft ² to see notes (cells with red indicator in upper right corner, type *SHIFT @ah 0.1 W/ft ²	nputer Servers EUI kWh/ft².yr 0.10 MJ/m².yr 3.68	
Usage during occupied period Usage during unoccupied period	100% 59%	Comp	MJ/m².yr 0.54 MJ/m².yr 21.01 Plug Loads EUI KVM/t².yr 0.11 MJ/m².yr 4.23 MJ/m².yr 4.23	
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI EUI kWh/ft².yr (MJ/m².yr a	All Electric EUI 2.2 EUI kWh/ft².yr 0.1 8.0 MJ/m².yr 1	
REFRIGERATION Provide description below:			EUI kWh/ft².yr 0.1 MJ/m².yr 3.0	
BLOCK HEATERS & MISCELLANE	ous		Block Heaters EUI kWh/ft².yr MJ/m².yr Miscellaneous EUI kWh/ft².yr M/m².yr 3	

EXISTING BUILDINGS: Schools Baseline	SIZE: All	СОММЕ	RCIAL SEC VINTAGE	tor Buildi	NG PROF	ILE	F	EGION: sland Interco	nnected		
SPACE HEATING											
Heating Plant Type			Fi	uel Oil / Propa	ne		Elect	ric		Т	
			Bi	oilers I	Packaged	A/A HP	W.S.HPF	I/R Chiller Re	sistanceTotal		
		System Present (%)	25%	nign	Unit				75% 100%	%	
		Eff./COP	70%	80%	70%	1.70	3.00	4.50	1.00		
		(kW/kW)	1.40	1.25	1.43	0.59	0.33	0.22	1.00		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	55.8 W/m ² 291 MJ/m ² .yr	17.7 Btu/hr.ft² 7.5 kWh/ft².y	r							All Electric EUI	
Electric Fuel Share	75.0% Fuel C	Dil / Propane Fuel Share 25.09	%	Oil Fuel Shar	e]			kWh/ft².yr	7.5
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence]						MJ/m².yr	291
	Fire Side	Inspection	(%)							Fuel Oil / Propane EUI	10.7
	Water Side	le Inspection for Scale Buildup	100%	, ,						MJ/m².yr	416
	Inspection Inspection Flue Gas	n of Controls & Safeties n of Burner Analysis & Burner Set-up	100% 100% 90%							Market Composite EUI kWh/ft².yr MJ/m².yr	8.3 323
SPACE COOLING											
A/C Plant Type		Centrifug	al Chillers	Screw	Recprocti	ng Chillers	Absorption	Chillers	Total		
		Standard	I HE	Chillers	Open	DX	W. H.	CW	00.0%		
		COP 2.	5 5.4	4.4	3.6	2.7	0.9	1	00.0 %		
		Performance (1 / COP) 0.4	0 0.19	0.23	0.28	0.37	1.11	1.00			
		Additional Refrigerant									
		Related Information									
Control Mode		Incidence of Use Fixed Setpoint	Reset]							
		Chilled Water Condenser Water									
Setpoint		Chilled Water Condenser Water 30 Supply Air 13	2°C)°C 0°C	44.6 86 55.4	°F °F °F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	54 W/m² 79.4 MJ/m².yr	17 Btu/hr.ft ² 69 2.0 kWh/ft ² .yr	ft²/Ton								
Sizing Factor	1.00	Operatio	n (occ. perio	4000	hrs/year	Note value	e cannot be le	ess than 2,900) hrs/year)		
A/C Saturation (Incidence of A/C)	2.0%				2						
Electric Fuel Share	100.0%		7								
Lieune i dei onare	100.078		_								
Chiller Maintenance	Annual Ma	aintenance Tasks	Incidence (%)	Frequency (years)							
	Inspect Co	ontrol, Safeties & Purge Unit									
	Inspect Co Megger M	oupling, Shart Sealing and Bearings lotors									
	Condense	er Tube Cleaning									
	Eddy Curr	rent Testing									
	Spectroch	nemical Oil Analysis								All Electric EUI	10
										MJ/m².yr	38
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency						Fuel Oil / Propage ELU	
	Inspection	/Clean Spray Nozzles	(/0)	(years)						kWh/ft².yr	
	Inspect/Se Meager M	ervice Fan/Fan Motors								MJ/m².yr	
	Inspect/Ve	erify Operation of Controls								Market Composite EUI	
										kWh/ft².yr MJ/m².yr	1.0 38
DOMESTIC HOT WATER			-		-	-					_
SOMEOTIC TOT WATER				· · · ·		T	(
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	PI SHW Avg. Tank resent (%) 0.65			Boiler 20% 0.75		Fuel Share Blended Eff	iciency	ossil 20% 0.75	Elec. Res. 80% 0.91	
Service Hot Water load (MJ/m ² .yr)	17.3										
				All Electric EU	I]	Fuel Oi	I / Propane E	UI	Market Composite EUI	
Wetting Use Percentage	90%			kWh/ft².yr MJ/m².yr	0.5 19		k N	Wh/ft².yr /IJ/m².yr	0.6 23	kWh/ft².yr MJ/m².yr	0.5 19.8

		COMMER	CIAL SECTOR BUILDING PROFILE					
EXISTING BUILDINGS:	SIZE:		VINTAGE:	REGION:				
Schools	All			Island Inte	rconnected	I		
Baseline								
HVAC FANS & PUMPS								
SUPPLY FANS				Ventilation and Exhau	st Fan Oper	ation & Cor	ntrol	
Sustam Design Air Flaus	2 1/2 m2	0.59 0.54/62	Cantral	Ventilation Fan	Exhaus	Variable		
System Design All Flow 3.0	D Do	0.56 CFW/IL	Control	Fixed Variable	Fixed	Variable		
System Static Pressure CAV 25	0 Pa	1.0 wg	Incidence of Line	100%	1009/	FIOW		
System Static Pressure VAV 25	u Pa	1.0 wg	Operation	100% Centinus y Cehedulad	100%	Cohodulod		
Fan Efficiency 007	/0		Operation	ContinuousScheduled	Johunuous	scheduled		
Sizing Easter 100	/0		Insidence of Line	250/ 750/	259/	760/		
Fan Design Load CAV 1	1 W/m2	0.13 W//ft2	Incidence of Ose	2370 7370	2370	13%		
Fan Design Load VAV 14	1 W/m ²	0.13 W/ft ²	Comments:					
		0.10	e en mente.					
EXHAUST FANS								
Washroom Exhaust 100) L/s.washro	oom 212 CFM/was	hroom					
Washroom Exhaust per gross unit area 0.1	1 L/s.m ²	0.01 CFM/ft ²						
Other Exhaust (Smoking/Conference) 0.1	1 L/s.m ²	0.02 CFM/ft ²						
Total Building Exhaust 0.2	2 L/s.m ²	0.03 CFM/ft ²						
Exhaust System Static Pressure 25	0 Pa	1.0 wg						
Fan Efficiency 259	%							
Fan Motor Efficiency 759	%							
Sizing Factor 1.0)							
Exhaust Fan Connected Load 0.	2 W/m ²	0.02 W/ft ²						
		·						
AUXILIARY COOLING EQUIPMENT (Condens	ser Pump an	nd Cooling Tower/Condenser Fans						
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton					
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser)	1.09 W/m ²	0.10 W/ft ²					
Condenser Pump								
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton					
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.004 U.S. gpm/ft ²					
Pump Head Pressure		kPa	ft					
Pump Efficiency		50%						
Pump Motor Efficiency		80%						
Sizing Factor		1.0						
Pump Connected Load		W/m ²	W/ft ²					
CIRCULATING PUMP (Heating & Cooling)								
	1	0.000	0.000111.0 ///0					
Pump Design Flow @ 5 °C (10 °F) delta I		0.002 L/s.m ²	0.0034 U.S. gpm/ft ² 2.4	U.S. gpm/1on				
Pump Head Pressure		100 kPa	33 ft					
Pump Efficiency		50%						
Pump Motor Efficiency		80%						
Sizing Factor		0.8	0.04 14/62					
Pump Connected Load	l	0.5 W/m²	0.04 W/II-					
Supply Fan Occ. Period	I	2000 hrs /vear						
Supply Fan Unoco Period		6760 brs /year						
Supply Fan Energy Consumption		5.2 kWb/m² vr						
Coppiy Fair Energy Consumption	l	0.2						
Exhaust Fan Occ. Period	1	2000 hrs./year						
Exhaust Fan Unocc. Period		6760 hrs./year						
Exhaust Fan Energy Consumption		0.8 kWh/m².vr						
	L	,						
Condenser Pump Energy Consumption]	kWh/m².vr						
Cooling Tower /Condenser Fans Energy Consu	mption	0.5 kWh/m².yr						
g a state st		,						
Circulating Pump Yearly Operation]	2000 hrs./year						
Circulating Pump Energy Consumption		0.2 kWh/m ² .yr						
	L							
Fans and Pumps Maintenance	Annual Ma	aintenance Tasks	Incidence Frequency					
			(%) (years)					
	Inspect/Se	rvice Fans & Motors						
	Inspect/Ad	just Belt Tension on Fan Belts				_		
	Inspect/Se	rvice Pump & Motors				E	EUI kWh/ft ² .y	r 0.6
							MJ/m ² .vr	24.0

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS:	:	SIZE:	VINTAGE:				REGION:			
Schools		All					Island Interconnected			
Baseline										
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		12.0 kWh/ft².yr 463.6 MJ/m².yr	Fuel Oil /	Propane:	2.8 kWh/ft ² .yr	108.7 MJ/m².yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	3.1	121.9	-	kWh/ft ² .yr	MJ/m².yr	kWh/ft2.yr	MJ/m².yr			
ARCHITECTURAL LIGHTING	0.7	27.3	SPACE HEATING	5.6	218.5	2.7	104.1			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.8					
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.4	15.2	0.1	4.6			
HVAC FANS & PUMPS	0.6	24.0	FOOD SERVICE EQUIPMENT	0.1	4.0					
REFRIGERATION	0.1	3.0								
MISCELLANEOUS	0.1	3.0								
BLOCK HEATERS										
COMPUTER EQUIPMENT	0.5	21.0								
COMPUTER SERVERS	0.1	3.7								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

Bacter Construct Top Construct Top <thconstruct th="" top<=""> Construct Top Co</thconstruct>	EXISTING BUILDINGS: University/College	SIZE: All		COMMER	CIAL SECT VINTAGE	FOR BUILD	ING PROF	OFILE REGION: Island Interconnected
Unit of Loss Image: Second Secon	Baseline							
Mult U and (Win*C) 000 Win*C 000 Wi	CONSTRUCTION							
Red U skale (WinkFig) Biol U skale (WinkFig) 3.58 WinkFig) 0.00 BinkInfe /F	Wall U value (W/m ² .°C)	0.38 W/m ² .°C	0.0	7 Btu/hr.ft ² .	°F		Typical Bu	Building Size 6,506 m ² 70,000 ft ²
Sking U value (WinY-C) 355 WinP-TC 0.55 Bindred T-FF Proprint Agency Rand BLW) 77 Bindred Value (WinY-C) Winderweit Raids (WinY-C) 355 365 77 Bindred Value (WinY-C) 77 Bindred Valu	Roof U value (W/m ² .°C)	0.38 W/m ² .°C	0.0	7 Btu/hr.ft ² .	°F		Typical Fo	Footprint (m ²) 3,253 m ² 35,000 ft ²
Present Considered Space Binding Conflicter (SG) 000 000 000 000 Vertication System Type 000 000 Vertication System Type 0000 000 Vertication System Type<	Glazing U value (W/m ² .°C)	3.58 W/m ² .°C	0.6	3 Btu/hr.ft ² .	°F		Footprint	t Aspect Ratio (L:W) 7
monocover, 100 0.00<							Percent C	Conditioned Space 100%
Bidding Coefficient (SC) Image: Control (SC) <thimage: (sc)<="" control="" th=""> Image: Control (SC)<!--</td--><td>Window/Wall Ratio (WIWAR) (%)</td><td>0.30</td><td></td><td></td><td></td><td></td><td>Percent C</td><td>as Exterior Zone</td></thimage:>	Window/Wall Ratio (WIWAR) (%)	0.30					Percent C	as Exterior Zone
Image: Instrume The second (b) The second (b) Verification System Type Image: Ima	Shading Coefficient (SC)	0.65					Typical #	# Stories 2
Vertraktion System Type System Preser (b) OV/ (CAVR OM/ (DAVR M/							Floor to F	Floor Height (m) 3.7 m 12.0 ft
VENTATION SYSTEM. BULLING CONTROLS & NOOCE CONDITIONS Ventilation System Type Interview (interview) 0/01 CAVE 0/02<								
vertilation System Type <u>interm Present (%) of % intermediate set (% in</u>	VENTILATION SYSTEM, BUILDING CO	NTROLS & INDO	OR CONDITIONS					
International system System Preserv(in) 2005 1005 1005 Occupancy of People Density Cocupancy Schedule Core. Period Cocupancy Schedule Core. Period Cocupancy Schedule Core. Period Tesh Art Key Lores Period Te	Ventilation System Type	Г		CAV	CAVR			
International sequences International sequences International sequences International sequences Decagancy or People Density Occupancy Stretck Uncore Fraid Implement 1531 (Piperson %DA 72.57% Decagancy Stretck Uncore Fraid Implement 151 (Piperson %DA 72.57% Fraid All Concentropy Stretck Uncore Fraid Implement 151 (Piperson Montemperson Fraid All Concentropy Stretck Uncore Fraid Implement 151 (Piperson Montemperson Streng Fraid - Implement 151 (Piperson Montemperson Montemperson Streng Fraid - Implement - Implement 0.000 (Pitter - Implement 0.000 (Pitter Streng Fraid - Implement - Implement - Implement 0.000 (Pitter - Operation acceptop priorities - Operation acceptopriorities - Operation acceptoprior	formation of otom type		System Present (%)	90%	0,1111	BBIIL	DBINET	10% 100%
Control Propie Density Docupancy Stretule Coc. Period Docupancy Stretule More Correct More Co		l	Min. Air Flow (%)					50%
Cocupany of People Density Occupany Schede Druce Prod 14 Implement 15 Reperson 10 Implement 15 Reperson Feeh All Control Type "(effet 1, 2, 0.2) 1 I Frein All Control Type 345 Lin" 0.10			(Minimum Throttled Air)	/olume as P	ercent of Fu	III Flow)		
Occupany Schede Dor, Period Teach Ar Requestments or Datable Air 000 10 Lis person 21 CPM person Piech Al Cortrol Type 10 Lis person 21 Control Type 000 000 000 It = maked ar cortrol 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Fied fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 3100% fresh air if a motor 2.4 - Field fresh air, 310	Occupancy or People Density		14 m ² /pers	on	151	ft²/person		%OA 17.57%
Inclusion and the frequencies on Obligits of Distributions and operation in the optic is and t	Occupancy Schedule Upocc Period	ŀ	90%					
Fresh Air Control Type "(enter a 1, 2 or 3) 1 If Fresh Air Control Type - 3' enter % FA. to the right:	Fresh Air Requirements or Outside Air	ŀ	10 L/s.pers	on	21	CFM/perso	n	
Intermedia Control type Control type <td>Freeh Ale Os stral To</td> <td></td> <td> ·</td> <td>Al- 0</td> <td></td> <td>-10/ -1</td> <td></td> <td>0.00</td>	Freeh Ale Os stral To		·	Al- 0		-10/ -1		0.00
Sump Factor 50% operation (%) Tail Air Cliculation or Design Air Flow 1.6 4.05 L/s.m ² 0.80 CPM/H ² Separate Male-up air unit (10% OA)	resn Air Control Type * (1 = mixed air control. 2 = Fixed fresh air	enter a 1, 2 or 3)	1 If Fresh	Air Control T Air Control T	ype = "2" e ype = "3" e	nter % FA. to nter Make-ur	o the right: Air Ventil:	:: 34% ilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
Bing Factor 1.6					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			50% operation (%)
India Ar Lockadation or Design Ar How 0.00 Ls.m* 0.00 Ls.m* 0.00 Separate Make-up at ret (100%, OA) OC	Sizing Factor	-	1.6		0.00	0514/62		
Initiation Rate 0.70 U.s. n ² 0.14 CPM/re Operation coccupied period 00% Correntiate and the same of the corrent of the same o	Total Air Girculation or Design Air Flow	L	4.06 L/S.M ²		0.80	GEMI/IT ²		Separate Make-up air unit (100% OA)
(air inflation is assumed to occur duing unoccupied model) Operation unoccupied period	Infiltration Rate	[0.70 L/s.m ²		0.14	CFM/ft ²		Operation occupied period 50%
Economizer Incidence of Use in introduction system visual status utility Economizer Incidence of Use in introduction of Design Parameters Summary of Design Cooling Load 752,785 Controls Type System Present (%) HVAC Room in entrolsystem visual status utility All Proximatic Introduction of Design Parameters 752,785 Discharge air entrolsystem visual status utility 232 Bulbam 232 Bulbam Discharge air entrolsystem visual status utility 330,020 752,785 Control Trode System Present (%) HVAC Room in entrolsystem visual status utility 232 Bulbam Discharge air entrolsystem visual status utility Total air circlastion or Design Parameters 752,785 Control mode Control Mode Preportional PI / PID Total Total Indoor Design Conditions Summer Temperature 221 °C Total 131 °C 55,41 °F Indoor Design Conditions Summer Temperature 221 °C 752 °F 131 °C 150 °C 60,81 °F United Concent Hundidy 505 Kulkg 223 °C 130 °C 130 °C 130 °C 130 °C 130 °C 130 °C 130 °C 130 °C 130 °C 130 °C	(air infiltration is assumed to occur during	unoccupied						Operation unoccupied period 50%
Economizer indexce of Use Enthaby Based Total Switchover Point Lxag 100% 100% Switchover Point Butthower Point Butthower Point Butthower Point Controls Type System Present (%) HVAC Room Feedbace Al Pneumatic Equipment Controls Peedbace Statubut Control mode Control mode Equipment Total Control mode Control Mode Proportional P1 / PID Total Indoor Design Conditions Summer Temperature Room Total Supply Air Indoor Design Conditions Summer Temperature Room Total Supply Air Winter Occ. Temperature 20 °C 75.21 °F Supply Air 10% Undoor Design Conditions Summer Hundity (%) 50% Erthategy 65.5 KJ/kg 22.8 But/bm 45.5 KJ/kg 10.8 But/bm Damper Maintenance Incidence of Annual Nunce. Hundity 30% 10% 10% 10% 10% 10% Air Filter Cleaning Control Mode Incidence of Annual Room Controte Maintenance Incidence <td< td=""><td></td><td>io wity</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		io wity						
Incidence of Use 100% 100% 100% Builtower Point 100% 100% 100% Controls Type System Present (%) 64.4 (F Pask Design Cooling Load ####################################	Economizer		Entha	lpy Based	Dry-Bu	lb Based	Total	
Controls Type System Present: (%) HVAC Room Room Room Sector value of all of the sector value of the sect		Switchover	Point	K.I/ka	100%	°C	100%	Summary of Design Parameters Peak Design Cooling Load ########
Controls Type System Present (%) HVAC Room Room air enthalpy 23.2 Buildom All Pneumatic Indexed in the second interval in the second interval int		e interiorer	- onk	Btu/lbm	64.4	°F		Peak Zone Sensible Load 752,785
Cuttors type System Present (**) PYAC ROUTING Document Control Big upment Control Equipment Control Sugget in the system of the	Controlo Turno	Custom Dro	acost (0/)		Deem	1		Room air enthalpy 28.2 Btu/lbm
All Proundic indicidence All Doc/Preventic indicidence All Doc indicidence All Doc indicidence Total air circulation or Design air 4.06 Vs.m ² Control mode Control Mode Proportional PI / PID Total Indoor Design Conditions Control Mode Proportional PI / PID Total Indoor Design Conditions Summer Humperature 24 °C 75.2 °F 13 °C 55.4 °F Summer Humidity (%) 550% 75.2 °F 13 °C 55.4 Vs.Mg. 23.4 °F Winter Voc. Temperature 22 °C 71.6 °F 16 °C 60.8 °F 16 °C 60.8 °F Winter Voc. Temperature 22 °C 71.6 °F 16 °C 60.8 °F 19.6 °C 10.6 °C	Controls Type	System Pre	esent (%)	Equipmen	t Controls			Discharge air enthalpy 23.4 Btu/ibm Specific volume of air at 55F & 100% R 13.2 ft ³ /lbm
DDC/Preunatic		All Pneuma	tic					Design CFM 35,020
Control mode Proportional P1 / P1D Total Control mode Control Mode Proportional P1 / P1D Total Indoor Design Conditions Summer Temperature 24 °C 75.2 °F 131 °C 55.4 °F Summer Temperature 224 °C 75.2 °F 131 °C 55.4 °F 100% Writter Occ. Temperature 222 °C 71.8 °F 161 °C 60.8 °F Writter Occ. Temperature 221 °C 71.8 °F 161 °C 60.8 °F Writter Occ. Temperature 221 °C 71.8 °F 161 °C 60.8 °F Writter Occ. Temperature 221 °C 71.8 °F 161 °C 60.8 °F Writter Occ. Temperature 221 °C 71.8 °F 161 °C 60.8 °F Writter Occ. Temperature 221 °C 71.8 °F 161 °C 60.8 °F Writter Unocc. Temperature 221 °C 10.3 °F 10.4 °F 10.6 °C Enthalpy 50 K.J/kg. 21.5 °F 10.4 °F 10.6 °C 10.6 °C Damper Maintenance Control Arm Adjustment (%) 19.6 °F 10.6 °C 10.6 °C Air Filter Clean		DDC/Pneur	matic	-		-		Total air circulation or Design air 4.06 l/s.m ²
Control mode Control Mode Fibed Discharge Reset Control Strategy Indoor Design Conditions Summer Temperature 24 'C 75.2' F 13 C 55.4' F Summer Humidity (%) 50% Enthalpy 65.5 KJ/kg 28.2 Btu/bm 54.5 KJ/kg 23.4 Btu/bm 45% Enthalpy 053 KJ/kg 21.5 Btu/bm Damper Maintenance Control Arm Adjustment 10% (%) Control Arm Adjustment 10% (%) Control Arm Adjustment 10% Control Arm A		Total (shou	ld add-up to 100%)			-		
Control Mode FlopUnuturia FlopUnuturia <td< td=""><td></td><td></td><td>Dra</td><td>antional</td><td></td><td>Total</td><td>1</td><td></td></td<>			Dra	antional		Total	1	
Indoor Design Conditions Fixed Discharge Reset Indoor Design Conditions Summer Temperature 24 °C 75.2 °F Summer Humidity (%) 50% 28.2 Btu/bm 54.5 K./kg, 23.4 Btu/bm Winter Occ. Temperature 22 °C 71.6 °F 161 °C 60.8 °F Winter Occ. Temperature 22 °C 71.6 °F 161 °C 60.8 °F Winter Occ. Temperature 22 °C 71.6 °F 161 °C 60.8 °F Winter Uncc. Temperature 22 °C 71.6 °F 161 °C 60.8 °F Winter Uncc. Temperature 21 °C 69.8 °F 19.6 Btu/bm Winter Uncc. Humidity 30% 21.5 Btu/bm 45.5 K./kg, 19.6 Btu/bm Damper Maintenance Incidence Frequency 69.8 °F 19.6 Btu/bm Lubrication Blade Seal Replacement Blade Seal Replacement 10.1 Blade Seal Replacement Air Filter Cleaning Controls Maintenance Incidence of Annual Room Controls Maintenance [rcidence] Incidence of Annual HVAC Controls Maintenance Tasks [rcidence] [rcidence] [rcidence] Calibration of Transmitters [rsidence] [rsindencc	Control mode	Control Mo	de	Jonionai	FI/FID	TUTA		
Indoor Design Conditions Indoor Design Conditions Room Supply Air Summer Temperature 224 °C 75.2] °F 131°C 55.4] °F Summer Temperature 224 °C 75.2] °F 100% 100% 23.4 Btu/Ibm Winter Occ. Temperature 222 °C 11.6] °F 16] °C 60.8] °F 66.5 KJ/kg. 23.4 Btu/Ibm Winter Occ. Humidity 30% 71.6] °F 16] °C 60.8] °F 66.9 F Winter Occ. Humidity 30% 71.6] °F 45.5 KJ/kg. 19.6 Btu/Ibm Damper Maintenance Incidence Frequency 69.8] °F 69.8] °F 100% <			Fixed	Discharge	Reset		1	
Indoor Design Conditions Rummer Temperature Room Supply Air Summer Temperature 224 °C 75.2] °F 13 °C 55.4] °F Summer Temperature 222 °C 71.8] °F 13 °C 66.5 K.J/kg. 28.2 B tu/bm 54.5 K.J/kg. 23.4 B tu/bm Winter Occ. Temperature 221 °C 71.6] °F 16 °C 60.8] °F 455% Winter Unocc. Temperature 221 °C 69.8] °F 455% 55.4 J/kg. 19.6 B tu/bm Winter Unocc. Temperature 21 °C 69.8] °F 65.8 K.J/kg. 19.6 B tu/bm Damper Maintenance Incidence Frequency 69.8 °F 10.0 °K 10.0 °K Air Filter Cleaning Control Arm Adjustment 10.0 °K 10.0 °K 10.0 °K Incidence of Annual HVAC Controls Maintenance Incidence Incidence of Annual Room Controls Maintenance 10.0 °K Incidence of Annual HVAC Controls Maintenance 10.0 °K Incidence Annual Maintenance 10.0 °K Calibration of Transmitters 10.0 °K 10.0 °K 10.0 °K 10.0 °K 10.0 °K Control Arm Adjustment 10.0 °K 10.0 °K 10.0 °K 10.0 °K		Control Stra	ategy				J	
Summer Temperature 24 °C 75.2 °F 13 °C 55.4 °F Summer Humidity (%) 50% 28.2 But/bm 54.5 KJ/kg. 23.4 But/bm Winter Occ. Temperature 22 °C 71.6 °F 16 °C 60.8 °F Winter Unocc. Humidity 30% 45% 19.6 Btu/bm Winter Unocc. Temperature 21 °C 69.8 °F Winter Unocc. Temperature 21 °C 69.8 °F Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg. 21.5 Btu/bm Damper Maintenance Incidence Frequency (%) (%) (years) Control Arm Adjustment 1 Lubrication 1 Biade Seal Replacement 1 Incidence of Annual HVAC Controls Maintenance 1 Arnual Maintenance 1 Annual Maintenance 1 Calibration of Transmitters 1 Calibration of Transmitters 1 Inspection/Calibration of Room Thermostat 1	Indoor Design Conditions				Room		_	Supply Air
Summer Humidity (%) 50% Enthalpy 65.5 kJ/kg. 28.2 Btu/lbm Winter Occ. Temperature 22 °C 71.6 °F 100% 45% Winter Occ. Humidity 30% 21 °C 71.6 65.8 kJ/kg. 22.8 Btu/lbm 45% Winter Unocc. Humidity 30% Control Arm Adjustment 1 Lubrication 1 Blade Seal Replacement 1 Blade Seal Replacement 1 Incidence of Annual Room Controls Maintenance 1 Incidence of Annual HVAC Controls Maintenance 1 Annual Maintenance 1 Annual Maintenance (%) Calibration of Transmitters 1 Calibration of Transmitters 1 Calibration of Transmitters 1		Summer Te	emperature	24	l °C	75.2	°F	13 °C 55.4 °F
Winter Occ. Temperature 22 C 71.6 *F 16 *C 60.8 *F Winter Occ. Humidity 30% 45% 45% 45% 19.6 Btu/lbm Winter Occ. Temperature 21 *C 69.8 *F 45.5 KJ/kg. 19.6 Btu/lbm Winter Unocc. Humidity 30% 21.5 Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm Damper Maintenance Incidence Frequency (%) (%) (years) (years) (years) Damper Maintenance Incidence Frequency (%) (years) (years) (years) Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Incidence (%) Calibration of Transmitters (%) Incidence Annual Maintenance (%) Incidence		Summer Hu Enthalov	umidity (%)	50% 65.5	5 KJ/ka.	28.2	Btu/lbm	100% 54.5 K.J/ka. 23.4 Btu/bm
Winter Occ. Humidity 30% 45% 45% Enthalpy 53 KJ/kg. 22.8 Btv/lbm 45.5 KJ/kg. 19.6 Btv/lbm Winter Unocc. Temperature 21 °C 69.8 °F 45.5 KJ/kg. 19.6 Btv/lbm Damper Maintenance Incidence Frequency 50 KJ/kg. 21.5 Btv/lbm 19.6 Btv/lbm Damper Maintenance Incidence Frequency (%) (years) 21.5 Btv/lbm 19.6 Btv/lbm Air Filter Cleaning Control Arm Adjustment 1 1 1 Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters (%) Enthalpy 10.6 Btv/lbm		Winter Occ	. Temperature	22	°C	71.6	°F	16 °C 60.8 °F
Entralpy 33 N/Mg. 22.5 But/bit 43.5 N/Mg. 19.0 But/bit Winter Unocc. Temperature 21 °C 69.8 °F 69.8 °F Winter Unocc. Humidity 30% 21.5 Btu/bm Damper Maintenance Incidence Frequency (%) (years) Air Filter Cleaning Changes/Year Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence Tasks Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) Inspection/Calibration of Room Thermostat Incidence		Winter Occ	. Humidity	30%		22.0	Rtu/lbm	45%
Winter Unocc. Humidity 30% Enthalpy 50 KJ/kg. 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment		Winter Uno	cc. Temperature	21	°C	69.8	°F	45.5 KJ/kg. 18.0 Bluibili
Enthalpy 50 KJ/kg. 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Incidence Frequency Lubrication Incidence Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Tasks Incidence Calibration of Transmitters (%) Calibration of Transmitters (%) Calibration of Transmitters Incidence Calibration of Transmitters (%) Calibration of Transmitters Incidence Calibration of Transmitters (%) Calibration of Transmitters Incidence Maintenance Tasks Incidence Inspection/Calibration of Room Thermostat Inspection/Calibration of Room Thermostat		Winter Uno	cc. Humidity	30%				
Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Lubrication Blade Seal Replacement Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Transmitters Calibration of Transmitters		Enthalpy		50	KJ/kg.	21.5	Btu/lbm	
Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Incidence Lubrication Incidence Blade Seal Replacement Incidence of Annual Mointenance Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters (%) Calibration of Transmitters Incidence Calibration of Transmitters Inspection/Calibration of Room Thermostat				-	1	-		
Air Filter Cleaning Control Arm Adjustment Incidence of Annual Room Controls Maintenance Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Tasks Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence Calibration of Transmitters (%) Inspection/Calibration of Room Thermostat	Damper Maintenance			Incidence	Frequency			
Air Filter Cleaning Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Annual Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Calibration of Transmitters Calibration of Calibrat		Control Arn	n Adjustment	(%)	(years)	1		
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence of Annual Room Controls Maintenance Annual Maintenance Annual Maintenance Tasks Incidence of Annual Maintenance Tasks Incidence Calibration of Transmitters Inspection/Calibration of Room Thermostat		Lubrication				1		
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Calibration of Transmitters Calibration of Calibration of Calibration of Calibration of Calibration of Calibration of Calibration of Calibration of Calibration of Calibration of Calibrati		Blade Seal	Replacement			J		
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibr					_			
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Transmitters Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) Inspection/Calibration of Room Thermostat Incidence (%) I	Air Filter Cleaning	Changes/Ye	ear					
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Inspection/Calibration of Room Thermostat						Incidence of	f Annual R	Room Controls Maintenance
Annual Maintenance Tasks Incidence (%) Incidence Calibration of Transmitters Inspection/Calibration of Room Thermostat	Incidence of Annual HVAC Controls Main	enance						
Calibration of Transmitters Calibration of Panel Gauges Ca		Approx Mai	ntenance Tasks	Incidence	-			Annual Maintenance Tasks
Calibration of Transmitters Calibration of Panel Gauges Unspection/Calibration of Room Thermostat		Annuarivial	INCIDE I dSKS	(%)				
Calibration of Panel Gauges		Calibration	of Transmitters]			Inspection/Calibration of Room Thermostat
Inspection of Auxiliany Daviage		Calibration	of Panel Gauges		-			Inspection of PE Switches
Inspection of Control Devices (Valves,		Inspection	of Control Devices		1			Inspection of Control Devices (Valves,
(Dampers, VAV Boxes)		· · ·						(Dampers, VAV Boxes)

EXISTING BUILDINGS: University/College Baseline	SIZE: Ali	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Island Interconnected	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.90 14.1 W/m ² 1.3	5 ft-candles 3 W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 90% 20%	Light Level (Lux) 300 500 700 1000 Total % Distribution 100% 100% 500 500 500 500 100% <td></td>	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 60% 35% 5% 0% 0% 100.0% CU 0.7 0.7 0.6 0.6 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.80 Efficacy (LW) 15 50 72 88 65 95 90	
Relamping Strategy & Incidence of Practice	Group Spot	EUI kWh	Vft².yr 5.4
ARCHITECTURAL LIGHTING COR Light Level Floor Fraction (ALFF) Connected Load Occ. Period(Hrs./yr.)	Bit Dors 27.5 0.10 11.4 4000 4000	9 ft-candles 1 W/ft ² Light Level (Lux) 300 500 700 1000 Total	<u>114.yi 207</u>
Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4760 100% 50%	% Distribution 100% 100% Weighted Average 300 INC CFL T12 T8 HID T5HO LED TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 8% 10% 15% 65% 00% 2% 100.0% CU 0.7 0.7 0.6 0.6 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.80 Efficacy (LW) 15 50 72 88 65 95 90	
Relamping Strategy & Incidence of Practice	Group Spot	EUL Lood X line X OF X OF F	v/ft².yr 0.7
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27.5 14.0 W/m ² 1.5	EUI = Load X Hrs. X Sr X GLFF Mult 9. ft-candles Floor fraction check: should = 1.00 1.00 3. W/ft ² W/ft ² Mult Mult	<u>Tř.yr 26</u>
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 700 1000 Total % Distribution 100% 100% 300	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 0% 100% 0% 100.0% CU 0.7 0.7 0.6 0.6 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.55 0.55 Efficacy (LMN) 15 50 72 84 88 65 90	
Relamping Strategy & Incidence of Practice	Group Spot	EUI kWh	√ft².yr m².yr
TOTAL LIGHTING		Overall LP 13.79 W/m² EUI TOTAL kWh M.//	√ft².yr 6 m².yr 233
OFFICE EQUIPMENT & PLUG LOA	DS		
Equipment Type	Computers	Monitors Printers Copiers Servers Plug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load	54.55 0.31 1.2 W/m ² 0.1 W/ft ²	51 100 200 217 0.31 0.02 0.02 0.01 1.1 <w m²<="" td=""> 0.1<w m²<="" td=""> 0.3 W/m² 0.1 0.1<w td="" tt²<=""> 0.01 W/t² 0.02 W/m² 0.09 0.01 W/t² 0.1 W/t² 0.1</w></w></w>	
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	3078 3078 10078 10078 50% 50% 50% 50% 2000 2000 2000 2000 6760 6760 6160 6760	
Total end-use load (occupied period) Total end-use load (unocc. period)	3.9 W/m² 2.2 W/m²	0.4 W/ft ² to see notes (cells with red indicator in upper right corner, type *SHIFT @@mputer Servers EUI kWh 0.2 W/ft ²	v/ft².yr 0.10 m².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 55%	Computer Equipment EUI K/Vh MJ/r Plug Loads EUI K/Vh MJ/r	√ft².yr 1.34 m².yr 51.73 √ft².yr 0.65 m².yr 25.18
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI All Elect EUI kWh/ft².yr 0.5 EUI kWh MJ/m².yr 20.0 MJ/r MJ/r	ctric EUI vft².yr 0.4 m².yr 15.0
REFRIGERATION Provide description below:		EUI kWh	v/ft².yr 0.5 m².yr 20.0
BLOCK HEATERS & MISCELLANE	ous	Block Heaters EUI kWh M./r Miscellaneous EUI kWh M./r	v/ft².yr m².yr v/ft².yr 0.3 m².yr 10

			COMMER	CIAL SECT	OR BUILD	NG PROF	ILE						
EXISTING BUILDINGS:	SIZE:			VINTAGE	:			1	REGION:	rconnecte	d		
Baseline	,							-			-		
SPACE HEATING													
											,		
Heating Plant Type				Fu	el Oil / Propa ilers	ne Packaged	A/A HP	W. S. HP	tric I/R Chiller	Resistance	Total		
				Stan.	High	Unit					1000/		
		Eff./COP		70%	80%	70%	1.70	3.00	4.50	20%	100%		
		Performance (1 / Eff.)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
											<u> </u>		
Peak Heating Load	52.3 W/m ²	16	.6 Btu/hr.ft ²										
(Tertiary Load)	207 Month Syn												
Sizing Factor	1.00										Г	All Electric EUI	
Electric Fuel Share	20.0% Fuel C	il / Propane Fuel Share	80.0%	b	Oil Fuel Sha	re]			-	kWh/ft².yr	7.7
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence	1						L	MJ/m².yr	297
	Fire Side I	Inonaction		(%)							-	Fuel Oil / Propane E	UI
	Water Side	le Inspection for Scale B	uildup	100%								MJ/m².yr	424
	Inspection	of Controls & Safeties		100%							Г	Market Composite F	-111
	Flue Gas	Analysis & Burner Set-u	р	90%							-	kWh/ft².yr	10.3
												MJ/m².yr	399
SPACE COOLING													
A/C Plant Type													
			Centrifuga	al Chillers	Screw	Reciprocat	ting Chillers	Absorption	Chillers	Total	I		
		System Present (%)	50.0%	DE DE	Chillers	Open	50.0%	vv. n.	CW	100.0%			
		COP Performance (1 / COP	4.7	7 5.4	4.4	3.6	2.6	0.9	1				
		(kW/kW)	, 0.2	0.15	0.20	0.20	0.00		1.00				
		Additional Refrigerant Related Information											
											l		
Control Mode		Incidence of Use	Fixed	Reset	1								
		Chilled Water	Setpoint										
		Condenser Water											
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water Supply Air	30	°C	86 55.4	°F							
			10.0	70	00.4								
Peak Cooling Load Seasonal Cooling Load	80 W/m ² 111.4 MJ/m ² .yr	25 Btu/hr.f 2.9 kWh/ft ²	t ² 474 .vr	ft²/Ton									
(Tertiary Load)													
Sizing Factor	1.00		Operatior	n (occ. perio	3000	hrs/year	Note value	e cannot be l	ess than 2	,900 hrs/ye	ar)		
A/C Saturation	15.0%												
(Incidence of A/C)	15.078												
Electric Fuel Share	100.0% Fuel C)il / Propane Fuel Share		7									
	100.070 1 0010	in ropane r der onare		1									
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence (%)	Frequency (vears)								
	Inspect Co	ontrol, Safeties & Purge	Unit	(··· /	()								
	Megger M	lotors	d Bearings										
	Condense	er Tube Cleaning											
	Eddy Curr	ent Testing									-		
	Spectroch	emical Oil Analysis									-	All Electric EUI kWh/ft² vr	12
				1	_							MJ/m².yr	46
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks		Incidence (%)	Frequency (years)						Г	Fuel Oil / Propane E	UI
	Inspection	Clean Spray Nozzles										kWh/ft².yr	
	Megger M	lotors									L	wiJ/IIIyi	
	Inspect/Ve	erify Operation of Contro	ols								-	Market Composite E kWh/ft².vr	:UI 1.2
												MJ/m².yr	46
SERVICE HOT WATER													
Canvies List Weter Direct Trans	E		ante	1		Deller	T			Fect?"	, I	Eleo Beo	
Service Hot vvater Plant Type	System P	resent (%)	ar ik			55%		Fuel Share		Fossil 75%		25%	
Service Hot Water load (M I/m?)	Eff./COP	0	.65	1		0.75]	Blended Eff	ficiency	0.75		0.91	
(Tertiary Load)	22.0						1						
Wetting Use Percentage	90%			A	Il Electric EL	10		Fuel O	il / Propan kWh/ft² vr	e EUI		Market Composite E kW/b/ft² vr	:UI 0.7
	00,0				MJ/m².yr	25		i	MJ/m².yr	30		MJ/m².yr	29.0

	CON	IMERCIAL SECTOR BUILDING PROFILE			
EXISTING BUILDINGS:	SIZE:	VINTAGE:	REGION:		
University/College	All		Island Int	erconnected	
Baseline					
HVAC FANS & PUMPS					
SUPPLY FANS			Ventilation and Exha	ust Fan Operation & Co	ontrol
		-	Ventilation Fan	Exhaust Fan	
System Design Air Flow 4.	1 L/s.m ² 0.80 CFM/ft ²	Control	Fixed Variable	Fixed Variable	
System Static Pressure CAV 75	50 Pa 3.0 wg	Incidence of Line	FIOW 100	FIOW	4
Fan Efficiency 600	% 3.0 Wg	Operation	90% 10% Continuous Scheduler	Continuous Scheduler	
Fan Motor Efficiency 80 ^o	<u>%</u>	Operation	ContinuousScheduler	icontinuous ochequied	
Sizing Factor 1.0	0	Incidence of Use	75% 25%	75% 25%	
Fan Design Load CAV 6	.4 W/m ² 0.59 W/ft ²				
Fan Design Load VAV 6.4	4 W/m ² 0.59 W/ft ²	Comments:			
EXHAUST FANS					
Washroom Exhaust 10	0 1/s washroom 212 CE	M/washroom			
Washroom Exhaust per gross unit area 0	1 1/s m ² 0.01 CFI	M/ft2			
Other Exhaust (Smoking/Conference)	1 L/s.m ² 0.02 CFI	M/ft ²			
Total Building Exhaust 0.	2 L/s.m ² 0.03 CFI	M/ft ²			
Exhaust System Static Pressure 25	50 Pa 1.0 wg				
Fan Efficiency 25	%				
Fan Motor Efficiency 75	%				
Sizing Factor 1.	0				
Exhaust Fan Connected Load 0.	.2 W/m ² 0.02 W/ft ²				
AUXILIARY COOLING EQUIPMENT (Conden	iser Pump and Cooling Tower/Condenser	Fans)			
Average Condensor Fon Bower Drow	0.034 kW//				
(Cooling Tower/Evap, Condenser/ Air Cooled (Condenser) 1.87 W/r	m ² 0.17 W/ft ²			
(oboling rower/Evap. condensel/ rin oboled e		0.17			
Condenser Pump					
Pump Design Flow	0.053 L/s.I	KW 3.0 U.S. gpm/Ton			
Pump Design Flow per unit floor area	0.004 L/s.r	m ² 0.006 U.S. gpm/ft ²			
Pump Head Pressure	kPa	n ft			
Pump Efficiency	50%				
Pump Motor Efficiency	80%				
Sizing Factor	1.0				
Pump Connected Load	W/r	n² W/ft²			
CIPCIII ATING BLIMP (Heating & Cooling)					
CIRCULATING FOMP (Heating & Cooling)					
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s m ²	0.0051 U.S. gpm/ft ²	24US gpm/Ton		
Pump Head Pressure	100 kPa	50 ft	2.1 o.o. gpitt ton		
Pump Efficiency	50%				
Pump Motor Efficiency	80%				
Sizing Factor	0.8				
Pump Connected Load	0.7 W/m ²	0.06 W/ft ²			
	(000)				
Supply Fan Occ. Period	4000 hrs./year				
Supply Fan Unocc. Period	4760 hrs./year				
Supply Pan Energy Consumption	45.9 KWWWF				
Exhaust Fan Occ. Pariod	4000 brs /vear				
Exhaust Fan Unoco Period	4760 brs /year				
Exhaust Fan Energy Consumption	1.6 kWb/m² vr				
Condenser Pump Energy Consumption	kWh/m².yr				
Cooling Tower /Condenser Fans Energy Consu	umption 0.7 kWh/m ² .yr				
	,				
Circulating Pump Yearly Operation	6000 hrs./year				
Circulating Pump Energy Consumption	3.3 kWh/m ² .yr				
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency			
		(%) (years)			
	Inspect/Service Fans & Motors				
	Inspect/Adjust Belt Tension on Fan Belts				ELU 1446-812
	inspect/Service Pump & Motors				EUI KWN/It ² .yr 4.8
					IVIJ/II1VI 100.0

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS: University/College Baseline	JILDINGS: SIZE: VINTA Nilege Ali		VINTAGE	1			REGION: Island Interconnected			
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	[16.5 kWh/ft².yr 637.9 MJ/m².yr	Fuel Oil /	Propane:	9.3 kWh/ft².yr	362.0 MJ/m ² .yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	5.4	207.3		kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr			
ARCHITECTURAL LIGHTING COR	F 0.7	26.2	SPACE HEATING	1.5	59.4	8.8	339.2			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	6.9					
OTHER PLUG LOADS	0.7	25.2	SERVICE HOT WATER	0.2	6.3	0.6	22.8			
HVAC FANS & PUMPS	4.8	185.5	FOOD SERVICE EQUIPMENT	0.4	15.0					
REFRIGERATION	0.5	20.0								
MISCELLANEOUS	0.3	10.0								
BLOCK HEATERS										
COMPUTER EQUIPMENT	1.3	51.7								
COMPUTER SERVERS	0.1	3.7								
ELEVATORS	0.1	3.9								
OUTDOOR LIGHTING	0.4	17.0								

			COMMER	CIAL SECT	OR BUILD	ING PROF	ILE						
EXISTING BUILDINGS:	SIZE:			VINTAGE	:				REGION				
Warehouse/Wholesale Baseline	All								Island Int	erconnected	1		
CONSTRUCTION													
	_		_								_		
Wall U value (W/m ² .°C) 0.38	8 W/m².°C	0.0	07 Btu/hr.ft ²	.°F		Typical Bu	uilding Size			5,576	m²	60,000	ft²
Roof U value (W/m ² .°C) 0.38	8 W/m ² .°C	0.0	07 Btu/hr.ft ²	.°F		Typical Fo	otprint (m ²)			5,576	m²	60,000	ft ²
Glazing U value (W/m ² .°C) 3.84	W/m².°C	0.0	68 Btu/hr.ft ²	.°F		Footprint /	Aspect Ratio	o (L:W)		1 100%			
						Percent C	onditioned s	Space		45%			
Window/Wall Ratio (WIWAR) (%) 0.05	5					Defined as	s Exterior Z	one					
Shading Coefficient (SC) 0.80)					Typical # \$	Stories			1			
						FIGOR TO FI	oor Height	(m)		6.1	m	19.9	π
VENTILATION SYSTEM, BUILDING CONTRO	DLS & IND	OOR CONDITIONS											
Ventilation System Type			CAN				VAV	VAVR			τοται		
ventilation bystem Type		System Present (%)	100%	6	DDINZ	DDMZVV	0710	V/WIX		10070 0.70	100%		
		Min. Air Flow (%)					50%						
		(Minimum Throttled Air	Volume as P	ercent of Fu	III Flow)								
Occupancy or People Density		100 m²/per	son	1076	ft²/person				%OA	6.56%			
Occupancy Schedule Occ. Period		90%											
Occupancy Schedule Unocc. Period		10 1/2 por		21	CEM/porco	n							
Fresh All Requirements of Outside All		10 L/s.pei	5011	21	CFIW/perso								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fresh	Air Control 1	ype = "2" e	nter % FA. to	the right:]			
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fresh	Air Control 7	Type = "3" e	nter Make-up	Air Ventila	ation and op	eration	0.5	5 L/s.m ²	0.10 C	FM/ft ²	
Sizing Factor		1							50%	operation (%)	i	
Total Air Circulation or Design Air Flow		1.53 L/s.m ²		0.30	CFM/ft ²					_		_	
		0.000			0.000		Separate M	/lake-up air	unit (100	% OA)	L	/s.m²	CFM/ft ²
Infiltration Rate	unied	0.70 L/s.m ²		0.14	CFM/ft ²			Operation	occupied	d period	50% 50%		
hours only if the ventilation system shuts down)	apica							operation	unoccupic		0070		
	-						т						
Economizer	Incidence	Enth	alpy Based	Dry-Bu 100%	lb Based	1 otal	ł	Summany	of Design	Parameters			
	Switchove	er Point	KJ/kg.	100 /8	°C	10078	ł	Peak Desi	gn Cooling	Load	509,519		
			Btu/lbm	64.4	°F			Peak Zone	Sensible	Load	387,357		
Controls Ture	Custom D	Propert (0/)	LIVAC	Deem	1			Room air e	enthalpy		28.2 Bi	tu/lbm	
Controls Type	System P	resent (%)	Equipmer	t Controls				Specific volu	me of air at	79 55F & 100% R	23.4 DI 13.2 ft ³	3/lbm	
	All Pneum	natic						Design CF	M		18,020		
	DDC/Pne	umatic						Total air ci	rculation o	r Design air	1.53 l/s	s.m²	
	Total (sho	ould add-up to 100%)											
		,			1								
Control mode	Control M	Pro	portional	PI / PID	Total								
Control mode	Control IV	Fixed	Discharge	Reset									
	Control S	trategy	j										
la de se Destara Osa ditistas			-	Deere				Our all Ala					
Indoor Design Conditions	Summer	Temperature	2	Room	71.6	°F	13	Supply Air	55 (1 °F			
	Summer I	Humidity (%)	50%	6			100%	-		_ ·			
	Enthalpy	.	65.	5 KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm			
	Winter Oo Winter Oo	cc. Lemperature	2	U'C	69.8	۲F	16 45%	-C	60.8	s °F			
	Enthalpy	so runnany	5	3 KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm			
	Winter Ur	nocc. Temperature	2	1 °C	69.8	°F							
	Winter Ur	nocc. Humidity	30%		21.5	Btu/lbm							
	Enuralpy		50	unung.	21.5	BIUNDIN	I						
				_	1								
Damper Maintenance			Incidence	Frequency									
	Control A	rm Adjustment	(70)	(years)									
	Lubricatio	'n											
	Blade Sea	al Replacement			J								
Air Filter Cleaning	Changes/	Year											
					Incidence -	Applied D	oom Contra	h Meinter	2000				
Incidence of Annual HVAC Controls Maintenance	e	Г			Inclaence of	Annual R	oom Contro	ns mainten	ance				
	-i			_									
	Annual Ma	aintenance Tasks	Incidence	9			Annual Ma	intenance T	Tasks		Incidence		
	Calibratio	n of Transmittere	(%)	-			Inspection	Calibration		Thermostat	(%)		
	Calibratio	n of Panel Gauges		1			Inspection	of PE Swit	ches	mennusidi			
	Inspection	n of Auxiliary Devices]			Inspection	of Auxiliary	/ Devices				
	Inspection	n of Control Devices					Inspection	of Control	Devices (/alves,			
							uampers,	VAV BOXE	:5)		I		

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: REGION: Island Interconnected	
LIGHTING HIGH BAY LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 0.90 10.5 W/m ²	37.2 ft-candles 1.0 W/ft ²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) 300 500 700 1000 % Distribution 50% 50%	Total 100% 400
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL 112 18 HID 15HO LEC System Present (%) 20% 10% 60% 10% CU 0.7 0.7 0.6 0.6 0.7 0.6 0.6 LLF 0.65 0.65 0.75 0.80 0.80 0.80 0.80 Efficacy (LW) 15 50 72 88 65 95 90	101AL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 3.8 MJ/m².yr 146
OTHER, OFFICE LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 0.10 20.9 W/m ²	46.5 [ft-candles	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%	Light Level (Lux) 300 500 700 1000 % Distribution 100%	Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC CPL I12 I8 II0 I80 CEL System Present (%) 10% 5% 60% 25% 0% 0% 0% CU 0.7 0.7 0.6 0.6 0.7 0.6 0.6 0.7 0.6 0.6 0.80	, 100.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr 0.8
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m ²	It-candles Floor fraction check: should = 1.00 1.00 W/ft ² W/ft ² M/ft ² M/ft ²]
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 700 1000 % Distribution	
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL 112 18 MH HPS System Present (%) 0% 0.6 0	0.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr M.J/m².yr
TOTAL LIGHTING		Overall LP 11.57 W/m ²	EUI TOTAL kWh/ft².yr 4.5 MJ/m².yr 175
OFFICE EQUIPMENT & PLUG LOA	DS		_
Equipment I ype Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	54.55 0.59 0.3 W/m ² 0.0 W/ft ² 90%	Monitors Printers Copiers Servers Plug Loads 51 100 200 217 0.59 0.03 0.03 0.06 0.3 W/m² 0.0 W/m² 0.1 W/m² 2 W/m² 0.0 W/t² 0.00 W/t² 0.01 W/t² 0.1 W/m² 2 W/m² 90% 90% 90% 90% 90% 90%	-
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	<u>50%</u> 2000 6760	50% 50% 100% 25% 2000 2000 2000 3500 6760 6760 6760 5260	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m ²	0.2 W/ft ² to see notes (cells with red indicator in upper right corner, type "SHIFT @@mputer Servers 0.1 W/ft ²	EUI kWh/ft².yr 0.11 MJ/m².yr 4.42
Usage during occupied period Usage during unoccupied period	100% 39%	Computer Equipmen Plug Loads	EUI kWh/ft².yr 0.34 MJ/m².yr 13.30 EUI kWh/ft².yr 0.83 MJ/m².yr 32.15
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share	Electricity Fuel Share: 100.0% Fuel Oil / Propane EUI EUI kWh/t².yr MJ/m².yr	All Electric EUI EUI kWh/ft².yr MJ/m².yr
REFRIGERATION Provide description below: Process			EUI kWh/ft².yr 1.5 MJ/m².yr 60.0
BLOCK HEATERS & MISCELLANE	ous	Block Heaters Miscellaneous	EUI KWh/ft².yr MJ/m².yr EUI KWh/ft².yr 0.3 MJ/m².yr 100

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All		COMMER	CIAL SECT VINTAGE	or Buildi	NG PROF	ILE		REGION: Island Inte	rconnecte	ed		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elec	ctric			I	
				Boiler	Unit Heater	Packaged Rooftop	A/A HP	W. S. HP	H/R Chiller	Resistanc	Total		
	Sy	stem Present (%)		25%	70%	70%	1 70	3.00	4.50	75%	100%		
	Pe	erformance (1 / Eff.) N/kW)		1.43	1.43	1.43	0.59	0.33	0.22	1.00	0	•	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	40.6 247 MJ/m ² .yr	12.9 6.4	Btu/hr.ft² kWh/ft².yr	1							1		
Electric Fuel Share	75.0% Fuel Oil / I	Propane Fuel Share	25.0%]	Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr	6.4
Boiler Maintenance	Annual Mainte	enance Tasks		Incidence								MJ/m².yr	247
	Fire Side Insp	pection		(%) 75%								Fuel Oil / Propane E kWh/ft².yr	UI 9.1
	Water Side In Inspection of	spection for Scale Build Controls & Safeties	dup	100% 100%								MJ/m².yr	353
	Inspection of Flue Gas Ana	Burner lysis & Burner Set-up		100% 90%								Market Composite E kWh/ft².yr	UI 7.1
		· · ·										MJ/m².yr	273
SPACE COOLING													
A/C Plant Type			Centrifuga	l Chillers	Screw	Reciprocat	ing Chillers	Absorption	Chillers	Total	T		
	Sy	stem Present (%)	Standard	HE	Chillers	Open	DX 100.0%	W. H.	CW	100.0%	0		
	CC	OP	4.7	5.4	4.4	3.6 0.28	2.6	0.9	1 1 00		1		
	(kV	N/kW)	0.21	0.15	0.20	0.20	0.00		1.00				
	Re	elated Information											
Control Mode		sidence of Lise	Fixed	Reset	I						1		
Control Mode	1110		Setpoint	Resel									
	Co	nilled Water ondenser Water											
				1 -									
Setpoint	Ch Co	nilled Water Andenser Water	7 30	°C °C	44.6 86	°F °F							
	Su	ipply Air	13.0	°C	55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	27 W/m ² 39.0 MJ/m ² .yr	8 Btu/hr.ft² 1.0 kWh/ft².yr	1413	ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/y	ear)		
A/C Saturation	5.0%												
	100.0% Eucl Oil / I	Branana Eucl Shara	[1									
Chiller Meisterene		Propane Fuel Share		Incidence	Frequency								
Chiller Maintenance		enance Tasks		(%)	(years)								
	Inspect Contro Inspect Coupl	ol, Safeties & Purge Ur ling, Shaft Sealing and I	nit Bearings										
	Megger Moto	rs ibe Cleaning											
	Vibration Ana	lysis											
	Eddy Current Spectrochemi	Testing ical Oil Analysis										All Electric EUI	
				1	_							kWh/ft².yr MJ/m².yr	0.4 16
Cooling Tower/Air Cooled Condense	r Maintenan Annual Mainte	enance Tasks		Incidence (%)	Frequency (years)							Fuel Oil / Propane E	UI
	Inspection/Cle Inspect/Servic	ean Spray Nozzles ce Fan/Fan Motors										kWh/ft².yr MJ/m².yr	
	Megger Moto	rs										Market Composite E	111
	inspect verify	Operation of Controls		1								kWh/ft².yr MJ/m².yr	0.4
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fuel S	HW Ava. Tank	<			Boiler	ſ			Fossil		Elec. Res.	
	System Prese	ent (%)				20%		Fuel Share	ficionari	20%	5	80%	
Service Hot Water load (MJ/m ² .yr)	17.0	0.65	2	I		0.75		Biended Et	nciency	0.75	1	0.91	
(I ertiary Load)				A	II Electric EU	1	1	Fuel C	0il / Propan	e EUI		Market Composite E	UI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	0.5 19			kWh/ft².yr MJ/m².yr	0.6 23		kWh/ft².yr MJ/m².yr	0.5 19.5

		COMMER	CIAL SECTOR BUILDING PROFILE					
EXISTING BUILDINGS:	SIZE:		VINTAGE:	REGION	:			
Warehouse/Wholesale	All			Island Ir	terconnecte	ed		
Baseline								
HVAC FANS & PUMPS								
SUPPLY FANS				Ventilation and Exh	aust Fan Ope	eration & Co	ontrol	
				Ventilation Fan	Exhai	ust Fan		
System Design Air Flow 1.	5 L/s.m ²	0.30 CFM/ft ²	Control	Fixed Variable	Fixed	Variable		
System Static Pressure CAV 30	0 Pa	1.2 wg		Flow		Flow		
System Static Pressure VAV 30	0 Pa	1.2 wg	Incidence of Use	100%	100%			
Fan Efficiency 60	/o		Operation	ContinuousSchedul	acontinuou	Scheduled		
Sizing Factor 1.0	/0		Incidence of Lise	80% 20	80%	20%		
Fan Design Load CAV	0 W/m ²	0.09 W/ft ²		0070 20	00/1	2070		
Fan Design Load VAV 1.0) W/m ²	0.09 W/ft ²	Comments:					
EXHAUST FANS								
Weekreen Eukeunt		212 CEM/w	a h x a a m					
Washroom Exhaust per gross unit area	L/s.washroom	0.01 CFM/#2	shioom					
Other Exhaust (Smoking/Conference)	1 L/s.m ²	0.02 CFM/ft ²						
Total Building Exhaust 0.	1 L/s.m ²	0.03 CFM/ft ²						
Exhaust System Static Pressure 25	0 Pa	1.0 wg						
Fan Efficiency 250	%							
Fan Motor Efficiency 750	%							
Sizing Factor 1.0)							
Exhaust Fan Connected Load 0.	2 W/m ²	0.02 W/ft ²						
			、					
AUXILIARY COOLING EQUIPMENT (Conden	ser Pump and Co	oling Tower/Condenser Fans	i)					
Average Condenser Fan Rower Draw		0.020 kW/kW	0.07 kW/Top					
(Cooling Tower/Evan, Condenser/ Air Cooled (ondenser)	0.54 W/m ²	0.07 W/ftr2					
(oboling rower/2 vap. condensel/ vii oboled e	ondenser)	0.04	0.00					
Condenser Pump								
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton					
Pump Design Flow per unit floor area		0.001 L/s.m ²	0.002 U.S. gpm/ft ²					
Pump Head Pressure		kPa	ft					
Pump Efficiency		50%						
Pump Motor Efficiency		80%						
Sizing Factor		1.0						
Pump Connected Load		W/m ²	W/ft ²					
CIRCULATING PUMP (Heating & Cooling)								
Pump Design Flow @ 5 °C (10 °F) delta T		0.001 L/s.m ²	0.0017 U.S. gpm/ft ² 2.4	U.S. gpm/Ton				
Pump Head Pressure		50 kPa	17 ft					
Pump Efficiency		50%	·					
Pump Motor Efficiency		80%						
Sizing Factor		0.8						
Pump Connected Load		0.1 W/m ²	0.01 W/ft ²					
Supply Fan Occ. Period		3500 brs /vear						
Supply Fan Unocc. Period		5260 brs /year						
Supply Fan Energy Consumption		7.3 kWb/m ² vr						
Cappi, ran Enorgy Consumption	L	1.0						
Exhaust Fan Occ. Period		3500 hrs./year						
Exhaust Fan Unocc. Period		5260 hrs./year						
Exhaust Fan Energy Consumption		1.4 kWh/m ² .yr						
Condenser Pump Energy Consumption		kWh/m².yr						
Cooling Tower /Condenser Fans Energy Consu	mption	0.2 kWh/m ² .yr						
		5000 1 /						
Circulating Pump Yearly Operation		5000 hrs./year						
Circulating Pump Energy Consumption		U.1 KWh/m².yr						
Fans and Pumps Maintenance	Annual Maintena	ince Tasks	Incidence Frequency					
ans and i umps mantenance	, vinuer maniene		(%) (vears)					
	Inspect/Service	Fans & Motors	() (joaio)					
	Inspect/Adjust Be	elt Tension on Fan Belts	+					
	Inspect/Service	Pump & Motors				[EUI kWh/f	t².yr 0.8
			· · · · · · · · · · · · · · · · · · ·				M.J/m	² .vr 32.8

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS: SIZE: Warehouse/Wholesale All Baseline		VINTAGE:				REGION: Island Interconnected				
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		14.1 kWh/ft².yr 545.9 MJ/m².yr	Fuel Oil /	Propane:	2.4 kWh/ft ² .yr	92.7 MJ/m².yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
HIGH BAY LIGHTING	3.8	146.3	-	kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr			
OTHER, OFFICE LIGHTING	0.8	29.1	SPACE HEATING	4.8	185.1	2.3	88.1			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.8					
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.4	14.9	0.1	4.5			
HVAC FANS & PUMPS	0.8	32.8	FOOD SERVICE EQUIPMENT							
REFRIGERATION	1.5	60.0								
MISCELLANEOUS	0.3	10.0								
BLOCK HEATERS										
COMPUTER EQUIPMENT	0.3	13.3								
COMPUTER SERVERS	0.1	4.4								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

EXISTING BUILDINGS: Restaurant	SIZE: All	COMMER	CIAL SECTOR BUILD VINTAGE:	NG PROFILE	REGION: Island Interconnected				
Baseline									
Wall U value (W/m².°C) 0.38 Roof U value (W/m².°C) 0.19 Glazing U value (W/m².°C) 3.97	W/m².°C W/m².°C W/m².°C	0.07 Btu/hr.ft ² .°F 0.03 Btu/hr.ft ² .°F 0.70 Btu/hr.ft ² .°F		Typical Building Size Typical Footprint (m ²) Footprint Aspect Ratio (L:W) Percent Conditioned Space Percent Conditioned Space	929 m ² 929 m ² 1 100% 45%	10,000 ft ² 10,000 ft ²			
Window/Wall Ratio (WIWAR) (%) 0.36 Shading Coefficient (SC) 0.58]			Defined as Exterior Zone Typical # Stories Floor to Floor Height (m)	1 3.7 m	12.0 ft			
VENTILATION SYSTEM, BUILDING CONTRO	LS & INDOOR CONDITIO	DNS							
Ventilation System Type	System Presen Min. Air Flow (%	CA\ t (%) 60%	/ CAVR DDMZ	DDMZVV VAV VAVR	IU 100% O.A TOTAL 40% 100%				
Occupancy or People Density Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period	20 90%	m²/person	215 ft²/person		%OA 24.92%				
Fresh Air Requirements or Outside Air Fresh Air Control Type *(enter a (1 = mixed air control, 2 = Fixed fresh air, 3 100%	20 a 1, 2 or 3) 1 6 fresh air)	L/s.person If Fresh Air Control Type If Fresh Air Control Type	42 CFM/perso e = "2" enter % FA. to the e = "3" enter Make-up Air	n right: Ventilation and operation	L/s.m ²] CFM/ft²			
Sizing Factor Total Air Circulation or Design Air Flow	1.3 4.01	L/s.m²	0.79 CFM/ft ²	Concrete Melia un sir					
Infiltration Rate (air infiltration is assumed to occur during unoccur hours only if the ventilation system shuts down)	0.70	L/s.m²	0.14 CFM/ft ²	Operation Operation	occupied period 50%				
Economizer	Incidence of Use Switchover Point	Enthalpy Based KJ/kg. Btu/lbm	Dry-Bulb Based 100% 18 °C 64.4 °F	Total 100% Summary of Peak Desig Peak Zone Deservation	of Design Parameters gn Cooling Load 323,602 Sensible Load 130,664 29 2	Dhullhan			
Controls Type	System Present (%) All Pneumatic DDC/Pneumatic All DDC Total (should add-up to 10	HVAC Equipment 0%)	Room Controls	Discharge Specific volu Design CF Total air ci	air enthalpy 20.2 air enthalpy 23.4 me of air at 55F & 100% R 13.2 M 6,078 roulation or Design air 4.01	Bluilbm ft ³ /lbm Vs.m ²			
Control mode	Control Mode Control Strategy	Proportional Fixed Discharge	PI / PID Total Reset						
Indoor Design Conditions	Summer Temperature Summer Humidity (%) Enthalpy Winter Occ. Temperature Winter Occ. Humidity Enthalpy Winter Unocc. Temperatu Winter Unocc. Humidity Enthalpy	2 509 66.1 2 309 50 re 2 309 50	Room 1°C 75.2 5 KJ/kg. 28.2 1°C 69.8 5 KJ/kg. 22.8 1°C 69.8 5 KJ/kg. 22.8 1°C 69.8 5 KJ/kg. 21.5	Supply Air °F 14 °C 98% 98% Btu/lbm 54.5 KJ/kg. °F 15 °C Btu/lbm 45.5 KJ/kg.	57.2] °F 23.4 Btu/lbm 59] °F 19.6 Btu/lbm				
Damper Maintenance	Control Arm Adjustment Lubrication Blade Seal Replacement	Incidence (%)	Frequency (years)						
Air Filter Cleaning	Changes/Year]	Annual Room Controls Mainten	ance				
Incidence of Annual HVAC Controls Maintenance	2								
	Annual Maintenance Tasks Calibration of Transmitters Calibration of Panel Gaug Inspection of Auxiliary Dev Inspection of Control Devi	s Incidence (%) s ss ces		Annual Maintenance T Inspection/Calibration Inspection of PE Swith Inspection of Auxiliary Inspection of Control I (Dampers, VAV Boxe	Tasks Incidence (%) of Room Thermostat ches / Devices Devices (Valves, (s)				
EXISTING BUILDINGS: Restaurant Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDIN VINTAGE:	IG PROFILE	REGION: Island Interco	nnected			
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LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 0.50 10.7 W/m ²	37.2 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	450 10%	550 650 80% 10%		5HO LED	Total 100% 550		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	80.0% 0.6 0.6 0.80 0.80 88 65	0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI k	.Wh/ft².yr ⁄IJ/m².yr	2.4 92
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 0.50 34.4	27.9 ft-candles 3.2 W/ft ²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 400 40% 40%	500 10%		Total 100% 350		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 70% 0.7 0.65 15	CFL T12 25% 0.7 0.6 0.65 0.75 50 72	T8 HID T 0.6 0.6 0.6 0.80 0.80 84	TSHO LED 5% 5% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot			- Load X Hrs X	SE X GLEE		EUI k	Wh/ft².yr	7.6
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor fract	ion check: should = 1.00	1.00]	<u>10/11 .yı</u>	234
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LM/)	0.7 0.65	0.7 0.6 0.65 0.75 50 72	0.6 0.6 0.80 0.80 84 88	MH HPS 0.6 0.6 0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot						EUI k	Wh/ft².yr	
TOTAL LIGHTING					Overall LP	22.57 W/m ²	EUI TOTAL k N	.Wh/ft².yr /J/m².yr	10 386
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	_		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.16 0.4 W/m ² 0.0 W/ft ² 80% 50% 2000 6760	51 0.16 0.4 W/m ² 0.0 W/ft ² 80% 50% 2000 6760	100 0.01 0.1 W/m ² 0.00 W/ft ² 80% 50% 2000 6760	200 W/m ² W/ft ² 80% 50% 2000 6760	217 0.03 0.1 W/m ² 0.01 W/ft ² 100% 2000 6760	1.15 W/m ² 0.11 W/ft ² 80% 50% 2500 6260			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.8 W/m ² 1.2 W/m ²	0.2 W/ft ² 0.1 W/ft ²				Computer Servers	EUI k	.Wh/ft².yr ⁄IJ/m².yr	0.11 4.42
Usage during occupied period Usage during unoccupied period	100% 65%					Computer Equipment Plug Loads	EUI k EUI k	Wh/ft².yr <u>IJ/m².yr</u> Wh/ft².yr IJ/m².yr	0.41 16.00 0.55 21.24
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:	2.0%	Electricity Fuel Share:	98.0%	Fuel Oil / Propane E EUI kWh/ft².yr MJ/m².yr	UI 0.1 5.0	All E EUI k M	Electric EUI Wh/ft².yr /J/m².yr	34.3 1330.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant]				EUI k	Wh/ft².yr /J/m².yr	16.8 650.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI k N EUI k	Wh/ft².yr 1J/m².yr Wh/ft².yr 1J/m².yr	0.3

			COMMER	CIAL SECT	OR BUILDI	NG PROFI	ILE						
EXISTING BUILDINGS: Restaurant Baseline	SIZE: All			VINTAGE	:				REGION: Island Inte	rconnected	i		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne	1	Ele	ctric				
riodang rian rypo				Bo	ilers	Packaged	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)		Stan. 10%	High	Unit				90%	100%		
		Eff./COP		70%	80%	70%	1.70	3.00	4.50	1.00			
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	63.6 W/m ² 517 MJ/m ² .yr	20.2 13.3	Btu/hr.ft² kWh/ft².yr								_		
Electric Fuel Share	90.0% Fuel 0	Dil / Propane Fuel Share	10.0%	I	Oil Fuel Sha	re					_	All Electric EUI kWh/ft².yr	13.3
Boiler Maintenance	Annual M	aintenance Tasks		Incidence]						L	MJ/m².yr	517
	Fire Side	Increation		(%)								Fuel Oil / Propane E	UI 10.1
	Water Side	de Inspection for Scale Build	dup	100%								MJ/m².yr	738
	Inspection	n of Controls & Safeties		100%							Г	Market Composite F	1.11
	Flue Gas	Analysis & Burner Set-up		90%							_	kWh/ft².yr	13.9
												MJ/m².yr	539
SPACE COOLING													
A/C Plant Type			Centrifuga	Chillers	WSHP	Reciprocat	ting Chiller	Absorptio	n Chillers	Total			
			Standard	HE		Open	DX	W. H.	CW	. otal			
		System Present (%)	47	5.4	3.5	35	100.0%	5 0 9	1	100.0%			
		Performance (1 / COP)	0.21	0.19	0.29	0.29	0.38	3 1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset	1								
			Setpoint										
		Chilled Water Condenser Water											
					1								
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water	30	°C	86	°F							
			14.0	-	51.2								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	102 W/m ² 126.1 MJ/m ² .yr	32 Btu/hr.ft ² 3.3 kWh/ft ² .yr	371	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note valu	e cannot be	e less than 2	,900 hrs/yea	ar)		
A/C Saturation	70.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		Ι									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
				(%)	(years)								
	Inspect C	ontrol, Safeties & Purge Or oupling, Shaft Sealing and I	at Bearings										
	Megger N	Aotors											
	Vibration	Analysis											
	Eddy Cur	rent Testing									F	All Electric ELI	
	Specific	nemical Oli Analysis			<u> </u>							kWh/ft².yr	1.4
Cooling Tower/Air Cooled Cordense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency							MJ/m².yr	55
Cooling Tower/Air Cooled Condense				(%)	(years)							Fuel Oil / Propane E	UI
	Inspection Inspect/S	n/Clean Spray Nozzles ervice Fan/Fan Motors										kWh/ft².yr M.J/m² vr	
	Megger N	Aotors									L		
	Inspect/V	errry Operation of Controls									F	Market Composite E kWh/ft².yr	UI 1.4
												MJ/m².yr	55
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	el SHW Tank				Boiler]			Fossil		Elec. Res.	
	System F	Present (%)				10%	-	Fuel Share	e fficiency	5% 1.50	-	95%	
Service Hot Water load (MJ/m ² .yr)	700.0	0.03	1		ı 1	5.75	L	Sishucu E		1.00		0.01	
(Tertiary Load)				Δ	Electric FU	JI	1	Fuel	Oil / Propan	e EUI	Г	Market Composite F	UI
Wetting Use Percentage	90%				kWh/ft².yr	19.9	1		kWh/ft².yr	12.0	F	kWh/ft².yr	19.5
					MJ/m².yr	769		1	MJ/m².yr	467		MJ/m².yr	754.1

		COMMER	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS: Restaurant Baseline	SIZE: All		VINTAGE:	1	REGION: Island Inte	rconnecte	d			
HVAC FANS & PLIMPS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	eration & Cont	rol		
System Design Air Flow	4.0 L/s.m ²	0.79 CFM/ft ²	Control	Ventilati Fixed	on Fan Variable	Exha	aust Fan Variable	-		
System Static Pressure CAV System Static Pressure VAV	750 Pa 750 Pa	3.0 wg 3.0 wg	Incidence of Use	60%	Flow	100%	Flow	-		
Fan Efficiency Fan Motor Efficiency	52% 85%			Continuous	Scheduled	Continuous	Scheduled			
Fan Design Load CAV Fan Design Load VAV	6.8 W/m ² 6.8 W/m ²	0.63 W/ft² 0.63 W/ft²	Comments:	90%	10%	90%	10%			
EXHAUST FANS										
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wash 0.2 L/s.m² 0.3 L/s.m² 250 Pa 40% 80% 1.0 0.2	212 CFM/washro 0.04 CFM/tr2 0.02 CFM/tr2 0.06 CFM/tr2 1.0 wg	bom							
AUXILIARY COOLING EQUIPMENT	(Condenser Pump a	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	0.020 kW/kW 2.00 W/m ²	0.07 kW/Ton 0.19 W/ft²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.005 L/s.m ² 90 kPa 55% 90% 1.0 0.98 W/m ²	3.0 U.S. gpm/Ton 0.008 U.S. gpm/ft ² 30 ft 0.09 W/ft ²							
CIRCULATING PUMP (Heating & Co	oling)									
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	olta T	0.004 L/s.m ² 150 kPa 55% 90% 0.5 0.7 W/m ²	0.0065 U.S. gpm/ft ² 2.4 50 ft 0.06 W/ft ²	4U.S. gpm/T	ōn					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 33.6 kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 2.0 kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy	n gy Consumption	0.5 kWh/m².yr 0.7 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	I	5000 hrs./year 0.3 kWh/m².yr								
Fans and Pumps Maintenance	Annual N	Aaintenance Tasks	Incidence Frequency (%) (years)							
	Inspect/S Inspect/A	ervice Fans & Motors djust Belt Tension on Fan Belts								
	Inspect/S	ervice Pump & Motors						EUI	kWh/ft².yr MJ/m².yr	3.5 133.9

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS:	5	SIZE:	VINTAGE	:			REGION:			
Restaurant		AII					Island Interconnected			
Daseille										
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		97.5 kWh/ft².yr 3,775.8 MJ/m².yr	Fuel Oil	Propane:	2.5 kWh/ft ² .yr	97.2 MJ/m ² .yr			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	2.4	91.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr			
ARCHITECTURAL LIGHTING	7.6	294.0	SPACE HEATING	12.0	464.9	1.9	73.8			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.0	38.5					
OTHER PLUG LOADS	0.5	21.2	DOMESTIC HOT WATER	18.9	730.8	0.6	23.3			
HVAC FANS & PUMPS	3.5	133.9	FOOD SERVICE EQUIPMENT	33.6	1,303.4	0.0	0.1			
REFRIGERATION	16.8	650.0								
MISCELLANEOUS	0.3	10.0								
BLOCK HEATERS										
COMPUTER EQUIPMENT	0.4	16.0								
COMPUTER SERVERS	0.1	4.4								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								



			COMMER	CIAL SECTOR BUILD	ING PROF	ILE					
EXISTING BUILDINGS:	SIZE:			VINTAGE:				REGION:			
Baseline	> 100 KW			Existing				Labrador	Interconnected		
CONSTRUCTION											
		0.00	Du // - 42 0F		TurkelD				000 2	40.000 (12	
Wall U Value (W/m².°C) 0.3	3 W/m².°C	0.06	Btu/hr.tt ² .*F		Typical Bu	unding Size			929 m²	10,000 ft2	
Glazing LL value (W/m². C) 0.24	+ W/m² °C	0.04	Btu/hr.ft2 °E		Footprint	Aspect Rati	o (L·W/)		929 111-	10,000 11-	
		0.02	Diaminite . 1		Percent C	onditioned	Space		100%		
	_				Percent C	onditioned	Space		45%		
Window/Wall Ratio (WIWAR) (%) 0.40 Shading Coefficient (SC) 0.50	3				Defined as Typical # 3	s Exterior Zo Stories	one		1		
	-				Floor to Fl	loor Height	(m)		3.7 m	12.0 ft	
VENTILATION SYSTEM, BUILDING CONTROL	OLS & INDOOR	CONDITIONS									
				0.01/0						7074	
Ventilation System Type	Syste	m Present (%)	CAV 75%	CAVR DDM		25%	VAVR	IU	100% O.A	100%	
	Min.	Air Flow (%)	10/0			60%				10070	
	(Minii	mum Throttled Air Vo	lume as Perce	nt of Full Flow)							
Occupancy or People Density		26 m²/persor		274 ft²/person				%OA	7.43%		
Occupancy Schedule Occ. Period		90%							I		
Occupancy Schedule Unocc. Period			, ,	16 CEM/pers	20						
		0 L/3.per30	1	10 CI W/pera	511						
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fresh Ai	Control Type	= "2" enter % FA. to th	e right:					0514/6	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fresh Ai	Control Type	= "3" enter Make-up A	r Ventilatior	and operat	tion		L/s.m ²	CFM/ft ²	
Sizing Factor		1.3						L	191.919999	J	
Total Air Circulation or Design Air Flow		3.96 L/s.m ²		0.78 CFM/ft ²		Soporato M	laka un ai	r unit (100%	04)	1 /c m2	CEM/ft2
Infiltration Rate		0.40 L/s.m ²		0.08 CFM/ft ²		Separate	Operation	occupied p	eriod	50%	CFW/IE
(air infiltration is assumed to occur during unoco	upied						Operation	unoccupied	l period	50%	
hours only if the ventilation system shuts down)											
Economizer		Entha	py Based	Dry-Bulb Based	Total] .					
	Incidence of Use	9	12.10	100%	100%		Summary	of Design F	Parameters	100.070	
	Switchover Poin	11	KJ/Kg. Btu/lbm	64.4 °F	-		Peak Desi Peak Zone	e Sensible L	Load	128.897	
		l.					Room air	enthalpy		28.2 Btu/lbm	
Controls Type	System Present	(%)	HVAC Equipment	Room			Discharge	air enthalpy	/	23.4 Btu/lbm 13.2 ft3/lbm	
	All Pneumatic		Equipment	Controls			Design CF	M	3F & 100 % K	5,996	
	DDC/Pneumatic						Total air ci	rculation or	Design air	3.96 l/s.m ²	
	Total (should ad	d-up to 100%)									
					_						
Control mode	Control Mode	Prop	ortional	PI/PID Tota							
Control mode	Control Wode	Fixed	Discharge	Reset	-						
	Control Strategy	1	-								
Indoor Design Conditions				Room		1	Supply Air				
······	Summer Tempe	rature	24	°C 75.	2 °F	14	°C	57.2	°F		
	Summer Humidi	ty (%)	50%	K 10-2	D1/lb	98%	KUlter	00.4	Dt. //h		
	Winter Occ. Ten	nperature	21	°C 69.	3 °F	54.5	°C	23.4	°F		
	Winter Occ. Hun	nidity	30%		-	45%		r			
	Enthalpy Winter Unocc. T	emperature	53	KJ/kg. 22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm		
	Winter Unocc. H	lumidity	30%	00.							
	Enthalpy		50	KJ/kg. 21.5	Btu/lbm						
Damper Maintenance			Incidence	Frequency							
	Control Arm Adi	ustmont	(%)	(years)							
	Lubrication	ustment									
	Blade Seal Repl	acement									
Air Filter Cleaning	Changes/Year			Ι							
				Incidence (of Annual R	oom Contro	ols Mainten	ance			
Incidence of Annual HVAC Controls Maintenand	e			incluence (uar R	Som Gonde	maintell				
			les dat	т		1		l		- 1 d	
	Annual Maintena	Ince Lasks	Incidence (%)			Annual Ma	Intenance 1	asks	Inc	ciaence	
	Calibration of Tr	ansmitters	1,707	İ		Inspection	Calibratior	of Room 1	Thermostat		
	Calibration of Pa	anel Gauges		ł		Inspection	of PE Swit	tches			
	Inspection of Au	ntrol Devices		ł		Inspection	of Control	Devices (V	alves,		
				_		(Dampers,	VAV Boxe	es)			

EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW	COMMER	RCIAL SECTOR BUILDIN VINTAGE: Existing	ig profile	REGION: Labrador Inte	erconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	550 Lux 0.90 14.8 W/m ²	51.1 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3300 5460 95% 20%	Light Level (Lux) % Distribution Weighted Average	450 10%	550 650 80% 10%			Total 100% 550		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.12 1.12 20.0% 0.7 0.6 0.65 0.75 50 72	10 110 6 80.0% 0.6 0.6 0.80 0.80 88 65	0.6 0.6 0.80 0.80 95 90	100.0%		
of Practice	Gloup Spot						EUI kV M	/h/ft².yr J/m².yr	5.2 202
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 0.10 31.0 W/m ²	32.5 ft-candles					1		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3400 5360 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 400 40% 40%	0 500 6 10%		Total 100% 350		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	45% 0.7 0.65 15	CFL T12 45%	18 HD 5% 5% 0.6 0.6 0.80 0.80 84 65	15HO LED 5% 5% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot			Elli – Load X Hrs.)			EUI kV	/h/ft².yr	1.5
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m²	ft-candles W/ft ²		Floor frac	tion check: should = 1.00	1.00]	<u>nii yi</u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700		Mul UD0	Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	2 18 0.6 0.6 0.80 0.80 84 88	0.6 0.6 0.55 0.55 65 90			
of Practice	Group Spot						EUI kV M	/h/ft².yr J/m².yr	
TOTAL LIGHTING					Overall LP	16.38 W/m ²	EUI TOTAL KV M.	/h/ft².yr J/m².yr	7 262
OFFICE EQUIPMENT & PLUG LOAI	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	55 0.9 1.9 W/m ² 0.2 W/ft ² 80% 50% 2000	51 0.9 1.8 W/m ² 0.2 W/ft ² 80% 50% 2000	100 0.15 0.6 W/m ² 0.05 W/ft ² 80% 50% 2000	200 0.1 0.8 W/m ² 0.07 W/ft ² 80% 50% 2000	217 0.06 0.5 W/m ² 0.05 W/ft ² 100% 100% 2000	1.5 W/m ² 0.14 W/ft ² 80% 50% 2500			
Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period)	6760 5.8 W/m ² 3.8 W/m ²	0.5 W/ft ²	6760	6760	6760	6260 Computer Servers	EUI kV	/h/ft².yr	0.42
Usage during occupied period Usage during unoccupied period	100% 66%					Computer Equipment Plug Loads	EUI kV Mi EUI kV Mi	/h/ft².yr J/m².yr /h/ft².yr J/m².yr	2.36 91.24 0.72 27.70
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane E EUI kWh/ft².yr MJ/m².yr	<u>EUI</u> 0.1 5.0	All El EUI kV M	ectric EUI /h/ft².yr J/m².yr	0.1 4.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant							EUI kV M	/h/ft².yr J/m².yr	0.1
BLOCK HEATERS & MISCELLANE	DUS					Block Heaters Miscellaneous	EUI kV M. EUI kV	/h/ft².yr J/m².yr Vh/ft².yr	0.1 5 0.1

		COM	MERCIAL SECTOR BUILDIN	G PROFILE		
EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW		VINTAGE: Existing		REGION: Labrador Interconnected	
SPACE HEATING						
Heating Plant Type			Fuel Oil / Propar	e	Electric	
			Boilers F Stan. High	ackaged A/A H Unit	IP W. S. HP H/R Chiller Resistance To	tal
		System Present (%) Eff./COP	70% 80%	70% 1.7	70 3.00 4.50 1.00	100%
		Performance (1 / Eff.)	1.43 1.25	1.43 0.	.59 0.33 0.22 1.00	
Peak Heating Load	64.3 W/m2	20.4 Btu/br.ft2				
Seasonal Heating Load	538 MJ/m².yr	13.9 kWh/ft².y	r			
Sizing Factor	1.00					
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share	Oil Fuel Shar			All Electric EUI kWh/ft².yr 13.9
Boiler Maintenance	Annual Ma	intenance Tasks	Incidence			MJ/m².yr 538
	Fire Side I	nspection	(%)			Fuel Oil / Propane EUI kWh/ft².vr
	Water Side	e Inspection for Scale Buildup	100%			MJ/m².yr
	Inspection	of Burner	100%			Market Composite EUI
	File Gas F		3078			MJ/m².yr 538
SPACE COOLING						
A/C Plant Type						
		Centri Standa	fugal Chillers WSHP F ard HE	eciprocating Chill Open DX	lers Absorption Chillers Total W. H. CW	
		System Present (%) 2 COP	0.0% 4.7 5.4 3.5	3.5	0% 100.0% 2.6 0.9 1	
		Performance (1 / COP)	0.21 0.19 0.29	0.29 0.	.38 1.11 1.00	
		Additional Refrigerant				
		Related Information				
Control Mode		Incidence of Use Fixed	Reset			
		Chilled Water				
		Condenser Water				
Sotociat		Chilled Water	7 00 446	-		
Selpoint		Condenser Water	7 C 444.0 30 °C 86 °	F		
			14.0]°C 57.2]°	F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	60 W/m ² 70.3 MJ/m ² .yr	19 Btu/hr.ft² 1.8 kWh/ft².yr	<u>629 </u> ft²/Ton			
Sizing Factor	1.00	Operation	n (occ. period) 3000 h	rs/year Note va	alue cannot be less than 2,900 hrs/year)	
A/C Saturation	50.0%					
(Incidence of A/C)						
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share				
Chiller Maintenance	Annual Ma	intenance Tasks	Incidence Frequency			
	Inspect Co	ontrol, Safeties & Purge Unit				
	Megger M	otors				
	Condense Vibration A	r Tube Cleaning Analysis				
	Eddy Curre Spectroch	ent Testing emical Oil Analysis				All Electric EUI
	<u> </u>					kWh/ft².yr 0.7 M.I/m².yr 29
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks	Incidence Frequency			Fuel Oil / Drepene FU
	Inspection	/Clean Spray Nozzles	(%) (years)			kWh/ft².yr
	Inspect/Se Megger M	otors				MJ/m².yr
	Inspect/Ve	rify Operation of Controls				Market Composite EUI kWh/ft².yr 0.7
						MJ/m².yr 29
DOMESTIC HOT WATER						
Service Hot Water Plant Type	Fossil Fue	I SHW Tank		Boiler	Fuel Share	Elec. Res.
	Eff./COP	0.65		0%	Blended Efficiency 0.75	0.91
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	22.8					
Wetting Use Percentage	90%		All Electric EU kWh/ft².yr	0.6	Fuel Oil / Propane EUI kWh/ft².yr 0.8	Market Composite EUI kWh/ft².yr 0.6
5 · · · 5 ·			MJ/m².yr	25	MJ/m².yr 30	MJ/m².yr 25.0



EXISTING BUILDINGS: Large Office Baseline	SIZE: > 100 kW	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: Existing	REGION: Labrador Interconnected	
HVAC FANS & PUMPS					
SUPPLY FANS			[]	Ventilation and Exhaust Fan Operation & Co	ntrol
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency Fan Motor Efficiency Sizing Factor Fan Design Load CAV Fan Design Load VAV	4.0 L/s.m ² 350 Pa 52% 85% 1.00 3.1 W/m ²	0.78 CFM/ft ² 1.4 wg 1.4 wg	Control Incidence of Use Operation Incidence of Use	Ventilation Fan Exmatst Fan Fixed Variable Fixed Variable Flow Flow Flow 75% 25% 100% Continuout Scheduled Continuous Scheduled 75% 25% 75% 25	<u></u>
EXHAUST FANS	0.1	0.20	Commondo.		
Washroom Exhaust Washroom Exhaust per gross unit aree Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s. washroom 0.2 L/s.m² 0.1 L/s.m² 0.3 L/s.m² 250 Pa 40% 80% 1.0 0.2 0.2 W/m²	212 CFM/washro 0.04 CFM/ft ² 0.02 CFM/ft ² 0.06 CFM/ft ² 1.0 wg	m		
AUXILIARY COOLING EQUIPMENT (Con	denser Pump and Cooli	ng Tower/Condenser Fans)			
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cool	ed Condenser)	0.020 kW/kW 1.18 W/m ²	0.07 kW/Ton 0.11 W/ft²		
Condenser Pump					
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.003 L/s.m ² 90 kPa 55% 90% 1.0 0.58 W/m ²	3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft ² 30 ft 0.05 W/ft ²		
CIRCULATING PUMP (Heating & Cooling)				
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.003 L/s.m ² 150 kPa 55% 90% 0.5 0.4 W/m ²	0.0038 U.S. gpm/ft ² 50 ft 0.04 W/ft ²	U.S. gpm/Ton	
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 21.2 kWh/m².yr			
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 1.8 kWh/m².yr			
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Co	Insumption	0.3 kWh/m².yr 0.4 kWh/m².yr			
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		5000 hrs./year kWh/m².yr			
Fans and Pumps Maintenance	Annual Maintenan Inspect/Service Fa Inspect/Adjust Belt Inspect/Service Pu	re Tasks rs & Motors Tension on Fan Belts mp & Motors	Incidence Frequency (%) (years)		EUI kWh/ft².yr 2.2

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS:	:	SIZE:	VINTAGE	:			REGION:			
Large Office Baseline	:	> 100 kW	Existing				Labrador Interconnected			
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		28.3 kWh/ft².yr 1,094.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	5.2	202.1		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr			
ARCHITECTURAL LIGHTING	1.5	59.9	SPACE HEATING	13.9	538.2					
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.4	14.5					
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0			
HVAC FANS & PUMPS	2.2	85.1	FOOD SERVICE EQUIPMENT	0.1	4.0					
REFRIGERATION	0.1	4.0								
MISCELLANEOUS	0.1	5.0								
BLOCK HEATERS	0.1	5.0								
COMPUTER EQUIPMENT	2.4	91.2								
COMPUTER SERVERS ELEVATORS	0.4	16.2								
OUTDOOR LIGHTING	0.4	17.0								



				COMMER	CIAL SECT	OR BUILD	ING PROF	ILE						
EXISTING BUILDINGS:	SIZE:				VINTAGE					REGION	:			
Small Office Baseline	< 100 kW				Existing					Labrado	r Interconnect	led		
CONSTRUCTION														
	_													
Wall U value (W/m ² .°C) 0.28	W/m².°C		0.05	Btu/hr.ft ² .°F			Typical Bu	uilding Size			929 m	n²	10,000 ft ²	
Roof U value (W/m ² .°C) 0.19	W/m².°C		0.03	Btu/hr.ft² .°F			Typical Fo	otprint (m ²)		929 m	n²	10,000 ft ²	
Glazing U value (W/m ² .°C) 3.52	W/m².°C		0.62	Btu/hr.ft ² .°F			Footprint	Aspect Rat	io (L:W)		1	-		
		<u> </u>					Percent C	onditioned	Space		100%			
	-						Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%) 0.30	-						Defined a	s Exterior Z	one					
Shading Coemcient (SC) 0.58							Floor to F	Siones Ioor Height	(m)		37 m	n [12.0 ft	
							11001101	loor rieigin	()		0.7		12.0	
												-		
VENTILATION SYSTEM, BUILDING CONTRO	LS & IND	OOR CONDITIONS	5											
Ventilation System Type				CAV	CAVR				VAVR			τοται		
Volumenter eyetetti i ype		System Present (%	%)	100%	0, (11)	0000	DDMLTT					100%		
		Min. Air Flow (%)						60%						
		(Minimum Throttle	d Air Vo	ume as Perce	nt of Full Fl	ow)								
Occurrency or Boople Descity		26 m	2/201002		274	ft2/porcon				e/ OA	9.069/			
Occupancy Schedule Occ. Period		90%	person		2/4	10/person				760A	0.00%			
Occupancy Schedule Unocc. Period														
Fresh Air Requirements or Outside Air		8 L/:	s.person		16	CFM/perso	on							
				a .		or E4							,	
Fresh Air Control Type *(enter a	a 1, 2 or 3) ⁄- freeb air)	1 11 1	-resh Air Fresh Air	Control Type	= "2" enter - "3" enter	Makeup Ai	e right: r Ventilation	and opera	tion		l/em2		CEM/ft2	
$(1 = 11)$ xed all control, $2 = 11$ xed thesh all, $3 \cdot 100$	o nesnan)		Testi Ali	Control Type	= 5 enter	wake-up Ai	rvenilialioi	ranu opera	uon		operation (%	6)	CFW/II-	
Sizing Factor		1.3									Toporation (A	<i>.</i> ,	J	
Total Air Circulation or Design Air Flow		3.65 L/	s.m²		0.72	CFM/ft ²					_			
						1.0514/0		Separate	Make-up ai	r unit (100	% OA)	500/	L/s.m ²	CFM/ft ²
Infiltration Rate	nied	0.40 L/:	s.m²		0.08	CFM/ft ²			Operation	occupied	period	50%		
hours only if the ventilation system shuts down)	pied								operation	unoccupie		3078		
,														
Economizer			Enthal	py Based	Dry-Bu	lb Based	Total							
	Incidence	of Use			100%		100%		Summary	of Design	Parameters	100 700		
	Switchove	er Point		KJ/kg. Btu/lbm	18	°C °E	-		Peak Des Peak Zon	ign Coolin Sonsible	g Load	180,760		
				Blundin	04.4	F			Room air	enthalpy	LUdu	28.2	Btu/lbm	
Controls Type	System P	resent (%)		HVAC	Room				Discharge	air enthal	ру	23.4	Btu/lbm	
				Equipment	Controls				Specific volu	ume of air at	55F & 100% R	13.2	ft³/lbm	
	All Pneum	atic							Design Cl	-M virgulation (r Dooign oir	5,526	1/a m2	
	All DDC	umatic				_			TUtaran u	Inculation	Design all	3.00	V5.IIF	
	Total (sho	uld add-up to 100%	o)											
						-	-							
O a strail sea da	0		Prop	ortional	PI / PID	Total								
Control mode	Control IV	ode	Fixed	Discharge	Reset		-							
	Control S	trategy	TIXEG	Discharge	Reset									
		0,			1									
Indoor Design Conditions			-		Room			-	Supply Air	r 	-1			
	Summer	emperature	-	24	°C	75.2	? °⊢	14	°C	57.	2_°⊢			
	Enthalov	numiaity (%)		50%	K I/ka	28.2	Btu/lbm	90% 54 F	K I/ka	23.4	Btu/lbm			
	Winter Oc	c. Temperature		21	°C	69.8	3°F	15	°C	5	9 °F			
	Winter Oc	c. Humidity		30%	l	-	-	45%						
	Enthalpy			53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm			
	Winter Ur	occ. Temperature	-	21	°C	69.8	3°⊢							
	Enthalov	ICCC. Humidity	-	50%	K.I/ka	21.5	Btu/lbm							
	Entroupy				rto/ng.	21.0	Brailbin	1				ł		
						_								
Damper Maintenance				Incidence	Frequency	·								
	Control A	rm Adjustment		(%)	(years)	-								
	Lubricatio	n Adjustment				_								
	Blade Sea	al Replacement												
		•				-								
	0		r		т									
Air Filter Cleaning	Changes/	Year	L		1									
						Incidence o	f Annual R	oom Contr	ols Mainter	nance				
Incidence of Annual HVAC Controls Maintenance	е	Ι									·			
					т			t				<u> </u>		
	Annual M	aintenance Tasks		Incidence				Annual Ma	aintenance	Tasks		Incidence		
	Calibratio	n of Transmittere		(%)	ł			Inspection	Calibration	n of Room	Thermostat	(%)		
	Calibratio	n of Panel Gauges			t			Inspection	of PE Swi	tches	monnosial			
	Inspection	of Auxiliary Device	s		l			Inspection	of Auxiliar	y Devices				
	Inspection	of Control Devices	3		1			Inspection	of Control	Devices (Valves,			
								Dampers	, VAV Box	es)				
1														

	817E ·	COMMER		IG PROFILE	RECION		
EXISTING BUILDINGS: Small Office Baseline	SIZE: < 100 kW		Existing		REGION: Labrador Interconnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	550 Lux	51.1 ft-candles					
Connected Load	14.8 W/m ²	1.4 W/ft ²					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 20%	Light Level (Lux) % Distribution Weighted Average	450 10%	550 650 80% 10%		Total 100% 550	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7	OFE 112 20.0% 0.7 0.6 0.65 0.75 50 72	80.0% 6 0.6 0.6 0.6 0.80 0.80 0.80 0.80 88 65 95	0.6 0.80 90	
Relamping Strategy & Incidence of Practice	Group Spot					EUI kWh/ft ²	.yr 4.7
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 0.05 31.0 W/m ²	32.5 ft-candles				MJ/m².	<u>yr 183</u>
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 400 40% 40%	500 10%	Total 100% 350	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 45% 0.7 0.65 15	CFL T12 45% 0.7 0.6 0.65 0.75 50 72	T8 HID T5HO LE 5%	D TOTAL 5% 100.0% 0.6 0.80 90	
Relamping Strategy & Incidence of Practice	Group Spot					EUI kWh/ft ²	².yr 0.7
		ft-candles		Eloor fracti	SF X GLFF	MJ/m².	<u>yr 27</u>
Floor Fraction (HBLFF) Connected Load		W/ft ²				1.00	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000	Total	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	INC 0.7 0.65	CFL T12 0.7 0.6 0.65 0.75	T8 MH 0.6 0.6 0.6 0.80 0.80 0.55	HPS TOTAL 0.6 0.55	
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50 72	84 88 65	EUI kWh/ft ²	².yr
TOTAL LIGHTING					Overall LP 15.57 W/m ²	EUI TOTAL kWh/ft ²	<u>yr</u> 2.yr 5 .yr 210
OFFICE EQUIPMENT & PLUG LOA	DS						
Equipment Type	Computers	Monitors	Printers	Copiers	Servers Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.9 1.9 W/m ² 0.2 W/ft ²	51 0.9 1.8 W/m ² 0.2 W/ft ²	100 0.15 0.6 W/m ² 0.05 W/ft ²	200 0.1 0.8 W/m ² 0.07 W/ft ²	217 0.06 0.5 0.05 W/m ² 0.15 W/m ² 0.14 W/t ²		
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	80% 50% 2000 6760	80% 50% 2000 6760	80% 50% 2000 6760	80% 50% 2000 6760	100% 80% 100% 50% 2000 2500 6760 6260		
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m² 3.8 W/m²	0.5 W/ft ² 0.4 W/ft ²			Computer S	ervers EUI kWh/ft ² MJ/m ² .	yr 0.42 yr 16.20
Usage during occupied period Usage during unoccupied period	100% 66%				Computer Equi	pment EUI KWh/tł² MJ/m². Loads EUI KWh/tł² MJ/m².	.yr 2.36 yr 91.24 4.yr 0.72 .yr 27.70
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr MJ/m².yr	All Electric EUI kWh/ft² MJ/m².	<u>c EUI</u> ?.yr .yr
REFRIGERATION Provide description below:						EUI kWh/ft² MJ/m².	².yr yr
BLOCK HEATERS & MISCELLANE	ous						
					Block H Miscella	eaters EUI kWh/ft² MJ/m². ineous EUI kWh/ft² M.I/m²	yr 0.1 yr 5 2.yr 0.1 yr 5

			COMMERCIAL	SECTO	R BUILDI	IG PROFI	LE						
EXISTING BUILDINGS: Small Office Baseline	SIZE: < 100 kW		VIN Exi	ITAGE: isting					REGION: Labrador I	nterconnec	ted		
SPACE HEATING													
Heating Plant Type				Fuel	Oil / Propa	ne		Elec	ctric		T		
			s	Boile Stan.	ers i High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Iotal		
		System Present (%) Eff./COP		70%	80%	70%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	51.3 W/m ² 414 MJ/m ² .yr	16.3 Bt 10.7 kV	u/hr.ft² Vh/ft².yr								Г	All Flectric FLII	
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share		C	Dil Fuel Shar	e]			-	kWh/ft².yr	10.7
Boiler Maintenance	Annual Ma	intenance Tasks	Inc	idence							L F	Evol Oil / Broppop	414
	Fire Side I	nspection	(%) 75%							=	kWh/ft².yr	UI
	Water Side Inspection	of Controls & Safeties		100% 100%							L	MJ/m².yr	
	Inspection Flue Gas A	of Burner Analysis & Burner Set-up		100% 90%							-	Market Composite E kWh/ft².yr	UI 10.7
												MJ/m².yr	414
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Chi Standard 4.7 0.21	Ilers HE 5.4 0.19	WSHP 1 3.5 0.29	Reciprocat Open 3.5 0.29	ing Chillers DX 100.0% 2.6 0.38	Absorption W. H. 0.9 1.11	CW CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Fi Se Chilled Water Condenser Water	xed Re:	set									
Setpoint		Chilled Water Condenser Water Supply Air	7 ℃ 30 ℃ 14.0 ℃		44.6 86 57.2	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	57 W/m ² 67.3 MJ/m ² .yr	18 Btu/hr.ft² 1.7 kWh/ft².yr	664 ft²/	Ton									
Sizing Factor	1.00	Ot	peration (occ. pe	eriod)	3000	nrs/year	Note value	e cannot be	less than 2,	900 hrs/yea	r)		
A/C Saturation (Incidence of A/C)	50.0%												
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share											
Chiller Maintenance	Annual Ma	intenance Tasks	Inc	idence I	Frequency								
	Inspect Co	ontrol, Safeties & Purge Unit	((%)	(years)								
	Inspect Co Megger M	oupling, Shaft Sealing and Bea otors	arings										
	Condense Vibration A	r Tube Cleaning Analysis											
	Eddy Curre Spectroch	ent Testing emical Oil Analysis									F	All Electric EUI kWh/ft².yr	0.7
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks	Inc	idence I	Frequency (years)						L	MJ/m².yr Fuel Oil / Propane E	29 UI
	Inspection Inspect/Se	/Clean Spray Nozzles rvice Fan/Fan Motors									F	kWh/ft².yr MJ/m².yr	
	Megger M Inspect/Ve	otors rify Operation of Controls										Market Composite E kWh/ft².yr	UI 0.7
												ıvlJ/m².yr	29
	E 9 E				T	Doile -	l			Ecco"		Eleo Bos	
Service Hot water Plant Type	System Pr	resent (%)				Boiler 0%		Fuel Share		POSSII		LIEC. KES. 100%	
Service Hot Water load (MJ/m².yr)	Eff./COP 22.8	0.65	I	I		0.75	l	Biended Ef	TICIENCY	0.75		0.91	
(Tertiary Load)				All	Electric EU	1		Fuel C	Dil / Propan	e EUI		Market Composite E	UI
Wetting Use Percentage	90%			k N	Wh/ft².yr /J/m².yr	0.6 25			kWh/ft².yr MJ/m².yr	0.8 30		kWh/ft².yr MJ/m².yr	0.6 25.0



		COMME	RCIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:	-	REGION:					
Small Office	< 100 l	kW	Existing	1	Labrador I	Interconne	cted			
Baseline										
HVAC FANS & PUMPS										
				Mandia						
SUPPLY FANS			[Ventilation	and Exhau	st Fan Ope	eration & Cont	rol		
Sustem Design Air Flow	2.6 1/2 m2	0.72 CEM/H2	Control	Ventilati	on Fan	Exha	aust Fan	-		
System Design Air Flow	3.6 L/S.M ²	2 0.72 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV	350 Pa	1.4 Wg	Insidence of Line	100%	FIOW	1000/	FIOW	-		
System Static Pressure VAV	350 Pa	1.4 Wg	Operation	Continuour	Cabadulad	100%	Cohodulod	-		
Fan Efficiency	5Z%		Operation	Continuous	Scheduled	Continuous	Scheduled			
Sizing Easter	05%		Insidence of Line	759/	250/	750/	259/	1		
Sizing Factor	0.50	0.12 \/////	Incidence of Ose	75%	25%	75%	25%	ή		
Fan Design Load VAV	1.4 W/m ²	0.13 W/ft2	Comments:							
	1.4	0.10	Commenta.							
EXHAUST FANS				1						
Washroom Exhaust	100 L/s.wa	ashroom 212 CFM/wash	room							
Washroom Exhaust per gross unit area	0.2 L/s.m ²	2 0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	2 0.02 CFM/ft ²								
Total Building Exhaust	0.3 L/s.m ²	2 0.06 CFM/ft ²								ļ
Exhaust System Static Pressure	250 Pa	1.0 wg								
Fan Efficiency	40%	, ~								ļ
Fan Motor Efficiency	80%									
Sizing Factor	0.5									
Exhaust Fan Connected Load	0.1 W/m ²	0.01 W/ft ²								
AUXILIARY COOLING EQUIPMENT ((Condenser Pum	p and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air	Cooled Condense	er) 1.12 W/m ²	0.10 W/ft ²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.003 L/s.m ²	0.004 U.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5	0.00 11///10							
Pump Connected Load		0.27 W/m ²	0.03 W/tt ²							
CIPCUL ATING PLIMP (Heating & Co.	oling)									
CIRCULATING FUMF (Heating & CO	oling)									
Pump Design Flow @ 5 °C (10 °F) de	ata T	0.002 L/c m ²	0.0036 U.S. com/ft2 2		on					
Pump Head Pressure	nia i	150 kPa	50 ft	40.0. gpm/1	on					
Pump Efficiency		55%	<u> </u>							
Pump Motor Efficiency		90%								
Sizing Factor		0.5								
Pump Connected Load		0.4 W/m ²	0.03 W/ft ²							
		0.1	0.00							
Supply Fan Occ. Period		3500 hrs./year								
Supply Fan Unocc. Period		5260 hrs./year								
Supply Fan Energy Consumption		10.8 kWh/m ² .yr								
Exhaust Fan Occ. Period		3500 hrs./year								
Exhaust Fan Unocc. Period		5260 hrs./year								
Exhaust Fan Energy Consumption		0.9 kWh/m².yr								
Condenser Pump Energy Consumption	n	0.1 kWh/m².yr								
Cooling Tower /Condenser Fans Energy	gy Consumption	0.4 kWh/m ² .yr								
Circulating Pump Yearly Operation		5000 hrs./year								
Circulating Pump Energy Consumption	i i i i i i i i i i i i i i i i i i i	kWh/m².yr								
Fans and Pumps Maintenance	Annual	Maintenance Tasks	Incidence Frequency							ļ
			(%) (years)							
	Inspect	t/Service Fans & Motors								
	Inspect	t/Adjust Belt Tension on Fan Belts								
	Inspect	t/Service Pump & Motors						EUI	kWh/ft².yr	1.1
1								1	MJ/m ² .vr	43.7

COMMERCIAL SECTOR BUILDING PROFILE												
EXISTING BUILDINGS: Small Office	:	SIZE: < 100 kW	VINT AGE Existing	:			REGION: Labrador Interconnected					
Baseline												
EUI SUMMARY												
TOTAL ALL END-USES:	Electricity:		22.4 kWh/ft².yr 869.4 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr					
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane					
GENERAL LIGHTING	4.7	183.1		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr					
ARCHITECTURAL LIGHTING	0.7	27.2	SPACE HEATING	10.7	413.9							
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.4	14.3							
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0					
HVAC FANS & PUMPS	1.1	43.7	FOOD SERVICE EQUIPMENT									
REFRIGERATION												
MISCELLANEOUS	0.1	5.0										
BLOCK HEATERS	0.1	5.0										
COMPUTER EQUIPMENT	2.4	91.2										
COMPUTER SERVERS ELEVATORS	0.4	16.2										
OUTDOOR LIGHTING	0.4	17.0										



			COMMERC	IAL SECT	or Building	PROFILE				
EXISTING BUILDINGS:	SIZE:			VINTAGE	:		R	EGION:		
Baseline	All			Existing			L	abrador interconnected		
CONSTRUCTION										
		г								
Wall U value (W/m ² .°C)	0.38 W/m ² .°C	-	0.07 Btu/hr.ft ² .°F		Ту	pical Building Si	ze	929 m ²	10,000 ft ²	
Roof U value (W/m ² .°C)	0.33 W/m ² .°C	-	0.06 Btu/hr.ft ² .°F		Ту	pical Footprint (r	m²)	929 m ²	10,000 ft ²	
Glazing U value (W/m ² .°C)	3.52 W/m ² .°C	l	0.62 Btu/hr.ft ² .°F		Fo	otprint Aspect R	Ratio (L:W)	1		
					Pe	rcent Conditione	ed Space	100%		
Window/Wall Ratio (WIWAR) (%)	0.06				De	fined as Exterio	r Zone	4578		
Shading Coefficient (SC)	0.69				Ту	pical # Stories		1		
					Flo	or to Floor Heig	ght (m)	4.3 m	14.0 ft	
VENTILATION SYSTEM, BUILDING	CONTROLS & IND	OOR CONDITIO	NS							
Vertilation Overlage Type			CAV	CAVD					a	
venuation System Type		System Present	(%) 100%	CAVR	DDIVIZ DL		AV VAVK	10 100% O.A 101A	. <u>L</u> %	
		Min. Air Flow (%	6)			50	0%			
		(Minimum Throt	tled Air Volume as Per	cent of Full	Flow)					
Occupancy or People Density		30	m²/nerson	323	ft²/person		0/	%OΔ 37.75%		
Occupancy Schedule Occ. Period		90%	in /peison	020	it/person		,	0011 0111070		
Occupancy Schedule Unocc. Period										
Fresh Air Requirements or Outside Air	r	30	L/s.person	64	CFM/person					
Fresh Air Control Type	*(enter a 1, 2 or 3)	1	If Fresh Air Control Tv	oe = "2" ent	ter % FA, to the	riaht:	Т			
(1 = mixed air control, 2 = Fixed fresh	air, 3 100% fresh air)		If Fresh Air Control Typ	be = "3" ent	ter Make-up Air	Ventilation and o	operation	0.5 L/s.m ² 0.1	0 CFM/ft ²	
Cizing Footor		1						50% operation (%)	j	
Total Air Circulation or Design Air Flow	N	2.65	L/s.m ²	0.52	CFM/ft ²					
						Separat	te Make-up air u	unit (100% OA)	L/s.m ²	CFM/ft ²
Infiltration Rate	ing upper mind	0.70	L/s.m ²	0.14	CFM/ft ²		Operation of	ccupied period 500	%	
hours only if the ventilation system shu	ing unoccupied its down)						Operation un	loccupied period 50	70	
Economizer	Incidence	of 1100	Enthalpy Based	Dry-Bu	lb Based	Total	Cummon of	(Design Deremeters		
	Switchove	er Point	KJ/ka	100%	°C	100%	Peak Design	n Cooling Load 301.50	5	
	e interior e	in the only	Btu/lbm	64.4	°F		Peak Zone S	Sensible Load 112,12	1	
				-	1		Room air en	thalpy 28.2	2 Btu/lbm	
Controls Type	System P	resent (%)	HVAC	Room			Discharge a	ir enthalpy 23.4 pe of air at 55E & 100% P 13	1 Btu/lbm 2 ft ³ /lbm	
	All Pneum	atic	Equipment	001101013			Design CFM	A 5,214	6	
	DDC/Pner	umatic					Total air circ	culation or Design air 2.65	l/s.m ²	
	All DDC Total (sho	uld add-up to 10	7%)							
	i otal (ono		5767		1					
	0		Proportional	PI / PID	Total					
Control mode	Control M	ode	Fixed Discharge	Reset						
	Control St	rategy								
la de se De si un Os e divis es				D			Quere la Ale		-	
Indoor Design Conditions	Summer T	emperature	22	°C	71.6 °E	-	13 °C	55.4 °F		
	Summer H	lumidity (%)	50%	U	11.0	100	0%			
	Enthalpy		65.5	KJ/kg.	28.2 Bt	lu/lbm 54	4.5 KJ/kg.	23.4 Btu/lbm		
	Winter Oc	c. Temperature	22	°C	71.6 °F	:	16 °C	60.8 °F		
	Enthalov	c. Humidity	53	KJ/ka.	22.8 Bt	45 tu/lbm 45	5.5 KJ/ka.	19.6 Btu/lbm		
	Winter Un	occ. Temperatur	e 21	°C	69.8 °F	-	no no ng.	Toto Bransm		
	Winter Un	occ. Humidity	30%							
	Enthalpy		50	KJ/kg.	21.5 Bt	.u/lbm				
Damper Maintenance			Incidence	Frequency						
	Control A	m A divetment	(%)	(years)						
	Lubricatio	n								
	Blade Sea	al Replacement								
Air Filter Cleaning	Changes/	Year								
3	5.0									
Incidence of Appuel HV/AC Controls M	laintananaa	т			Incidence of Ar	nual Room Cor	ntrols Maintenar	nce		
Incluence of Annual HVAC Controls M	antenance	1								
	Annual Ma	aintenance Tasks	Incidence			Annual	Maintenance Ta	asks Incidenc	e	
			(%)				10 17	(%)	4	
	Calibration	n of Transmitters	e .			Inspecti	ion/Calibration of	of Room Thermostat		
	Inspection	of Auxiliary Dev	ices			Inspecti	ion of Auxiliarv [Devices	1	
	Inspection	of Control Devic	ces			Inspecti	ion of Control D	vevices (Valves,	7	
						(Dampe	ers, VAV Boxes)		
1										

EXISTING BUILDINGS: Food Retail Baseline	SIZE: All	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing	REGION: Labrador Interconnected
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.90 14.5 W/m ² 1.3] ft-candles] W/ft²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 100% 20%	Light Level (Lux) 300 500 700 % Distribution 100%	1000 Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC CPL 112 3% 2% 15% CU 0.7 0.7 0.6 LLF 0.65 0.65 0.75 Efficacy (L/W) 15 50 72	16 160 LED 101AL 75% 5% 0% 0% 100.0% 0.6 0.7 0.6 0.6 0.80 0.80 88 65 95 90 90 100.0%
of Practice	Group Spot		EUI kWh/ft².yr 6.5 MJ/m².yr 251
ARCHITECTURAL LIGHTING (COR Light Level Floor Fraction (ALFF) Connected Load	State State <th< td=""><td>] ft-candles]W/ft²</td><td></td></th<>] ft-candles]W/ft²	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 100% 50%	Light Level (Lux) 300 500 700 % Distribution 100% Weighted Average	1000 Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 172 CU 0.7 0.7 LLF 0.65 0.65 0.75 Efficacy (L/W) 15 50 72	100 1010 1010 10110 10110 75% 10% 0% 0% 100.0% 0.6 0.6 0.6 0.6 0.80 0.80 0.80 0.80 88 65 95 90
Relamping Strategy & Incidence of Practice	Group Spot	EUI = Load X Hrs. X SF	EUI kWh/ff2.yr 0.8 F X GLFF MJ/m2.yr 32
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27.9 14.0 W/m ² 1.3	ft-candles Floor fraction W/ft ²	check: should = 1.00 1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 700 % Distribution 100%	1000 Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	Inco CHL 112 System Present (%) 0% 0 CU 0.7 0.7 0.6 LLF 0.65 0.65 0.75 Efficacy (L/W) 15 50 72	10 min nrs 101AL 100% 0% 100.0% 0.0 0.6 0.6 0.6 0.6 0.80 0.85 0.55 5 84 88 65 90 90
Relamping Strategy & Incidence of Practice	Group Spot		EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LP 14.39 W/m ² EUI TOTAL kWh/ft ² .yr 7 MJ/m ² .yr 284
OFFICE EQUIPMENT & PLUG LOA	DS		
Equipment Type	Computers	Monitors Printers Copiers	Servers Plug Loads
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.43 0.8 W/m ² 0.1 W/tt ²	51 100 200 0.43 0.01 0.01 0.01 0.7 W/m² 0.0 0.1 W/m² 0.1 W/m² 0.00 W/m² 0.01	217 0.02 0.1 W/m² 0.1 W/t² 0.1 W/t²
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 90% 90% 50% 50% 50% 2000 2000 2000 6760 6760 6760	100% 90% 100% 50% 2600 4100 6160 4660
Total end-use load (occupied period) Total end-use load (unocc. period)	2.9 W/m² 1.7 W/m²	0.3 W/ft ² to see notes (cells with red indicator in upper right 0.2 W/ft ²	ht corner, type "SHIFT @@hputer Servers EUI kWh/ft2.yr 0.03 MJ/m2.yr 1.24
Usage during occupied period Usage during unoccupied period	100% 58%		Computer Equipment EUI KWntte-yr 0.78 MJ/m².yr 30.2 Plug Loads EUI KWh/t².yr 0.84 MJ/m².yr 32.5
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0%	Fuel Oil / Propane EUI All Electric EUI JI kWh/t².yr 2.6 MJ/m².yr 100.0 MJ/m².yr 3.1
REFRIGERATION Provide description below: Commercial refrigeration display case	is		EUI KWh/ft².yr 25.8 MJ/m².yr 1000.0
BLOCK HEATERS & MISCELLANE	ous		Block Heaters EUI KWh/ft2.yr 0.1 MJ/m2.yr 5 Miscellaneous EUI KWh/ft2.yr 0.1



EXISTING BUILDINGS: Food Retail Baseline	SIZE: All		COMMERCIAL SE VINTA Existin	ECTOR BUILDIN GE: 19	G PROFILE	REGION: Labrador	Interconnected		
SPACE HEATING									
Heating Plant Type		System Present (%) Eff./COP Performance (1 / Eff.)	Star 7	Fuel Oil / Propar Boilers F High 0% 80% .43 1.25	e A/A HF Rooftop 70% 1.7 1.43 0.9	Electric P W. S. HP H/R Chille 0 3.00 4.50 59 0.33 0.22	Resistance Total 100% 100% 1.00 1.00		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	35.8 W/m ² 1137 MJ/m ² .yr	(KW/KW) 11.4 29.4	Btu/hr.ft² kWh/ft².yr				<u> </u>	All Electric EUI	
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share		Oil Fuel Shar	9			kWh/ft².yr MJ/m².yr	29.4 1137
Boiler Maintenance	Annual M. Fire Side Water Sic Inspection Inspection Flue Gas	aintenance Tasks Inspection le Inspection for Scale Buil n of Controls & Safeties n of Burner Analysis & Burner Set-up	lncide (%) dup 10 10 10 5	nce) 5% 0% 0% 0%				Fuel Oil / Propane EUI kWh/ft8.yr MJ/m².yr Market Composite EUI kWh/ft8.yr MJ/m².yr	l 29.4 1137
SPACE COOLING									
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Chillers Standard HE 4.7 0.21 (Screw F Chillers 5.4 4.4 0.19 0.23 0.23	Acciprocating Chille Open DX 100.0 3.6 0.28 0.3	ers Absorption Chillers W. H. CW % 0.9 1 38 1.11 1.00	Total 100.0%		
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Reset Setpoint						
Setpoint		Chilled Water Condenser Water Supply Air	7 ℃ 30 ℃ 13.0 ℃	44.6 86 55.4	F F				
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	95 W/m² 54.1 MJ/m².yr	30 30 Btu/hr.ft² 1.4 kWh/ft².yr	398 ft ² /Ton	I					
Sizing Factor	1.00		Operation (occ. pe	riod 4000 H	rs/year Note val	lue cannot be less than 2	2,900 hrs/year)		
A/C Saturation (Incidence of A/C)	25.0%								
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share							
Chiller Maintenance	Annual M. Inspect C Inspect C Megger N Condense Vibration Eddy Cur Spectrocl	aintenance Tasks ontrol, Safeties & Purge Ut oupling, Shaft Sealing and fotors er Tube Cleaning Analysis rent Testing nemical Oil Analysis	Incide (%)	nce Frequency) (years)			ĺ	All Electric EUI kWh/ft2.vr	0.6
Cooling Tower/Air Cooled Condense	er Maintenan Annual M Inspection Inspect/S Megger M Inspect/V	aintenance Tasks vClean Spray Nozzles ervice Fan/Fan Motors lotors erify Operation of Controls	Incide (%	nce Frequency) (years)			[MJ/m ² .yr Fuel Oil / Propane EUI kWh/ft².yr MJ/m ² .yr Market Composite EUI kWh/ft².yr MJ/m ² .yr	25 I 0.6 25
SERVICE HOT WATER									
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Avg. Tank Present (%) 65.00			Boiler 0% 0.75	Fuel Share Blended Efficiency	Fossil 0% 0.75	Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load) Wetting Use Percentage	45.5			All Electric EU kWh/ft².vr	1.3	Fuel Oil / Propar kWh/ft² vr	ne EUI 1.6	Market Composite EUI kWh/ft².vr	l 1.3
	<u> </u>			MJ/m².yr	50	MJ/m².yr	61	MJ/m².yr	50.0



COMMERCIAL SECTOR BUILDING PROFILE											
EXISTING BUILDINGS:	SIZE:			VINTAGE:	R	EGION:					
Food Retail	All			Existing	L	abrador I	nterconne	cted			
Baseline				-							
HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation a	nd Exhau	et Fan Ope	eration & Co	ontrol		
SUFFEITANG					Ventilatio	n Fan	Exhau	ist Fan]		
System Design Air Flow	2.6 L/s.m ²	0.52	CFM/ft ²	Control	Fixed V	'ariable	Fixed	Variable	1		
System Static Pressure CAV	350 Pa	1.4	wq			Flow	. I	Flow			
System Static Pressure VAV	350 Pa	1.4	wg	Incidence of Use	100%		100%	<u> </u>	1		
Fan Efficiency 6	ე%		0	Operation	ContinuousS	cheduled	Continuous	Scheduled	e e e e e e e e e e e e e e e e e e e		
Fan Motor Efficiency 8	ე%										
Sizing Factor 1.	00	·	i.	Incidence of Use	100%		100%				
Fan Design Load CAV	1.9 W/m ²	0.18	W/ft ²	0							
Fan Design Load VAV	.9 W/m²	U.18	W/ft ²	Comments:							
EARAUST FARS											
Washroom Exhaust	00 L/s.wasł	nroom	212 CFM/wash	hroom							
Washroom Exhaust per gross unit area).2 L/s.m ²		0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	1	0.02 CFM/ft ²								
Total Building Exhaust	J.3 L/s.m ²	1	0.06 CFM/ft ²								
Exhaust System Static Pressure	250 Pa	ſ	1.0 wg								
Fan Efficiency 2	5%										
Fan Motor Efficiency 7	5%										
Sizing Factor 1	.0		,								
Exhaust Fan Connected Load	0.4 W/m ²	0.04	W/ft ²								
AUXILIARY COOLING FOURPMENT (Condo	Dumn		(Candancar Fana)								
	nser Pump a	and Cooling 1 ow	er/Condenser Fans)								
Average Condensor Fon Bower Drow		ı	0.020 1/1/1/1/1/	0.07 kW//Top							1
Average Condenser Fair Power Draw	Condenser)	ł	0.020 kvv/kvv	0.07 KW/T011							
(Cooling Tower/Evap. Condensel/ All Cooled	Condenser	l	1.90 w/m*	U.16 W/It-							1
Candangar Diumn											1
Condenser Pump											
Pump Design Flow		ſ	0.053 L/s KW	3.0 U.S. apm/Top							
Pump Design Flow per unit floor area		ŀ	0.005 L/S.NW	0.007 LLS apm/ft ²							
Pump Head Pressure		ŀ	0.005L/S.III	ft							
Pump Efficiency		+	50%								
Pump Motor Efficiency		+	80%								
Sizing Factor		†	10								1
Pump Connected Load		†	W/m ²	W/ft ²							1
		L									
CIRCULATING PUMP (Heating & Cooling)											
		·									
Pump Design Flow @ 5 °C (10 °F) delta T		0.004	L/s.m ²	0.0060 U.S. gpm/ft ² 2	2.4 U.S. gpm/To	on					
Pump Head Pressure		100	kPa	50 ft							
Pump Efficiency		50%	I								1
Pump Motor Efficiency		80%	I								
Sizing Factor		0.8	l	0.00 11///0							1
Pump Connected Load		0.8	W/m²	0.08 W/tt ²							
Supply Fan Occ. Pariod		5000	bre /vear								
Supply Fail locc. Period		3760	hrs /vear								
Supply Fan Energy Consumption		16.9	1 k\N/h/m² vr								
Supply Fall Energy Consumption		10.0	Kvviviii .yi								
Exhaust Fan Occ. Period		5000	hrs./vear								
Exhaust Fan Unocc, Period		3760	hrs./year								1
Exhaust Fan Energy Consumption		3.7	kWh/m².yr								
		·	,								
Condenser Pump Energy Consumption			kWh/m².yr								
Cooling Tower /Condenser Fans Energy Cons	sumption	0.3	kWh/m².yr								
			-								
Circulating Pump Yearly Operation		7000	hrs./year								
Circulating Pump Energy Consumption			kWh/m².yr								
Fans and Pumps Maintenance	Annual M	laintenance Task	3	Incidence Frequency							
	1		<u> </u>	(%) (years)							
	Inspect/S	ervice Fans & Mc	itors								
	Inspect/A	djust Belt Tension	1 on Fan Belts							114/1- (612	4.0
	inspect/S	ervice Pump & M	otors						EUI	KVVD/TC ² .yr	75.2

COMMERCIAL SECTOR BUILDING PROFILE											
EXISTING BUILDINGS: SIZE: Food Retail All Baseline		VINTAGE Existing	:			REGION: Labrador Interconnected	I				
EUI SUMMARY											
TOTAL ALL END-USES:	Electricity:		71.8 kWh/ft².yr 2,780.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr				
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane				
GENERAL LIGHTING	6.5	251.1		kWh/ft ² .yr	MJ/m².yr	kWh/ft2.yr	MJ/m².yr				
ARCHITECTURAL LIGHTING (COR	0.8	32.5	SPACE HEATING	29.4	1,137.3						
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	6.1						
OTHER PLUG LOADS	0.8	32.5	SERVICE HOT WATER	1.3	50.0	0.0	0.0				
HVAC FANS & PUMPS	1.9	75.2	FOOD SERVICE EQUIPMENT	3.1	120.0						
REFRIGERATION	25.8	1,000.0									
MISCELLANEOUS	0.1	5.0									
BLOCK HEATERS	0.1	5.0									
COMPUTER EQUIPMENT	0.8	30.2									
COMPUTER SERVERS	0.0	1.2									
ELEVATORS											
OUTDOOR LIGHTING	0.9	33.9									



			COMMER	CIAL SECTOR BUILD	DING PROFI	ile
EXISTING BUILDINGS:	SIZE:			VINTAGE:		REGION:
Large Non-Food Retail Baseline	> 100 KW			Existing		Labrador Interconnected
CONSTRUCTION						
	_		-			
Wall U value (W/m ² .°C) 0.38	8 W/m².°C	0.07	Btu/hr.ft ² .°	°F	Typical Bui	uilding Size 929 m ² 10,000 ft ²
Roof U value (W/m ² .°C) 0.28	8 W/m ² .°C	0.05	Btu/hr.ft ² .°	°F	Typical Foo	potprint (m ²) 929 m ² 10,000 ft ²
Glazing U value (W/m ² .°C) 3.52	2 W/m².°C	0.62	Btu/hr.ft ² .°	°F	Footprint A	Aspect Ratio (L:W) 5
					Percent Co	conditioned Space 100%
Window/Wall Ratio (WIWAR) (%) 0.10	1				Defined as	s Exterior Zone
Shading Coefficient (SC) 0.75	; ;				Typical # S	Stories 1
	_				Floor to Flo	loor Height (m) 4.3 m 14.0 ft
VENTILATION SYSTEM, BUILDING CONTRO	DLS & INDO	OR CONDITIONS				
	-					
Ventilation System Type	-	Custom Dresent (0/)	CAV	CAVR DDM2	Z DDMZVV	VAV VAVR IU 100% O.A TOTAL
	f	Min. Air Flow (%)	100%			50%
		(Minimum Throttled Air Vo	olume as Pe	ercent of Full Flow)	1 1	
	r					
Occupancy or People Density	ŀ	25 m²/persor	ı	269 ft²/person		%UA <u>9.43%</u>
Occupancy Schedule Unocc. Period	ŀ					
Fresh Air Requirements or Outside Air		18 L/s.perso	n	38 CFM/perse	on	
Fresh Air Control Type	a 1 2 cr 2)	1 If Eroch A	r Control T	vpa = "2" antor % 5 4	to the right:	349/
(1 = mixed air control. 2 = Fixed fresh air. 3 100	a ı,∠oro) % freshair)	If Fresh A	r Control T	ype = ∠ enter % rA.1 ype = "3" enter Make-u	io une rigrit. Ip Air Ventilat	ation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
(,				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		50% operation (%)
Sizing Factor		2				
Total Air Circulation or Design Air Flow	L	7.64 L/s.m ²		1.50 CFM/ft ²		Separate Make up air upit (100% OA)
Infiltration Rate	Γ	L/s.m ²		CFM/ft ²		Operation occupied period 50%
(air infiltration is assumed to occur during unocc	upied					Operation unoccupied period 50%
hours only if the ventilation system shuts down)						
Economizer		Enthalo	v Based	Dry-Bulb Based	Total	Т
Leonomizer	Incidence o	fUse	y Daseu	100%	100%	Summary of Design Parameters
	Switchover	Point	KJ/kg.	18 °C		Peak Design Cooling Load 301,435
			Btu/lbm	64.4 °F		Peak Zone Sensible Load 161,666
Controls Type	System Pre	esent (%)	HVAC	Room		Discharge air enthalpy 28.2 Btu/lbm
Controls Type	System in	53en (70)	Equipment	Controls		Specific volume of air at 55F & 100% R 13.2 ft ³ /lbm
	All Pneuma	tic				Design CFM 7,521
	DDC/Pneur	matic				Total air circulation or Design air 7.64 l/s.m ²
	Total (shou	ld add-up to 100%)				
					_	
		Propo	ortional	PI / PID Total	I	
Control mode	Control Mo	de Fixed D	ischarge	Reset	_	
	Control Stra	ategy	loonargo	110001		
Indoor Design Conditions	Summor To	moratura	21	Room	ol ∘⊏	Supply Air
	Summer H	umidity (%)	50%	0 03.0	<u> </u>	100%
	Enthalpy		65.5	KJ/kg. 28.2	Btu/lbm	54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ	. Temperature	21	°C 69.8	B °F	15 °C 59 °F
	Enthalpy	. Humidity	30%	K.J/ka. 22.8	Btu/lbm	45% 45.5 KJ/kg. 19.6 Btu/bm
	Winter Uno	cc. Temperature	21	°C 69.8	B °F	
	Winter Uno	cc. Humidity	30%		- 	
	Enthalpy		50	KJ/kg. 21.5	Btu/lbm	
Damper Maintenance			Incidence	Frequency		
	Control Are	a Adiuatea ant	(%)	(years)		
	Lubrication	n Aujustment				
	Blade Seal	Replacement				
Air Filter Cleaning	Changes/Y	ear		1		
	g]		
Insidence of Annual LIV/AC Controls Maintenan				Incidence of	of Annual Ro	toom Controls Maintenance
THORE OF ATTICAL IT VAC CONTONS MAINTENANC	9					
	Annual Mai	ntenance Tasks	Incidence]	ļ.	Annual Maintenance Tasks Incidence
	0-111-11	- (Tana and it	(%)	1	l.	(%)
	Calibration	of Panel Gaures		1	H	Inspection/Calibration of Room Inermostat
	Inspection	of Auxiliary Devices]	ĥ	Inspection of Auxiliary Devices
	Inspection	of Control Devices		J	Ī	Inspection of Control Devices (Valves,
					Ľ	(Dampers, VAV BOXes)

EXISTING BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMMER	CIAL SECTOR BUILDI VINTAGE: Existing	NG PROFILE	REGION: Labrador Int	erconnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.95 20.5 W/m ² 1.9	ft-candles						
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 95% 15%	Light Level (Lux) % Distribution Weighted Average	400 25%	500 600 50% 25%			Total 100% 500	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	10% 0.7 0.65 15	CFL T12 10% 20% 0.7 0.6 0.65 0.75 50 72	18 HD 55% 5% 0.6 0.6 0.80 0.80 88 65	15HO LED 0% 0% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot						EUI kWh/ft².y MJ/m².yr	r 8.2
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46.5 0.05 31.7 W/m ² 2.9	ft-candles	200	500 700	1000		Total	
Unocc. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 95% 50%	% Distribution Weighted Average	300 30%	500 700 40% 30% CFL T12	2 T8 HID	T5HO LED	100% 500 TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	30% 0.7 0.65 15	5% 10% 0.7 0.6 0.65 0.75 50 72	50% 0.6 0.6 0.80 0.80 88 65	0% 5% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot			EUI = Load X Hrs. X	SF X GLFF		EUI kWh/ft².y MJ/m².yr	r 0.9 35
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft²		Floor frac	tion check: should = 1.00) 1.00	Ι	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	0 1000		Total	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LAM)	0.7 0.65	CFL T12 0.7 0.6 0.65 0.75 50 72	2 T8 0.6 0.6 0.80 0.80	MH HPS 0.6 0.6 0.55 0.55 65 90		
Relamping Strategy & Incidence of Practice	Group Spot		13	30 72	04 00	05 30	EUI kWh/ft².y	r
TOTAL LIGHTING					Overall LP	21.07 W/m ²	EUI TOTAL kWh/ft².y MJ/m².yr	r 9 352
OFFICE EQUIPMENT & PLUG LOA	DS							
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	Computers 55 0.22 0.5 W/m ²	Monitors 51 0.22 0.4 W/m ²	Printers 100 0.01 0.0 W/m ²	200 0.01 0.1 W/m ²	217 0.02 0.1 W/m ²	Plug Loads		
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.0 W/ft ² 90% 50% 2000 6760	0.0 W/ft ² 90% 50% 2000 6760	0.00 W/ft ² 90% 50% 2000 6760	0.01 W/ft ² 90% 50% 2000 6760	0.01 W/ft ² 100% 2000 6760	0.11 W/ft ² 90% 50% 4100 4660		
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m ² 1.2 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells with	ed indicator in upper	right corner, type "SHIFT	Computer Servers	EUI kWh/ft².y MJ/m².yr	r 0.1 4.42
Usage during occupied period Usage during unoccupied period	100% 59%				C	omputer Equipment Plug Loads	EUI kWh/ft².y MJ/m².yr EUI kWh/ft².y MJ/m².yr	r 0.5 19.1 r 0.6 24.9
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5	Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI	All Electric I EUI kWh/ft².y MJ/m².yr	EUI r 1.0 38.7
REFRIGERATION Provide description below:							EUI kWh/ft².y MJ/m².vr	r 1.5
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI kWh/ft².y MJ/m².yr EUI kWh/ft².y MJ/m².yr	r 0.1 5 r 0.1

EXISTING BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMMERCIAL SECTOR BUILDING PROFILE SIZE: VINTAGE: REGION: > 100 kW Existing Labrador Interconnecte						cted					
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elect	ric				
				Bo Stan.	ilers High	Packaged Rooftop	A/A HP	W. S. HP H	I/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		70%	80%	70%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	45.5 W/m ² 383 MJ/m ² .yr	14.4	Btu/hr.ft² kWh/ft².yr				1						
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share]	Oil Fuel Sha	re]			-	kWh/ft².yr	9.9
Boiler Maintenance	Annual Ma	intenance Tasks		Incidence							L	MJ/m².yr	383
	Fire Side I	nspection		(%) 75%							-	Fuel Oil / Propane EL kWh/ft².yr	λI
	Water Sid	e Inspection for Scale Build	dup	100%								MJ/m².yr	
	Inspection	of Burner		100%							ļ	Market Composite El	JI
	Flue Gas A	Analysis & Burner Set-up		90%								kWh/ft².yr MJ/m².yr	9.9 383
SPACE COOLING													
A/C Plant Type													
			Centrifuga Standard	Chillers HE	Screw Chillers	Reciprocat Open	ting Chillers DX	Absorption (W. H.	Chillers CW	Total			
		System Present (%)	4.9	5.4	4.4	27	100.0%	0.0	1	100.0%			
		Performance (1 / COP)	0.21	0.19	0.23	0.27	0.38	1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
O antes Maria			Fired	Deret									
Control Mode		Incidence of Use	Setpoint	Reset									
		Chilled Water Condenser Water											
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water Supply Air	30 14.0	င် င	86 57.2	°F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	95 W/m² 77.4 MJ/m².yr	30 Btu/hr.ft² 2.0 kWh/ft².yr	398	ft²/Ton									
Sizing Factor	1.00												
A/C Saturation	25.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share]									
Chiller Maintenance	Annual Ma	intenance Tasks		Incidence	Frequency								
	Inspect Co	ontrol, Safeties & Purge Ur	nit	(%)	(years)								
	Inspect Co Meager M	oupling, Shaft Sealing and I	Bearings										
	Condense	r Tube Cleaning											
	Vibration / Eddy Curr	Analysis ent Testing											
	Spectroch	emical Oil Analysis									-	All Electric EUI	0.8
					_							MJ/m².yr	32
Cooling Tower/Air Cooled Condense	Inspection	/Clean Spray Nozzles ervice Fan/Fan Motors		(%)	(years)						[Fuel Oil / Propane EL kWh/ft².yr MJ/m².yr	Л
	Megger M Inspect/Ve	otors arify Operation of Controls										Market Composite El kWh/ft².yr MJ/m².yr	JI 0.8 32
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System Pi	I SHW Avg. Tank resent (%)	<			Boiler 0%	ļ	Fuel Share	iciency	Fossil 0%		Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m ² .yr)	17.3	0.05	1	1		0.75	J	Sichaed Ell	.515116¥	0.70		0.01	
(Tertiary Load) Wetting Use Percentage	90%			A	II Electric EL kWh/ft².yr	0.5]	Fuel Oi k	I / Propane Wh/ft².yr	e EUI 0.6	[Market Composite El kWh/ft².yr	0.5
L					ıvıJ/m².yr	19	1	N N	/IJ/m².yr	23		MJ/m².yr	19.0



			COMMER	CIAL SECTOR BUILDING PROFILE						
EXISTING BUILDINGS:	SIZE:			VINTAGE:	REGION	:				
Large Non-Food Retail	> 100 kW	I		Existing	Labrado	r Interconne	ected			
Baseline										
HVAC FANS & PUMPS										٦
SUPPLY FANS					Ventilation and Exh	aust Fan Ope	eration & Co	ontrol		
System Design Air Flow	7.6 I/s m ²	1.50	CFM/ft2	Control	Ventilation Fan	Exhau	ust Fan Variable			
System Design Air How System Static Pressure CAV	350 Pa	1.30	wa	Control	Flow	TIXEU	Flow			
System Static Pressure VAV	350 Pa	1.4	wg	Incidence of Use	100%	100%				
Fan Efficiency	60%			Operation	Continuou: Schedule	edContinuous	Scheduled			
Fan Motor Efficiency	88%			Incidence of Line	00% 10	0.00%	400/			
Fan Design Load CAV	5.1 W/m ²	0.47	W/ft ²	Incidence of Ose	90% 10	/0 90%	10%	1		
Fan Design Load VAV	5.1 W/m ²	0.47	W/ft ²	Comments:						
			-							
EXHAUST FANS										
Washroom Exhaust	50 L/s.wash	room	106 CFM/was	shroom						
Washroom Exhaust per gross unit area	0.1 L/s.m ²		0.02 CFM/ft ²							
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²		0.02 CFM/ft ²							
Total Building Exhaust	0.2 L/s.m ²		0.04 CFM/ft ²							
Exhaust System Static Pressure	250 Pa		1.0 Wg							
Fan Motor Efficiency	75%									
Sizing Factor	1.0		_							
Exhaust Fan Connected Load	0.3 W/m ²	0.03	W/ft ²							
	Condenser Pump a	and Cooling Toy	ver/Condenser Fans)						-
	bondenser i unp d			1						
Average Condenser Fan Power Draw			0.020 kW/kW	0.07 kW/Ton						
(Cooling Tower/Evap. Condenser/ Air C	Cooled Condenser)		1.90 W/m ²	0.18 W/ft ²						
Condenses Dump										
Condenser Pump										
Pump Design Flow			L/s.KW	U.S. gpm/Ton						
Pump Design Flow per unit floor area			L/s.m ²	U.S. gpm/ft ²						
Pump Head Pressure			45 kPa	15 ft						
Pump Efficiency			50%							
Sizing Eactor			80%							
Pump Connected Load			1.0 W/m ²	W/ft ²						
CIRCULATING PUMP (Heating & Cod	Jing)									
Pump Design Flow @ 5 °C (10 °F) det	ta T	0.004	1 /s m²	0.0060 LLS gpm/ft ² 2.4	U.S. gpm/Ton					
Pump Head Pressure		0.001	kPa	ft	joioi gpiit foii					
Pump Efficiency		50%								
Pump Motor Efficiency		80%								
Sizing Factor		0.8		11///2						
Pump Connected Load			W/m ²	W/ft²						
										-
Supply Fan Occ. Period		5500	hrs./year							
Supply Fan Unocc. Period		3260	hrs./year							
Supply Fan Energy Consumption		42.7	kWh/m².yr							
Exhaust Fan Occ. Period		5500	brs /vear							
Exhaust Fan Unocc, Period		3260	hrs./vear							
Exhaust Fan Energy Consumption		2.3	kWh/m².yr							
		-	-							
Condenser Pump Energy Consumption			kWh/m².yr							
Cooling Tower /Condenser Fans Energy	y Consumption	0.4	kWh/m².yr							
Circulating Pump Yearly Operation		7000	hrs./vear							
Circulating Pump Energy Consumption			kWh/m².yr							
		-	-							
Fans and Pumps Maintenance	Annual M	laintenance Tasl	s							
	Inenect/P	envice Fane & M	otors	(%) (years)						
	Inspect/A	djust Belt Tensio	n on Fan Belts	+						
	Inspect/S	ervice Pump & N	Aotors				J	EUI kW	/h/ft².yr 4.	2
				· · · ·				M	i/m².yr 163.	5

COMMERCIAL SECTOR BUILDING PROFILE												
EXISTING BUILDINGS: SIZE:		SIZE:	VINTAGE:				REGION:					
Large Non-Food Retail Baseline	:	> 100 kW	W Existing				Labrador Interconnect	ed				
EUI SUMMARY												
TOTAL ALL END-USES:	Electricity:		28.8 kWh/ft².yr 1,114.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr					
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane					
GENERAL LIGHTING	8.2	316.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr					
ARCHITECTURAL LIGHTING	0.9	35.2	SPACE HEATING	9.9	382.6							
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	7.9							
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0					
HVAC FANS & PUMPS	4.2	163.5	FOOD SERVICE EQUIPMENT	1.0	38.7							
REFRIGERATION	1.5	58.1										
MISCELLANEOUS	0.1	5.0										
BLOCK HEATERS	0.1	5.0										
COMPUTER EQUIPMENT	0.5	19.1										
COMPUTER SERVERS	0.1	4.4										
ELEVATORS/ESCALATORS												
OUTDOOR LIGHTING	0.9	33.9										



			COMMER	CIAL SECTOR BUILD	DING PROF	FILE
EXISTING BUILDINGS:	SIZE:			VINTAGE:		REGION:
Small Non-Food Retail Baseline	< 100 kW			Existing		Labrador Interconnected
CONSTRUCTION						
Wall U value (W/m ² .°C) 0.2	28 W/m ² .°C	0.0	5 Btu/hr.ft ²	°F	Typical Bu	Building Size 929 m ² 10,000 ft ²
Roof U value (W/m ² .°C) 0.1	9 W/m ² .°C	0.0	3 Btu/hr.ft ²	°F	Typical Fo	Footprint (m ²) 929 m ² 10,000 ft ²
Glazing U value (W/m ² .°C) 3.5	i2 W/m².°C	0.6	2 Btu/hr.ft ²	°F	Footprint /	t Aspect Ratio (L:W) 5
					Percent C	Conditioned Space 100%
	0				Percent C	Conditioned Space 45%
Shading Coefficient (SC) 0.7	5				Typical #	# Stories 1
	-				Floor to F	Floor Height (m) 4.3 m 14.0 ft
VENTILATION SYSTEM BUILDING CONTR						
	010 0 110	CON CONDITIONO				
Ventilation System Type			CAV	CAVR DDM2	Z DDMZVV	V VAV VAVR IU 100% O.A TOTAL
		System Present (%)	100%	b		100%
		(Minimum Throttled Air	Volume as P	ercent of Full Flow)		50%
		(,		
Occupancy or People Density		25 m²/pers	on	269 ft²/person		%OA 19.11%
Occupancy Schedule Upace, Period		90%				
Fresh Air Requirements or Outside Air		18 L/s.pers	son	38 CFM/pers	on	
Fresh Air Control Type *(enter	ra 1, 2 or 3)	1 If Fresh	Air Control T	ype = "2" enter % FA.	to the right:	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	0% fresh air)	If Fresh	Air Control 1	ype = "3" enter Make-u	ip Air Ventila	ilation and operation 0.5 L/s.m ² 0.10 CFM/H ²
Sizing Factor		1				50%[0]perau01(%)
Total Air Circulation or Design Air Flow		3.77 L/s.m ²		0.74 CFM/ft ²		
						Separate Make-up air unit (100% OA) L/s.m ² CFM/ft ²
Infiltration Rate	auniad	0.42 L/s.m ²		0.08 CFM/ft ²		Operation occupied period 50%
hours only if the ventilation system shuts down	l					Operation diroccupied period 50%
,						
Economizer		Entha	lpy Based	Dry-Bulb Based	Total	
	Incidence	of Use	K Mar	100%	100%	% Summary of Design Parameters
	SWITCHOVE		Btu/lbm	64.4 °F	-	Peak Zone Sensible Load 159.469
					1	Room air enthalpy 28.2 Btu/lbm
Controls Type	System P	resent (%)	HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
		atic	Equipmer	t Controls		Specific volume of air at 55F & 100% R 13.2 H%/Ibm
	DDC/Pne	umatic				Total air circulation or Design air 3.77 l/s.m ²
	All DDC					
	Total (sho	ould add-up to 100%)				
		Pro	portional	PI / PID Tota		
Control mode	Control M	ode				
		Fixed	Discharge	Reset		
	Control S	trategy				
Indoor Desian Conditions				Room		Supply Air
	Summer 7	Femperature	21	I °C 69.8	۶°F	14 °C 57.2 °F
	Summer I	Humidity (%)	50%	b	T =	100%
	Enthalpy Winter Oc	c Temperature	65.5	5 KJ/kg. 28.2	Btu/lbm	54.5 KJ/kg. 23.4 Btu/lbm
	Winter Oc	c. Humidity	30%	6 03.	<u>י</u>	45%
	Enthalpy		53	3 KJ/kg. 22.8	Btu/lbm	45.5 KJ/kg. 19.6 Btu/lbm
	Winter Un	occ. Temperature	21	I °C 69.8	8°F	
	Enthalov	IOCC. HUMIDITY	30%) K.l/ka 21.5	Btu/lbm	
	Entricipy		00	21.0	Diarioini	
Damper Maintenance			Incidence	Frequency		
	Control A	rm Adjustment	(%)	(years)		
	Lubricatio	n				
	Blade Sea	al Replacement				
Air Filter Cleaning	Changes/	Year		7		
	Ū			_		
Incidence of Annual LIVAC Controls Maintenan		1		Incidence of	of Annual R	Room Controls Maintenance
Incluence of Annual HVAC Controls Maintenan						
	Annual Ma	aintenance Tasks	Incidence	1		Annual Maintenance Tasks Incidence
		A 1997 A	(%)	4		(%)
	Calibratio	n of Transmitters	_	4		Inspection/Calibration of Room Thermostat
	Inspection	n of Auxiliary Devices		1		Inspection of Auxiliary Devices
	Inspection	of Control Devices]		Inspection of Control Devices (Valves,
						(Dampers, VAV Boxes)

EXISTING BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	COMMERCIAL S VINTA Existi	SECTOR BUILDING AGE: ing	9 PROFILE		REGION: Labrador Ir	nterconnected			
Light Level Floor Fraction (GLFF)	500 Lux 46.5	5 ft-candles								
Connected Load	20.5 W/m ² 1.9	9 W/ft ²							7	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 95% 15%	Light Level (Lux) % Distribution Weighted Average	400 25%	500 50%	600 10 25%	000		100%		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	INC 10% 0.7 0.65	CFL 10% 0.7 0.65	T12 20% 5: 0.6 0 0.75 0.	T8 HID 5% 5% 0.6 0.6 80 0.80	T5HO LE 0% 0° 0.6 0.1 0.80 0.8	D TOTAL % 100.0% 6 0	• •	
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	15	50	72	88 65	95 9	EUI	kWh/ft².yr	8.2
ARCHITECTURAL LIGHTING									MJ/m².yr	317
Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46.5 0.05 31.7 W/m² 2.5	5 ft-candles 9 W/ft ²								
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	4000 4760 95%	Light Level (Lux) % Distribution Weighted Average	300 30%	500 40%	700 10 30%	000		Total 100% 500		
Usage During Unoccupied Period Fixture Cleaning:	50%	System Present (%)	INC 30%	CFL 5%	T12 10% 5	T8 HID	T5HO LE 0% 5	D TOTAL % 100.0%	-	
Interval	years	LLF Efficacy (L/W)	0.65	0.65	0.75 0.	80 0.80 88 65	0.8 0.8	0		
Relamping Strategy & Incidence of Practice	Group Spot		FI	II = Load X H	Hrs X SF X G	il FF		EUI	kWh/ft².yr	0.9
SPECIAL PURPOSE LIGHTING Light Level	Lux	ft-candles		Floor	r fraction cheo		00 1.0	0		
Floor Fraction (HBLFF) Connected Load	W/m²	W/ft ²								
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	4000 4760 0%	Light Level (Lux) % Distribution Weighted Average	300	500	700 10	000		Total	-	
Usage During Unoccupied Period Fixture Cleaning: Incidence of Practice	100%	System Present (%) CU	0.7	CFL 0.7	T12	T8 0.6 0.6	MH HP 0.6 0.1	S TOTAL	-	
Interval Relamping Strategy & Incidence	years Group Spot	LLF Efficacy (L/W)	0.65 15	0.65 50	0.75 0. 72	80 0.80 84 88	0.55 0.55 65 9	5		
of Practice								EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING						Overall LP	21.07 W/m ²	EUI TOTAL	. kWh/ft².yr MJ/m².yr	9 352
OFFICE EQUIPMENT & PLUG LOA	DS									
Equipment Type	Computers	Monitors	Printers	Copiers	:	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.22 0.5 W/m ²	51 0.22 0.4 W/m ²	100 0.01 0.0 W/m ²	200 0.01 0.1 W/m	2	217 .02 0.1 W/m ²	1.15 W/m ²			
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	90% 50% 2000	90% 50% 2000 2700	90% 50% 2000	90% 50% 2000	100 100 200	01 W/14 0% 000	90% 50% 4100			
Total end-use load (occupied period)	2.1 W/m ²	0.2 W/ft ² to see	e notes (cells with rec	l indicator in u	upper right co	mer, type "SHIF	-T @@mputer Serve	rsEUI	kWh/ft².yr MJ/m².yr	0.1
Usage during occupied period Usage during unoccupied period	100% 59%						Computer Equipme Plug Load	nt EUI ds EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr	0.5 19.1 0.6
		5	ioity Eucl Chorn	100.0%	-		. = 111			24.9
n rovide description below:	i dei Oil / Fioparie Fuel Share:		ioity ruel Share:	100.0%	EUI	kWh/ft².yr MJ/m².yr		EUI	kWh/ft².yr MJ/m².yr	
REFRIGERATION Provide description below:								EUI	kWh/ft².vr	
									MJ/m².yr	
BLOCK HEATERS & MISCELLANE	ous									
							Block Heate	rs EUI us EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.1 5 0.1

EXISTING BUILDINGS: Small Non-Food Retail	SIZE: < 100 kW	COMMER	CIAL SECT VINTAGE: Existing	or Buildi	NG PROFI	LE	F	REGION: _abrador I	nterconne	cted		
baseline												
SPACE HEATING												
Heating Plant Type			Fu	el Oil / Propa ilers	ne Packaged	A/A HP	Elect W. S. HP	tric I/R Chiller	Resistance	Total		
	Queters De		Stan.	High	Rooftop				4000/	4000/		
	Eff./COP	sent (%)	70%	80%	70%	1.70	3.00	4.50	1.00%	100%		
	Performand (kW/kW)	e (1/Eff.)	1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	39.0 W/m ² 495 MJ/m ² .yr	12.4 Btu/hr.ft² 12.8 kWh/ft².yr	r							_		
Electric Fuel Share	100.0% Fuel Oil / Propane	Fuel Share	٦	Oil Fuel Shar	e		1			-	All Electric EUI kWh/ft².yr	12.8
Boiler Maintenance	Annual Maintenance Ta	asks	Incidence				-			L	MJ/m².yr	495
	Fire Oide lange eting		(%)							F	Fuel Oil / Propane E	UI
	Water Side Inspection	for Scale Buildup	100%								KVVh/tt².yr MJ/m².yr	
	Inspection of Controls Inspection of Burner	& Safeties	100%							Г	Market Composite E	UI
	Flue Gas Analysis & E	urner Set-up	90%								kWh/ft².yr	12.8
											WJ/TIP.yl	495
SPACE COOLING												
A/C Plant Type		Contrifug	ol Chilloro	Sorou	Doginrogot	ing Chillorg	Abcorption	Chillora	Total			
		Standard	HE	Chillers	Open	DX	W. H.	CW	Total			
	System Pre	sent (%)	8 54	4 4	37	100.0%	0.9	1	100.0%			
	Performanc	e (1 / COP) 0.2	1 0.19	0.23	0.27	0.38	1.11	1.00				
	(kW/kW) Additional F	efrigerant										
	Related Info	ormation										
Control Mode	Incidence o	Use Fixed	Reset									
		Setpoint										
	Condenser	Water										
Setpoint	Chilled Wat Condenser	er 7 Water 30	°C °C	44.6 86	°F							
	Supply Air	14.	0°C	57.2	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	94 W/m² 87.0 MJ/m².yr	30 Btu/hr.ft ² 401 2.2 kWh/ft ² .yr	ft²/Ton									
Sizing Factor	1.00											
A/C Saturation	25.0%											
(Incidence of A/C)												
Electric Fuel Share	100.0% Fuel Oil / Propane	Fuel Share										
Chiller Maintenance	Annual Maintenance Ta	asks	Incidence	Frequency								
	Inspect Control, Safeti	es & Purge Unit	(%)	(years)								
	Inspect Coupling, Shaf Meager Motors	t Sealing and Bearings										
	Condenser Tube Clear	ing										
	Vibration Analysis Eddy Current Testing											
	Spectrochemical Oil A	nalysis								F	All Electric EUI	0.9
											MJ/m².yr	36
Cooling Tower/Air Cooled Condense	r Maintenand Annual Maintenance Ta	asks	Incidence (%)	Frequency (years)						Г	Fuel Oil / Propane E	UI
	Inspection/Clean Spray	Nozzles								F	kWh/ft².yr	
	Megger Motors									L _	wj/flf.yl	
	Inspect/Verify Operation	on of Controls									Market Composite E kWh/ft².yr	UI 0.9
											₩J/M ² .yr	
Service Hot Water Plant Tuno	Foreil Fuel SHW	Avg Tack		T	Boilor				Fossil		Elec Res	
Service Hot water Plant Type	System Present (%)	Avg. Tank			Boiler 0%		Fuel Share		FOSSII		100%	
Service Hot Water load (M I/m2 vr)	Eff./COP	0.65			0.75		Blended Eff	iciency	0.75		0.91	
(Tertiary Load)	17.5		r							-		
Wetting Use Percentage	90%		A	II Electric EU kWh/ft ² .yr	I 0.5		Fuel Oi	il / Propan Wh/ft².yr	e EUI 0.6	F	Market Composite E kWh/ft ² .yr	.UI 0.5
				MJ/m².yr	19		N	MJ/m².yr	23		MJ/m².yr	19.0



EXISTING BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: Existing	RE La	EGION: abrador Ir	nterconne	cted			
HVAC FANS & PUMPS										
SUPPLY FANS			[]	Ventilation an	nd Exhaus	t Fan Ope	eration & Co	ntrol		
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency	3.8 L/s.m² 350 Pa 350 Pa 60%	0.74 CFM/ft ² 1.4 wg 1.4 wg	Control Incidence of Use Operation	Fixed Va	Flow Flow	Fixed 100%	Variable Flow Scheduled			Ĩ
Fan Motor Efficiency Sizing Factor Fan Design Load CAV Fan Design Load VAV	88% 1.00 2.5 W/m ² 2.5 W/m ²	0.23 W/ft ² 0.23 W/ft ²	Incidence of Use Comments:	90%	10%	90%	10%			
EXHAUST FANS										
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	50 L/s.washroom 0.1 L/s.m² 0.1 L/s.m² 0.2 L/s.m² 250 Pa 25% 1.0 0.3 W/m²	106 CFM/was 0.02 CFM/ft² 0.02 CFM/ft² 0.04 CFM/ft² 1.0 wg 0.03 W/ft²	shroom							
AUXILIARY COOLING EQUIPMENT (Con	lenser Pump and Coolin	g Tower/Condenser Fans))							
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Coole	ed Condenser)	0.020 kW/kW 1.89 W/m ²	0.07 kW/Ton 0.18 W/ft ²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		L/s.KW L/s.m ² 45 50% 80% 1.0 W/m ²	U.S. gpm/Ton U.S. gpm/Tt ² 15 ft W/ft ²							
CIRCULATING PUMP (Heating & Cooling)									
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.004 kPa 50% 0.8 W/m ²	0.0060 U.S. gpm/ft ² 2.4	U.S. gpm/Tor	n					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		5500 hrs./year 3260 hrs./year 21.1 kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		5500 hrs./year 3260 hrs./year 2.3 kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Co	nsumption	kWh/m².yr 0.4 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000 hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual Maintenance Inspect/Service Fan Inspect/Adjust Belt 1 Inspect/Service Pun	⇒ Tasks s & Motors Fension on Fan Belts np & Motors	Incidence Frequency (%) (years)				[EUI	kWh/ft².yr MJ/m².yr	2.2 85.8

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS: SIZE: VINTAG							REGION:	nected		
Baseline		< 100 KVV	Existing					mecteu		
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	Γ	27.2 kWh/ft².yr 1,053.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².	yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	8.2	316.7		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr			
ARCHITECTURAL LIGHTING	0.9	35.2	SPACE HEATING	12.8	495.3					
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	8.9					
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0			
HVAC FANS & PUMPS	2.2	85.8	FOOD SERVICE EQUIPMENT							
REFRIGERATION										
MISCELLANEOUS	0.1	5.0								
BLOCK HEATERS	0.1	5.0								
COMPUTER EQUIPMENT	0.5	19.1								
COMPUTER SERVERS ELEVATORS/ESCALATORS	0.1	4.4								
OUTDOOR LIGHTING	0.9	33.9								



			COMMER	CIAL SEC	TOR BUILD	ING PROF	ILE				
EXISTING BUILDINGS:	SIZE:			VINTAGE				F	REGION:	ata d	
Baseline	> 100 KW			Existing					abrador interconne	cted	
CONSTRUCTION											
									[_
Wall U value (W/m ² .°C)	0.28 W/m ² .°C		0.05 Btu/hr.ft ² .9	°F		Typical B	uilding Size	9	1,394	m² 15,00	<u>J0</u> ft ²
Roof U value (W/m ² .°C)	0.28 W/m ² .°C		0.05 Btu/hr.ft ² .°	'F		Typical Fo	potprint (m ²	2)	1,394	m² 15,00	J0 ft ²
Glazing U value (W/m ² .°C)	3.52 W/m ² .°C		0.62 Btu/hr.ft ² .°	F		Footprint	Aspect Rat	tio (L:W)	4	-	
						Percent C	onditioned	Space	100%	-	
Window/Wall Ratio (WIWAR) (%)	0.28					Defined a	s Exterior 2	Zone	4378]	
Shading Coefficient (SC)	0.57					Typical #	Stories		1]	
						Floor to F	loor Heigh	t (m)	3.7	m 12	.0 ft
VENTILATION SYSTEM, BUILDING CO	ONTROLS & IND	OOR CONDITIONS	3								
						001000		1		7074	
Ventilation System Type		System Present (%	() CAV	CAVR	DDMZ		VA\	VAVR	IU 100% O.A	101AL	
		Min. Air Flow (%)	0) 0070				60%	6		10070	
		(Minimum Throttled	d Air Volume as Pe	ercent of F	ull Flow)					-	
Occupancy or Reople Density		46 m ²	Person	405	ft2/percon			0	KOA 5 30%	1	
Occupancy Schedule Occ. Period		50%	person	433	nt/peison			/	30A 3.33%		
Occupancy Schedule Unocc. Period		80%			_						
Fresh Air Requirements or Outside Air		8 L/s	s.person	16	CFM/perso	n					
Fresh Air Control Type	*(enter a 1, 2 or 3)	1 If F	resh Air Control T	vpe = "2" e	enter % FA, te	o the right:			15%		
(1 = mixed air control, 2 = Fixed fresh air	, 3 100% fresh air)	lf F	resh Air Control T	ype = "3" e	nter Make-u	o Air Ventil	ation and o	peration	0.5 L/s.m ²	0.10 CFM/ft ²	
									50% operation	(%)	
Sizing Factor Total Air Circulation or Design Air Flow		1.3 3.02 L/s	s m²	0.60	CEM/ft ²						
		0.02 2.0		0.00			Separate	Make-up air u	unit (100% OA)	L/s.m ²	CFM/ft ²
Infiltration Rate		0.70 L/s	s.m²	0.14	CFM/ft ²			Operation o	ccupied period	50%	
(air infiltration is assumed to occur during	(unoccupied							Operation u	noccupied period	50%	
nours only if the ventilation system shats	downy										
Economizer		E	Enthalpy Based	Dry-Bu	ulb Based	Total	1	(-			_
	Incidence	of Use	1/1/10	100%		100%		Summary of	f Design Parameters	106.091	
	Switchove		Btu/lbm	64.4	°F			Peak Design	Sensible Load	147.639	
				-			1	Room air er	nthalpy	28.2 Btu/lbm	
Controls Type	System P	resent (%)	HVAC	Room				Discharge a	ir enthalpy	23.4 Btu/lbm	
	All Pneum	atic	Equipment	Controis				Design CFN	ne of air at 55F& 100% R M	6.868	
	DDC/Pneu	umatic						Total air circ	culation or Design air	3.02 l/s.m ²	
	All DDC	uld add up to 1000()	`								
	Total (Sho)								
			Proportional	PI / PID	Total	1					
Control mode	Control M	ode	Eived Discharge	Ponot		-					
	Control St	rategy	ixeu Discharge	Resei							
Indoor Design Conditions	Cummer 7			Room	74.6	l or	4	Supply Air	FF 4 9F	1	
	Summer H	lumidity (%)	50%		/1.0	1.F	100%		55.4 F		
	Enthalpy		65.5	KJ/kg.	28.2	Btu/lbm	54.5	5 KJ/kg.	23.4 Btu/lbm		
	Winter Oc	c. Temperature	21	°C	69.8	°F	15	5 °C	59 °F		
	Winter Oc Enthaloy	c. Humidity	30%	K I/ka	22.8	Btu/lbm	45%	6 5 K I/ka	19.6 Btu/lbm		
	Winter Un	occ. Temperature	18	°C	64.4	°F	40.0	J NJ/Kg.	13.0 Diturbiti	1	
	Winter Un	occ. Humidity	30%			-					
	Enthalpy		50	KJ/kg.	21.5	Btu/lbm					
Damper Maintenance			Incidence	Frequency	(
	Control A	na Adiustra ant	(%)	(years)							
	Lubricatio	n									
	Blade Sea	I Replacement									
Air Filter Cleaning	Changes/	Year									
	g			1						_	
		1			Incidence o	f Annual R	oom Conti	rols Maintenar	nce]	
Incidence of Annual HVAC Controls Main	ntenance										
	Annual Ma	intenance Tasks	Incidence	1			Annual M	aintenance Ta	asks	Incidence	
			(%)				L		· · · · · · · · · · · · · · · · · · ·	(%)	
	Calibration	n of Transmitters					Inspection	n/Calibration of	of Room Thermostat	 	
	Inspection	of Auxiliary Devices	s				Inspection	n of Auxiliary I	Devices	<u>├</u> }	
	Inspection	of Control Devices		1			Inspection	n of Control D	evices (Valves,		
							(Dampers	s, VAV Boxes)		
1											

EXISTING BUILDINGS: Large Accommodation	SIZE: > 100 kW	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing	REGION: Labrador Interconnected	
Baseline				
GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF)	125 Lux 11.6] ft-candles		
Connected Load	12.7 W/m ² 1.2	W/ft ²		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) 100 125 % Distribution 25% 50% Weighted Average	150 300 25%	Total 100% 125
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL System Present (%) 60% 20% CU 0.7 0.7 LLF 0.65 0.65	T12 T8 HID T5HO LED 5% 5% 0% 10% 0.6 0.6 0.6 0.6 0.75 0.80 0.80 0.80 0.80	TOTAL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W) 15 50	72 88 65 95 90	EUI kWh/ft².yr 2.5
LOBBY, BALLROOMS, CORRIDORS Light Level Floor Fraction (ALFF) Connected Load	S, BACK OF HOUSE OTHER 300 Lux 27.5 0.25 23.3 W/m² 2.2] ft-candles		MJ/m².yr 97
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 50%	Light Level (Lux) 300 500 % Distribution 100% Weighted Average	700 1000	Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL System Present (%) 40% 10% CU 0.7 0.7 LLF 0.65 0.65 Efficacy (LW) 15 50	T12 T8 HID T5HO LED 35% 10% 0% 5% 0.6 0.6 0.6 0.6 0.75 0.80 0.80 0.80 0.80 72 88 65 95 90	TOTAL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr 2.9
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27.5	EUT = Load 7	or fraction check: should = 1.00 1.00	MJ/m².yr 114
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 % Distribution 100% Weighted Average		Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CHL 0% 0% CU 0.7 0.7 LLF 0.65 0.65 Efficacy (LW) 15 50	112 18 MH HPS 0.6 0.6 0.6 0.6 0.6 0.75 0.80 0.80 0.55 0.55 72 84 88 65 90	100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LP 15.37 W/m ²	EUI TOTAL kWh/ft².yr 5 MJ/m².yr 210
OFFICE EQUIPMENT & PLUG LOA	DS			
Equipment Type	Computers	Monitors Printers Copier	s Servers Plug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.3 0.4 W/m ² 0.0 W/ft ²	51 100 200 0.3 0.05 0.033 0.01 0.3 W/m² 0.1 W/m² 0.1 W/m² 0.1 W/m² 0.0 W/t² 0.01 W/t² 0.01 W/t² 0.01 W/t²	/m ² 0.1 W/m ² 1.5 W/m ² /ft ² 0.01 W/ft ² 0.14 W/ft ²	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 50% 2000 6760	50% 50% 50% 50% 50% 50% 2000 2000 2000 6760 6760 6760	100% 70% 100% 25% 2500 3000 6260 5760	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.6 W/m ² 1.0 W/m ²	0.2 W/ft ² to see notes (cells with red indicator i 0.1 W/ft ²	n upper right corner, type "SHIFT @@mputer Servers	EUI kWh/ft².yr 0.10 MJ/m².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 59%		Computer Equipment	EUI kwinit:-yr 0.38 MJ/m².yr 14.80 EUI kWh/ft².yr 0.49 MJ/m².yr 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr 1.0 MJ/m².yr 40.0	All Electric EUI EUI kWh/ft2.yr 1.3 MJ/m2.yr 50.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	26		EUI kWh/ft².yr 0.8 MJ/m².yr 30.0
BLOCK HEATERS & MISCELLANE	DUS		Block Heaters Miscellaneous	EUI KWh/ft².yr 0.1 MJ/m².yr 5 EUI KWh/ft².yr 0.1 MJ/m².yr 5

EXISTING BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW		COMMER	CIAL SECT VINTAGE Existing	for Build :	ING PROF	ILE		REGION: Labrador I	nterconne	ected		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ine		Elec	tric		<u> </u>		
riodaling Filank Fypo				Bo	pilers	Packaged	A/A HP	W. S. HP	H/R Chiller	Resistanc	Total		
	Syste	em Present (%)		Stan.	High	Unit				100%	100%		
	Eff./C	COP		70%	80%	70%	1.70	3.00	4.50	1.00			
	(kW/k	(W)			1.20		0.00	0.00	0.22				
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	56.8 W/m ² 464 MJ/m ² .yr 1.00	18.0 12.0	Btu/hr.ft² kWh/ft².yr								F		
Electric Fuel Share	100.0% Fuel Oil / Pro	pane Fuel Share]	Oil Fuel Sha	re]			-	All Electric EUI kWh/ft².yr	12.0
Boiler Maintenance	Annual Maintena	ince Tasks		Incidence	1						L	MJ/m².yr	464
	Eire Oide Incore			(%)	-						F	Fuel Oil / Propane E	UI
	Water Side Inspec	tion ection for Scale Build	dup	100%	-							MJ/m².yr	
	Inspection of Co	ntrols & Safeties		100%	-						Г	Market Composite F	=1.11
	Flue Gas Analys	is & Burner Set-up		90%]						-	kWh/ft².yr	12.0
												MJ/m².yr	464
SPACE COOLING													
A/C Plant Type			Centrifuga	Chillers	Screw	Peciprocat	ting Chillers	Absorption	Chillore	Total	т		
			Standard	HE	Chillers	Open	DX	W. H.	CW	Total			
	Syste COP	em Present (%)	4.7	5.4	4.4	3.6	100.0%	0.9	1	100.0%	-		
	Perfo	rmance (1 / COP)	0.21	0.19	0.23	0.28	0.38	1.11	1.00		1		
	Addit	(VV) ional Refrigerant									+		
	Relat	ed Information											
					1						1		
Control Mode	Incide	ence of Use	Fixed Setpoint	Reset									
	Chille	d Water			-								
	Cond	enser water]								
Setpoint	Chille	d Water	7	ŀc	44.6	°F							
	Cond	enser Water	30	°C	86	°F							
	Supp	ly Air	13.0	°C	55.4	۳F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	35 W/m ² 46.1 MJ/m ² .yr	11 Btu/hr.ft ² 1.2 kWh/ft ² .yr	1080	ft²/Ton									
Sizing Factor	0.85		Operation	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ear)		
A/C Saturation	50.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel Oil / Pro	pane Fuel Share]									
Chiller Maintenance	Annual Maintena	ince Tasks		Incidence	Frequency	1							
		Cofeties 9 D	:4	(%)	(years)								
	Inspect Control, Inspect Coupling	Saleties & Purge Un , Shaft Sealing and E	n Bearings										
	Megger Motors	Clooning											
	Vibration Analys	is											
	Eddy Current Te Spectrochemica	esting I Oil Analysis									Г	All Electric EUI	
					1						-	kWh/ft².yr	0.5
Cooling Tower/Air Cooled Condense	er Maintenan Annual Maintena	ince Tasks		Incidence	Frequency						L	wij/m².yr	19
	Inspection/Clear	Spray Nozzles		(%)	(years)						F	Fuel Oil / Propane E kWb/ft² vr	UI
	Inspect/Service	Fan/Fan Motors										MJ/m².yr	
	Megger Motors Inspect/Verify O	peration of Controls									Г	Market Composite E	UI
												kWh/ft².yr M l/m² yr	0.5
												wio/iir.yi	13
DOMESTIC HOT WATER	_						_						
Service Hot Water Plant Type	Fossil Fuel SHV	V Avg. Tank				Boiler		Fuel Share		Fossil		Elec. Res.	
	Eff./COP	0.65				0.75		Blended Ef	ficiency	0.75		0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	236.6												
Wetting Line Descente	0001			Å	All Electric EL	JI		Fuel C)il / Propan	e EUI] [Market Composite E	UI
wearing use Percentage	90%				MJ/m².yr	260			MJ/m ² .yr	8.1 315		куул/тт².yr MJ/m².yr	260.0



EXISTING BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: Existing	F	REGION: _abrador I	nterconne	ected			
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation a	and Exhau	st Fan Ope	eration & Co	ontrol		
System Design Air Flow 3.0 System Static Pressure CAV 300	L/s.m ² 0.60 D Pa 1.2	CFM/ft ² wg	Control	Ventilation Fixed	on Fan /ariable Flow	Exhau Fixed	ist Fan Variable Flow			
System Static Pressure VAV 300 Fan Efficiency 45% Fan Motor Efficiency 80%	D Pa <u>1.2</u>] wg	Incidence of Use Operation	100% Continuous	Scheduled	100% Continuous	Scheduled			
Fan Design Load CAV 2.1 Fan Design Load VAV 2.5	5 W/m ² 0.23 W/m ² 0.23	W/ft² W/ft²	Comments:	75%	2376	15%	2376			
EXHAUST FANS										
Washroom Exhaust 100 Washroom Exhaust per gross unit area 0.1 Other Exhaust (Smoking/Conference) 0.1 Total Building Exhaust 0.2 Exhaust System Static Pressure 256 Fan Efficiency 259 Fan Motor Efficiency 759 Sizing Factor 1.0 Exhaust Fan Connected Load 0.3	U/s.washroom U/s.m² U/s.m² JPa 6 3 W/m² 0.03	212 CFM/was 0.03 CFM/ft ² 0.05 CFM/ft ² 0.05 CFM/ft ²	shroom							
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tov	ver/Condenser Fans)							
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	ondenser)	0.020 kW/kW 0.70 W/m ²	0.07 kW/Ton 0.07 W/ft ²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.002 L/s.m ² kPa 50% 80% 1.0 W/m ²	3.0 U.S. gpm/Ton 0.003 U.S. gpm/ft ² ft W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.002 100 50% 80% 0.8 0.3	L/s.m² kPa W/m²	0.0022 U.S. gpm/ft ² 2.4 33 ft 0.03 W/ft ²	U.S. gpm/To	on					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption	3500 5260 18.8	hrs./year hrs./year kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	3500 5260 2.4	hrs./year hrs./year kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consur	nption 0.2	kWh/m².yr kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000	hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual Maintenance Task Inspect/Service Fans & M Inspect/Adjust Belt Tensio	ks otors n on Fan Belts	Incidence Frequency (%) (years)					E	1-1 1 16 /642 - 14	
	Inspect/Service Pump & N	NULUIS						EUI	KVVIVIT ² .Vľ MJ/m².Vľ	2.0 77.1

COMMERCIAL SECTOR BUILDING PROFILE										
EXISTING BUILDINGS: SIZE: VINT							REGION:			
Large Accommodation Baseline	:	> 100 kW	Existing				Labrador Interco	nnected		
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	Γ	30.1 kWh/ft².yr 1,165.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².	yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING (SUITES)	2.5	96.8		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr			
LOBBY, BALLROOMS, CORRIDORS	5 2.9	113.7	SPACE HEATING	12.0	463.6					
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	9.4					
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0			
HVAC FANS & PUMPS	2.0	77.1	FOOD SERVICE EQUIPMENT	1.3	50.0					
REFRIGERATION	0.8	30.0								
MISCELLANEOUS	0.1	5.0								
BLOCK HEATERS	0.1	5.0								
COMPUTER EQUIPMENT	0.4	14.8								
COMPUTER SERVERS	0.1	3.7								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								



				COMMER	CIAL SECT	OR BUILD	ING PROF	ILE	
EXISTING BUILDINGS:	SIZE:				VINTAGE	:			REGION:
Small Accommodation	< 100 kW	1			Existing				Labrador Interconnected
CONSTRUCTION									
Wall U value (W/m ² .°C) 0.28	W/m².°C		0.05	Btu/hr.ft ² .	°F		Typical Bu	uilding Size	697 m ² 7,500 ft ²
Roof U value (W/m ² .°C) 0.19	W/m².°C		0.03	Btu/hr.ft ² .	°F		Typical Fo	ootprint (m ²)	697 m ² 7,500 ft ²
Glazing U value (W/m ² .°C) 3.52	W/m².°C		0.62	Btu/hr.ft ² .	°F		Footprint /	Aspect Ratio (L:W)	4
				-			Percent C	onditioned Space	100%
	7						Percent C	onditioned Space	45%
Shading Coefficient (SC) 0.57	-						Typical # 3	Stories	1
							Floor to Fl	loor Height (m)	3.7 m 12.0 ft
VENTILATION SYSTEM BUILDING CONTRO			ONS						
Ventilation System Type			. (6/)	CAV	CAVR	DDMZ	DDMZVV	VAV VAVR	IU 100% O.A TOTAL
		Min Air Flow ((%) 6)	100%				60%	100%
		(Minimum Thro	ttled Air Vo	olume as Pe	ercent of Fu	III Flow)		0070	
						1			
Occupancy or People Density		46	m²/persor	n	495	ft²/person			%OA 4.53%
Occupancy Schedule Unocc. Period		80%							
Fresh Air Requirements or Outside Air		8	L/s.perso	n	16	CFM/persc	n		
Freeh Air Control Turce	1 0 0	· ·	If Erech A	Control -	VD0 101	ntor 0/ EA	o the richt		159/
(1 = mixed air control, 2 = Fixed fresh air 3 100°)	aı,∠or3) % freshair\	1	If Fresh Ai	ir Control T	ype = "2" ei ype = "3" ei	nter Make-u	o me right: o Air Ventil⊧	ation and operation	0.5 L/s.m ² 0.10 CFM/ft ²
	o moon any				<i>)</i> po = 0 0.	nor mano a			50% operation (%)
Sizing Factor		1.3				1			
Total Air Circulation or Design Air Flow		3.60	L/s.m ²		0.71	CFM/ft ²		Senarate Make-un air	(μnit (100% ΟΔ)
Infiltration Rate		0.70	L/s.m ²		0.14	CFM/ft ²		Operation	occupied period 50%
(air infiltration is assumed to occur during unoccu	pied							Operation	unoccupied period 50%
hours only if the ventilation system shuts down)									
Economizer			Enthalp	v Based	Drv-Bu	b Based	Total	T	
	Incidence	of Use			100%		100%	Summary of	of Design Parameters
	Switchove	er Point		KJ/kg.	18	°C		Peak Desig	gn Cooling Load 112,083
				Btu/lbm	64.4	°F		Peak Zone	e Sensible Load 87,862
Controls Type	System P	resent (%)		HVAC	Room			Discharge	air enthalpy 23.4 Btu/lbm
	-			Equipment	Controls			Specific volu	me of air at 55F & 100% R 13.2 ft ³ /lbm
	All Pneum	natic				1		Design CF	M 4,087
	All DDC	umauc						T Otal all Ci	iculation of Design all 3.00 Vs.m-
	Total (sho	ould add-up to 10	0%)						
			Deres			T-1-1	1		
Control mode	Control M	lode	Propo	ortional	PI/PID	Iotai			
			Fixed D	ischarge	Reset				
	Control S	trategy				L]		
Indoor Design Conditions					Room			Supply Air	
indeer Beelgr eenakere	Summer -	Temperature		22	°C	71.6	°F	13 °C	55.4 °F
	Summer I	Humidity (%)		50%			- T	100%	
	Enthalpy Winter Or			65.5	KJ/kg.	28.2	Btu/lbm ∘⊑	54.5 KJ/kg.	23.4 Btu/lbm
	Winter Oc	c. Humidity		30%	C	09.0	1 -	45%	
	Enthalpy			53	KJ/kg.	22.8	Btu/lbm	45.5 KJ/kg.	19.6 Btu/lbm
	Winter Ur	nocc. Temperatu	е	18	°C	64.4	°F		
	Enthalov	IOCC. Humidity		30%	K.I/ka	21.5	Btu/lbm		
	Entraipy				i to/ngi	2110	Branbin		
					-	1			
Damper Maintenance				Incidence	Frequency	1			
	Control A	rm Adjustment		(70)	(years)				
	Lubricatio	n							
	Blade Sea	al Replacement				l			
Air Filter Cleaning	Changes/	Year]				
						Incidonao o	f Appual D	oom Controle Mainton	anaa
Incidence of Annual HVAC Controls Maintenanc	e	٦				incidence o	I Annual R	com controis Maintena	
	- L	_			_				
	Annual Ma	aintenance Tasks		Incidence				Annual Maintenance T	Tasks Incidence
	Calibratio	n of Transmitter		(%)	1			Inspection/Calibration	of Room Thermostat
	Calibratio	n of Panel Gaug	es		1			Inspection of PE Swit	tches
	Inspection	n of Auxiliary Dev	vices		1			Inspection of Auxiliary	/ Devices
	Inspection	n of Control Devi	ces	1]			Inspection of Control	Devices (Valves,
								Loampers, VAV DOXE	<i></i>

EXISTING BUILDINGS: Small Accommodation	SIZE: < 100 kW	COMMERCIAL SECTOR BUILDING PROFIL VINTAGE: Existing	LE REGION: Labrador Interconnected	
LIGHTING GENERAL LIGHTING (SUITES)	125 Juny 116			
Floor Fraction (GLFF) Connected Load	0.85 14.3 W/m ² 1.3] W/ft ²		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Upoccupied Period	2500 6260 50% 25%	Light Level (Lux) 100 125 % Distribution 25% 50% Weighted Average 50%	150 300 25%	Total 100% 125
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL System Present (%) 70% 20% CU 0.7 0.7 LLF 0.65 0.65	T12 T8 HID T5HO LEC 5% 5% 0% 0% 0% 0.6 0.6 0.6 0.6 0.6 0.6 0.75 0.80 0.80 0.80 0.80 0.80	TOTAL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W) 15 50	72 88 65 95 90	EUI kWh/ft².yr 3.2
LOBBY, BALLROOMS, CORRIDOR Light Level Floor Fraction (ALFF) Connected Load	S, BACK OF HOUSE OTHER 27.9 300 Lux 27.9 0.15 23.3 W/m² 2.2] ft-candles]W/ft ²		MJ/m².yr 123
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 50%	Light Level (Lux) 300 500 % Distribution 100% Weighted Average	700 1000	Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC CFL System Present (%) 40% 10% CU 0.7 0.7 LLF 0.65 0.65 Efficacy (L/W) 15 50	T12 T8 HID T5HO LED 35% 10% 0% 5% 0.6 0.6 0.6 0.6 0.75 0.80 0.80 0.80 72 88 65 95 90	TOTAL 100.0%
Relamping Strategy & Incidence of Practice	Group Spot	Ell-Log		EUI kWh/ft².yr 1.8
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27.9 14.0 W/m ² 1.3] ft-candles [Floor fraction check: should = 1.00 1.00]
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 500 % Distribution 100% Weighted Average	700 1000	Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC O'L System Present (%) 0% CU 0.7 0.7 LLF 0.65 0.65 Efficacy (L/W) 15 50	112 18 101 112 100% 0% <td< td=""><td>100.0%</td></td<>	100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LP 15.62 W/m ²	EUI TOTAL kWh/ft².yr 5 MJ/m².yr 191
OFFICE EQUIPMENT & PLUG LOA	DS			
Equipment Type	Computers	Monitors Printers Copi	ers Servers Plug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.3 0.4 W/m ² 0.0 W/ft ²	51 100 200 0.3 0.05 0.033 0.3 W/m² 0.1 W/m² 0.1 0.0 W/tl² 0.01 W/tl² 0.01	217 0.02 W/m² 0.1 W/m² 0.5 W/m² 0.14 W/t² 0.14	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 50% 2000 6760	50% 50% 50% 50% 50% 50% 2000 2000 2000 6760 6760 6760	100% 70% 100% 25% 2500 3000 6260 5760	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.6 W/m² 1.0 W/m²	0.2 W/ft ² to see notes (cells with red indicato	r in upper right corner, type "SHIFT @@imputer Servers	EUI kWh/ft².yr 0.10 MJ/m².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 59%		Computer Equipmen	EUI kWh/tt2.yr 0.38 MJ/m ² .yr 14.80 EUI kWh/ft2.yr 0.49 MJ/m ² .yr 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr 1.0 MJ/m².yr 40.0	Ali Electric EUI EUI kWh/tf2.yr 0.6 MJ/m2.yr 25.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	is		EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
BLOCK HEATERS & MISCELLANE	DUS		Block Heaters Miscellaneous	EUI KWh/ft².yr 0.1 MJ/m².yr 5 EUI KWh/ft².yr 0.1 MJ/m².yr 5


EXISTING BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW	,	COMMER	CIAL SEC [®] VINTAGE Existing	for Build :	NG PROF	ILE		REGION: Labrador	Interconne	cted		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ine		Elec	tric				
				Bo Stan	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)			g.i	700/				100%	100%		
		Eff./COP Performance (1 / Eff.)		70%	80%	70%	1.70	3.00 0.33	4.50	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	65.9 W/m ² 548 MJ/m ² .yr	<u>20.9</u> 14.1	Btu/hr.ft² kWh/ft².yr								F		
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share]	Oil Fuel Sha	re					-	kWh/ft².yr	14.1
Boiler Maintenance	Annual M	aintenance Tasks		Incidence	1						L	MJ/m².yr	548
	Fire Olds	lana a dia a		(%)	-						F	Fuel Oil / Propane El	UI
	Water Side	Inspection de Inspection for Scale Build	dup	100%								MJ/m².yr	
	Inspection	n of Controls & Safeties		100%							Г	Market Composite F	1.11
	Flue Gas	Analysis & Burner Set-up		90%							-	kWh/ft².yr	14.1
												MJ/m².yr	548
SPACE COOLING													
A/C Plant Type					-			1					
			Centrifuga Standard	I Chillers HE	Screw Chillers	Reciprocat Open	ting Chillers DX	sAbsorption W. H.	Chillers CW	Total			
		System Present (%)	4.7				100.0%		4	100.0%			
		Performance (1 / COP)	0.21	0.19	0.23	0.28	0.38	3 0.9 3 1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	octpoint										
		Condenser Water]								
				1.0									
Setpoint		Condenser Water	30	°C	44.6	°F							
		Supply Air	13.0	°C	55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	40 W/m ² 51.4 MJ/m ² .yr	13 Btu/hr.ft² 1.3 kWh/ft².yr	945	ft²/Ton									
Sizing Factor	0.85		Operation	(occ. perio	3000	hrs/year	Note valu	e cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation	50.0%												
(Incidence of A/C)	00.070												
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		1									
Chiller Maintenance	Appuel M	aistananaa Taaka		Incidence	Frequency								
Crimer Waintenance	Annuariti	antenance rasks		(%)	(years)								
	Inspect C Inspect C	ontrol, Safeties & Purge Ur oupling, Shaft Sealing and I	nit Bearings										
	Megger N	Notors	g										
	Vibration	ar Tube Cleaning Analysis											
	Eddy Cur	rent Testing									F	All Electric ELU	
	Specifici	leffical Off Analysis									-	kWh/ft².yr	0.5
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency							MJ/m².yr	21
				(%)	(years)						F	Fuel Oil / Propane El	UI
	Inspect/s	ervice Fan/Fan Motors										kVVh/tt².yr MJ/m².yr	
	Megger N	Notors									- -	Market Composite F	
	inspect/v	entry Operation of Controls									_	kWh/ft².yr	0.5
												MJ/m².yr	21
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue	el SHW Avg. Tank				Boiler	Ι			Fossil		Elec. Res.	
	System P	Present (%)				0%		Fuel Share	ficiency	0%		100%	
Service Hot Water load (MJ/m ² .yr)	236.6	0.65	1	I	1	0.75	1	Diended Et	поненсу	0.75		0.91	
(Tertiary Load)					All Electric FI	JI]	Fuel C)il / Propar	e EUI	Г	Market Composite F	UI
Wetting Use Percentage	90%				kWh/ft².yr	6.7	1		kWh/ft².yr	8.1	F	kWh/ft².yr	6.7
				1	MJ/m².yr	260	I	1	wJ/m².yr	315		MJ/m².yr	260.0



EXISTING BUILDINGS: Small Accommodation Baseline	CO SIZE: < 100 kW	MMERCIAL SECTOR BUILDING PROFILE VINTAGE: Existing	REGION: Labrador Interconnected
HVAC FANS & PUMPS			
SUPPLY FANS			Ventilation and Exhaust Fan Operation & Control Ventilation Fan Exhaust Fan
System Design Air Flow Image: CAV System Static Pressure CAV Image: CAV System Static Pressure VAV Image: CAV Fan Efficiency 4 Fan Motor Efficiency 8 Sizing Factor 0. Fan Design Load CAV Image: CAV Fan Design Load VAV Image: CAV	3.6 L/s.m ² 0.71 CFM/ft ² 300 Pa 1.2 wg 300 Pa 1.2 wg 5%	Control Incidence of Use Operation Incidence of Use Comments:	Fixed Variable Fixed Variable Flow Flow Flow Flow 100% 100% Continuous Scheduled 75% 25% 75% 25%
EXHAUST FANS			
Washroom Exhaust 1 Washroom Exhaust per gross unit are () Other Exhaust (Smoking/Conference) () Total Building Exhaust () Exhaust System Static Pressure 2 Fan Efficiency 2 Fan Motor Efficiency 7 Sizing Factor () Exhaust Fan Connected Load ()	00 L/s.washroom 212 Cf 0.3 L/s.m² 0.06 Cf 0.1 L/s.m² 0.02 Cf 0.4 L/s.m² 0.08 Cf 0.4 L/s.m² 0.08 Cf 250 Pa 1.0 wg 5% 5% 0.5 0.3 0.3 W/m² 0.02 W/ft²	FM/washroom FM/t² FM/t² FM/t² 9	
AUXILIARY COOLING EQUIPMENT (Conde	enser Pump and Cooling Tower/Condense	er Fans)	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled	0.020 kW 0.80 W	//kW 0.07 kW/Ton //m ² 0.07 W/ft ²	
Condenser Pump			
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.053 L/s 0.002 L/s 50% 80% 0.5 W	S.KW 3.0 U.S. gpm/Ton .m ² 0.003 U.S. gpm/ft ² Pa ft ft //m ² W/ft ² W/ft ²	
CIRCULATING PUMP (Heating & Cooling)			
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.002 L/s.m ² 100 kPa 50% 80% 0.5 0.2 W/m ²	0.0025 U.S. gpm/ft ² 2. 33 ft 0.02 W/ft ²	₄U.S. gpm/Ton
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption	3500 hrs./year 5260 hrs./year 11.2 kWh/m².yr		
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	3500 hrs./year 5260 hrs./year 1.9 kWh/m².yr		
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cons	sumption 0.3 kWh/m².yr		
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	5000 hrs./year kWh/m².yr		
Fans and Pumps Maintenance	Annual Maintenance Tasks Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors	Incidence Frequency (%) (years)	EUI kWh/ff2.yr 1.2 MJ/m².yr 48.1

			COMMERCIAL SECT	or Buildi	NG PROFILE				
EXISTING BUILDINGS:		SIZE:	VINTAGE:				REGION:		
Baseline		< 100 KW	Existing				Labrador Interconnected	1	
EUI SUMMARY									
TOTAL ALL END-USES:	Electricity:	[30.0 kWh/ft².yr 1,162.4 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft ² .yr	0.0 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane		
GENERAL LIGHTING (SUITES)	3.2	123.0		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr		
LOBBY, BALLROOMS, CORRIDORS	1.8	68.2	SPACE HEATING	14.1	547.9				
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.3	10.6				
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0		
HVAC FANS & PUMPS	1.2	48.1	FOOD SERVICE EQUIPMENT	0.6	25.0				
REFRIGERATION	0.4	15.0							
MISCELLANEOUS	0.1	5.0							
BLOCK HEATERS	0.1	5.0							
COMPUTER EQUIPMENT	0.4	14.8							
COMPUTER SERVERS ELEVATORS	0.1	3.7							
OUTDOOR LIGHTING	0.4	17.0							



			COMME	RCIAL SEC	TOR BUILDING	PROFILE				
EXISTING BUILDINGS:	SIZE:			VINTAGE:				REGION:		
Health Care Baseline	All			Existing				Labrador Interconnected		
CONSTRUCTION										
Wall U value (W/m ² .°C) 0.	33 W/m².°C		0.06 Btu/hr.ft ²	.°F	Турі	cal Building Siz	e	8,829 m ²	95,000 ft ²	
Roof U value (W/m ² .°C) 0.	33 W/m².°C		0.06 Btu/hr.ft ²	.°F	Tvpi	cal Footprint (n	n²)	2.943 m ²	31.667 ft ²	
Glazing U value (W/m ² °C) 3	52 W/m ² °C		0.62 Btu/br ft ²	°F	Foot	print Aspect R	atio (L·W)	2		
Glazing o value (Wini : C) 3.	JZ W/III C		0.02 Diamini		Perc	ent Conditione	d Space	100%		
					Perc	ent Conditione	d Space	45%		
Window/Wall Ratio (WIWAR) (%) 0.	15				Defi	ned as Exterior	Zone			
Shading Coefficient (SC) 0.	65				Турі	cal # Stories		3		
					Floo	r to Floor Heig	ht (m)	3.7 m	12.0 ft	
VENTILATION SYSTEM BUILDING CONTR	2015 & IND		s							
PERIOR OF OF EM, BOILDING CONT			0							
Ventilation System Type			CA	V CAVR	DDMZ DDM	AZVV VA	VAVR	IU 100% O.A TC	TAL	
		System Present (*	%) 80%	6		20	%	1	00%	
		Min. Air Flow (%)				50	%			
		(Minimum motue	a Air volume as r	rercent or Fu	ii FiOW)					
Occupancy or People Density		30 m	² /person	323	ft²/person			%OA 9.76%		
Occupancy Schedule Occ. Period		90%								
Occupancy Schedule Unocc. Period		75%								
Fresh Air Requirements or Outside Air		15 L	/s.person	32	CFM/person					
Freeh Air Control Turne */ent		4 14	Freeh Air Centrel	Tumo "2" or	ter 0/ FA to the	i alati	r	450/		
(enter (1 = mixed air control 2 - Fixed freeb air 2 10	n a 1, 2 0r 3) 10% freeb air∖		Fresh Air Control	1 ype = "2" er Type = "3" or	iter % FA. to the	ignt: /entilation and	operation	15% 0.5 1 /s m²	0.10 CEM/ft2	
	o /o neonair)			iype = 5 ei	iter make-up Air	entilation and	operation	50% operation (%)	0.10 01 10/11	
Sizing Factor		3								
Total Air Circulation or Design Air Flow		5.12 L	/s.m²	1.01	CFM/ft ²					
						Separate	e Make-up air	unit (100% OA)	L/s.m ²	CFM/ft ²
Infiltration Rate		0.70 L	/s.m²	0.14	CFM/ft ²		Operation of	occupied period	50%	
(air inflitration is assumed to occur during uno	ccupied						Operation	inoccupiea perioa	50%	
hours only if the ventilation system shuts down	9									
Economizer			Enthalpy Based	Dry-Bul	b Based	Total				
	Incidence	of Use		100%		100%	Summary o	f Design Parameters		
	Switchove	er Point	KJ/kg.	18	°C		Peak Desig	n Cooling Load ####	4###	
			Btu/lbm	64.4	°F		Peak Zone	Sensible Load 686,	735	
	Svetom B	recent (%)	HVAC	Room			Room air e	nthalpy air enthalpy	28.2 Btu/lbm 23.4 Btu/lbm	
Controls Type	System F	resent (76)	Equipmer	nt Controls			Specific volum	ne of air at 55E & 100% R H	13.2 ft ³ /lbm	
	All Pneum	atic	Equipmo	N OOTNOO			Design CFN	VI 31.	.947	
	DDC/Pne	umatic					Total air cir	culation or Design air fk 5.1	2 l/s.m ²	
	All DDC									
	Total (sho	ould add-up to 100%	6)							
	-		Bronortional		Total					
Control mode	Control M	ode	Порониона	11/110	rotar					
	Condorn	000	Fixed Discharge	Reset						
	Control S	trategy	Ť							
				_						
Indoor Design Conditions	C.mmor		2	Room	75.0 %5		Supply Air	57.0 °F		
	Summer	lemperature	509	4 0	75.2 F	100	%	57.2 F		
	Enthalpy	lamany (70)	65.	5 KJ/ka.	28.2 Btu/	bm 54	.5 KJ/ka.	23.4 Btu/lbm		
	Winter Oc	c. Temperature	2	4°C	75.2 °F	16	i.5 °C	61.7 °F		
	Winter Oo	c. Humidity	30%	6		45	%			
	Enthalpy		5	3 KJ/kg.	22.8 Btu/	bm 45	5.5 KJ/kg.	19.6 Btu/lbm		
	Winter Ur	occ. Temperature	2	4 °C	75.2 °F					
	Enthalov	IOCC. Humidity	30%	0 K I/ka	21.5 Btu	hm				
	Lindipy		5	u Ku/kg.	21.5 Dia	Iom				
Damper Maintenance		-	Incidence	e Frequency						
			(%)	(years)						
	Control A	rm Adjustment								
	Blade Se	al Replacement								
	2.000 00		1							
Air Filter Cleaning	Changes/	Year								
Insidence of Annual HVAC Controls Mainten		7			Incidence of Ann	al Room Cor	trols Maintena	ance		
Incluence of Annual HVAC Controls Maintena	nce									
	Annual M	aintenance Tasks	Incidence	e			Aaintenance T	asks	ence	
			(%)			, and a local in		(%	a)	
	Calibratio	n of Transmitters	()			Inspectio	on/Calibration	of Room Thermostat		
	Calibratio	n of Panel Gauges		4		Inspectio	on of PE Swite	ches		
	Inspection	n of Auxiliary Device	es	4		Inspectio	on of Auxiliary	Devices		
	Inspection	n or Control Device	s	_		Inspectio	on of Control [Devices (Valves,		
						Uampe	IS, VAV DUXES	2/]	

EXISTING BUILDINGS: Health Care Baseline	SIZE: All	COMMERCIAL SECTOR BUILDING PR VINTAGE: Existing	REGION: Labrador Interconnected	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	250 Lux 23 0.40 8.8 W/m ² 0	2 ft-candles		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 40%	Light Level (Lux) 50 1 % Distribution Weighted Average	00 200 300 50% 50%	Total 100% 250
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 1% 5% 5 CU 0.7 00 0.1 0.65 0.6 LLF 0.65 0.6 5 0.6 0.6 0.7 0.6 0.7 0.6 0.6 0.7 0.6 0.7 0.6 0.7 0.6 0.7 0.6 0.7 0.7 0.6 0.7 0.7 0.7 0.6 0.7 0.7 0.6 0.7 0.7 0.7 0.7 0.6 0.7 0.7 0.7 0.6 0.7 0.6 0.7 0.6 0.7 0.7 0.6 0.7 0.7 0.7 0.6 0.7 0.7 0.6 0.7 0.	1 1	6 100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr 1.1 M.l/m².yr 44
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46 0.60 U/m² 1	.5 It-candles .6 W/tt²		,
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 65% 20%	Light Level (Lux) 300 5 % Distribution 100 Weighted Average		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC C System Present (%) 4% 5 CU 0.7 0 LLF 0.65 0.6 Efficacy (LW) 15 5	PL 112 18 110 1810 Let 5% 50% 40% 0% 19 7 0.6 0.6 0.6 0.6 55 0.75 0.80 0.80 0.80 50 72 88 65 95 90	6 100.0%
of Practice	Group Spot	EUI = 1	Load X Hrs. X SF X GLFF	EUI kWh/ft².yr 5.4 MJ/m².yr 209
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	250.00 Lux 23 11.9 W/m ² 1	2 ft-candles	Floor fraction check: should = 1.00 1.00]
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 100%	Light Level (Lux) 200 3 % Distribution 50% 50 Weighted Average	00 500 700 9%	Total 100% 250
Fixture Cleaning: Incidence of Practice Interval	years	Incol Incol System Present (%) 15% 15 CU 0.7 00 LLF 0.65 0.6 Efficacy (L/W) 15 5	In In In In In \$% 20% 50% 09 09 In 0.6 0.6 0.6 0.6 0.6 55 0.75 0.80 0.85 0.55 0.55 50 72 88 88 65 90	6 100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LPD 13.72 W/m ²	EUI TOTAL kWh/ft².yr 7 MJ/m².yr 254
OFFICE EQUIPMENT & PLUG LOA	DS			_
Equipment Type Measured Power (W/device) Density, (device/occupant)	54.55	Monitors Printers C	Copiers Servers Plug Loads 00 217 0.04	-
Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.9 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	0.8 W/m² 0.1 W/m² 0 0.1 W/t² 0.1 W/m² 0 90% 90% 90% 90 50% 50% 50 50 2000 2000 200 200 6760 6760 67 67	1.1 W/m² 0.3 W/m² 3.85 W/m² 01 W/tt² 0.02 W/tt² 0.36	
Total end-use load (occupied period) Total end-use load (unocc. period)	5.4 W/m² 2.2 W/m²	0.5 W/ft ² to see notes (cells with red india 0.2 W/ft ²	cator in upper right corner, type "SHIFT F£omputer Server Computer Equipmer	s EUI kWh/ft².yr 0.2 MJ/m².yr 8.10 tt EUI kWh/ft².yr 0.9
Usage during occupied period Usage during unoccupied period	100% 40%		Plug Load	MJ/m ² .yr 35.0 s EUI kWh/ft ² .yr 1.7 MJ/m ² .yr 67.3
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.0	Fuel Oil / Propane EUI EUI kWh/ft².yr 3.1 MJ/m².yr 120.0	All Electric EUI EUI kWh/t².yr 2.1 MJ/m².yr 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in cool	lers/freezers, refrigerated buffet ca	ses		EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
BLOCK HEATERS & MISCELLANE	DUS		Block Heater Miscellaneou	s EUI KWh/ft².yr 0.1 MJ/m².yr 5 s EUI KWh/ft².yr 0.1 MJ/m².yr 5



EXISTING BUILDINGS: Health Care Baseline	SIZE: All		COMME	RCIAL SEC VINTAGE Existing	CTOR BUILI	DING PROF	FILE		REGION: Labrador In	terconnect	ed		
SPACE HEATING													
Heating Plant Type]			Fu	uel Oil / Propa	ane		Ele	ectric]	
				Bo Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		10% 70%	80%	70%	1.70	3.00	4.50	90% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	29.1 W/m ² 229 MJ/m ² .yr	9.2 5.9	Btu/hr.ft ² kWh/ft².yr									All Electric	FIII
Electric Fuel Share	90.0% Fuel Oi	I / Propane Fuel Share	10.0%	2	Oil Fuel Sha	re]				kWh/ft²	.yr 5.9
Boiler Maintenance	Annual Mai	intenance Tasks		Incidence								MJ/II+.	yi 229
	Fire Side Ir	nspection		(%)								Fuel Oil / Prop kWh/ft2	yr 8.5
	Water Side Inspection	Inspection for Scale Build of Controls & Safeties	dup	100%	<u>,</u>							MJ/m².	yr 328
	Inspection Flue Gas A	of Burner nalysis & Burner Set-up		100%))							Market Compo kWh/ft ²	osite EUI .yr 6.2
												MJ/m².	yr 239
SPACE COOLING													
A/C Plant Type]	 I	Centrifuga	al Chillers	Screw	Reciprocat	ing Chillers	Absorptior	Chillers	Total]		
		System Present (%)	Standard	HE 50.0%	Chillers	Open	DX 50.0%	W. H.	CW	100.0%	-		
		COP Performance (1/COP)	4.7	7 5.4 0.19	4.4	3.6 0.28	2.7	0.9	1				
		(kW/kW)	0.2		0.20	0.20	0.01						
		Related Information											
Control Mode	1	Incidence of Llos	Fired	Deset	ו								
Control Mode		Incidence of Ose	Setpoint	Resel									
		Chilled Water Condenser Water			-								
Setpoint		Chilled Water Condenser Water Supply Air	7 30 14.0	°C °C °C	44.6 86 57.2	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	54 W/m² 51.5 MJ/m².yr	17 Btu/hr.ft² 1.3 kWh/ft².yr	704	ft²/Ton									
Sizing Factor	1.00		Operation	(occ. perio	3000	hrs/year	Note value	e cannot be	less than 2,9	00 hrs/year	.)		
A/C Saturation (Incidence of A/C)	35.0%												
Electric Fuel Share	100.0% Fuel Oi	I / Propane Fuel Share		Ι									
Chiller Maintenance	Annual Mai	intenance Tasks		Incidence	Frequency								
	Inspect Co	ntrol, Safeties & Purge Un	nit Rooringo	(/0)	()ouroy								
	Megger Mo	otors	searings										
	Vibration A	nalysis											
	Eddy Curre Spectroche	ent Testing Emical Oil Analysis										All Electric	EUI
												kWh/ft² MJ/m².	.yr 0.5 yr 21
Cooling Tower/Air Cooled Condense	er Maintenan Annual Mai	ntenance Tasks		Incidence (%)	Frequency (years)							Fuel Oil / Prop	ane EUI
	Inspection/ Inspect/Set	Clean Spray Nozzles rvice Fan/Fan Motors										kWh/ft². MJ/m².v	.yr vr
	Megger Mo	otors										Market Compo	osite ELII
	inspective.]						kWh/ft²	yr 0.5
												wi3/11*.)	yı 21
Service Hot Water Bloot Tuno	Econil Fuel			1	1	Boilor	1			Fossil		Flec Rec	
Service Hot water Plant Type	System Pre	esent (%)				0%		Fuel Share	fiele	0%		100%	
Service Hot Water load (MJ/m².yr)	Eff./COP 118.3	0.65	1	1	I	0.75	1	Biended E	mciency	0.75	I	0.91	
(Tertiary Load)					All Electric El	II]	Fuel	Oil / Propane	EUI]	Market Compo	osite EUI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	3.4 130			kWh/ft².yr MJ/m².yr	4.1 158		kWh/ft² M.I/m²	.yr 3.4 vr 130.0



			COMME	RCIAL SEC	TOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:			VINTAGE			REGION:					
Health Care	All			Existing			Labrador Int	erconnect	ed			
Baseline												
SUPPLY FANS						Ventilation	and Exhaust	Fan Opera	ation & Con	trol		
	_					Ventila	ation Fan	Exhau	ust Fan			
System Design Air Flow 5.	1 L/s.m ²	1.01	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
System Static Pressure CAV /5	DO Pa	3.0	wg	Incidence		0.00/	FIOW 20%	100%	Flow			
Fan Efficiency 52	90 Fa %	3.0	wy	Operation	JI USE	Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 85	%			opolation		Continuou						
Sizing Factor 1.0	0			Incidence of	of Use	80%	20%	80%	20%			
Fan Design Load CAV 8	.7 W/m ²	0.81	W/ft ²									
Fan Design Load VAV 8.	7 W/m ²	0.81	W/ft ²		Comments:							
EXHAUST FANS												
Washroom Exhaust 10	0 L/s.wash	room	212 CFM/was	hroom								
Washroom Exhaust per gross unit area 0.	1 L/s.m ²		0.01 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0.	5 L/s.m ²		0.10 CFM/ft ²									
Exhaust System Static Pressure 26	6 L/S.M ²		0.11 CFM/ft ²									
Fan Efficiency 25	%		1.0 Wg									
Fan Motor Efficiency 75	%											
Sizing Factor 1.	0											
Exhaust Fan Connected Load 0	.8 W/m ²	0.07	W/ft ²									
AUXILIARY COOLING FOUIRMENT (Conden	eor Pump	and Cooling Toy	er/Condenser Fans									
ADVIENT COOLING EQUITIMENT (CONDEN			rencondenser rans									
Average Condenser Fan Power Draw			0.017 kW/kW		0.06 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser)		0.89 W/m ²		0.08 W/ft ²							
Condenser Pump												
Pump Design Flow			0.053 I /s KW		30 U.S. gpm/Top							
Pump Design Flow per unit floor area			0.003 L/s.m ²		0.004 U.S. gpm/ft ²							
Pump Head Pressure			100 kPa		33 ft							
Pump Efficiency			50%									
Pump Motor Efficiency			80%									
Sizing Factor			1.0 0.71 W/m2		0.07 \W/ft2							
Pump Connected Load			0.71 W/m-		0.07 W/II2							
CIRCULATING PUMP (Heating & Cooling)												
			L									
Pump Design Flow @ 5 °C (10 °F) delta T		0.002	L/s.m ²	0.0034	U.S. gpm/ft ² 2.4	4 U.S. gpm/	Ton					
Pump Head Pressure		100	кра	33	π							
Pump Motor Efficiency		80%										
Sizing Factor		0.8										
Pump Connected Load		0.5	W/m ²	0.04	W/ft ²							
Supply Fap Occ. Reriad		4000	brs /vear									
Supply Fan Unocc. Period		4000	hrs./year									
Supply Fan Energy Consumption		61.6	kWh/m².yr									
			-									
Exhaust Fan Occ. Period		4000	hrs./year									
Exhaust Fan Unocc. Period		4760	hrs./year									
Exhaust Fan Energy Consumption		5.9	ĸvv⊓/m².yf									
Condenser Pump Energy Consumption		0.8	kWh/m².vr									
Cooling Tower /Condenser Fans Energy Consu	Imption	0.2	kWh/m².yr									
Circulating Pump Yearly Operation		7000	hrs./year									
Circulating Pump Energy Consumption		0.3	kWh/m².yr									
Fans and Pumps Maintenance		aintenance Task	s	Incidence	Frequency							
	, the local live		~	(%)	(years)							
	Inspect/S	ervice Fans & M	otors	() ~ /	\ / · · · ·/							
	Inspect/A	djust Belt Tensio	n on Fan Belts	-								
	Inspect/S	ervice Pump & N	lotors	L						EUI	kWh/ft².yr	6.4
1										1	M I/m ² vr	248.0



			COMMERCIAL SEC	TOR BUILD	ING PROFIL	E		
EXISTING BUILDINGS:	:	SIZE:	VINTAGE:			I	REGION:	
Health Care		All	Existing			1	_abrador Interconnected	
Baseline								
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		28.6 kWh/ft².yr 1,108.7 MJ/m².yr	Fuel Oil /	Propane:	0.8 kWh/ft ² .yr	32.8 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	1.1	44.2	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	5.4	209.4	SPACE HEATING	5.3	206.5	0.8	32.8	
TERTIARY LIGHTING			SPACE COOLING	0.2	7.3			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0	
HVAC FANS & PUMPS	6.4	248.0	FOOD SERVICE EQUIPMENT	2.1	80.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.4	15.0						
COMPUTER EQUIPMENT	0.9	35.0						
COMPUTER SERVERS	0.2	8.1						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.9	33.9						



				COMMER	CIAL SEC	TOR BUILD	ING PROP	FILE							
EXISTING BUILDINGS:	SIZE:				VINTAGE	:			1	REGION					
Schools	All								I	Labrador	Interconn	ected			
CONSTRUCTION												-			
	-			7								-			
Wall U value (W/m ² .°C) 0.28	W/m².°C		0.05	Btu/hr.ft ² .	°F		Typical B	uilding Size			3,717	m²	40,0	000 ft ²	
Roof U value (W/m ² .°C) 0.28	W/m ² .°C		0.05	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²)			3,717	m²	40,0)00 ft ²	
Glazing U value (W/m ² .°C) 3.52	W/m ² .°C		0.62	Btu/hr.ft ² .	°F		Footprint	Aspect Ratio	o (L:W)		ł	5			
							Percent C	onditioned	Space		100%	0			
Window/Wall Ratio (WIWAR) (%) 0.13							Defined a	s Exterior Zo	one		507	2			
Shading Coefficient (SC) 0.65	i i						Typical #	Stories				1			
							Floor to F	loor Height	(m)		3.7	m	1:	2.0 ft	
VENTILATION SYSTEM, BUILDING CONTRO	LS & IND	OOR CONDITIO	ONS									-			
Mantilation Oceana Trans				0.01	0.01/0	DDM			VAVD		14000/ 0	A TOT			
ventilation System Type		System Preser	nt (%)	100%	CAVR			VAV	VAVR	IL	J 100% O.A	10	AL 0%		
		Min. Air Flow (%)	10070				50%					070		
		(Minimum Thro	ttled Air Vo	olume as P	ercent of Fi	ull Flow)									
Occupancy or People Density		10	m²/perso	n	108	ft²/person				%OA	18,16%	6			
Occupancy Schedule Occ. Period		90%	in /perce		100	, it /poiloon				///	10.107	2			
Occupancy Schedule Unocc. Period															
Fresh Air Requirements or Outside Air		6	L/s.perso	n	13	CFM/perso	on								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1	If Fresh A	ir Control T	ype = "2" e	enter % FA. t	o the right:		Т	34%	6			7	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)		If Fresh A	ir Control T	ype = "3" e	nter Make-u	p Air Ventil	ation and op	peration	0.5	5 L/s.m ²	0	.10 CFM/ft ²	:	
O'aina Fastar	L.,	10								50%	operation	(%)]	
Sizing Factor Total Air Circulation or Design Air Flow		3.30	L/s.m ²		0.65	CFM/ft ²									
· · · · · · · · · · · · · · · · · · ·								Separate N	Make-up air	unit (1009	% OA)		L/s.m ²		CFM/ft ²
Infiltration Rate		0.42	L/5.192	_	0.08	CFM/ft ²			Operation of	occupied	period	50	0%		
(air infiltration is assumed to occur during unoccur bours only if the ventilation system shuts down)	lpied								Operation u	Inoccupie	a period	50	0%		
Economizer			Enthalp	y Based	Dry-Bu	ulb Based	Total	1.	1-						
	Incidence	of Use		14.18	100%		100%	2	Summary of	of Design	Parameter	S 047.4	10		
	Switchove	er Point		кJ/кg. Btu/lbm	64.4	°F			Peak Desig	Sensible	Load	947,1 424.3	35		
	L				•	_	1	- /	Room air e	nthalpy		28	3.2 Btu/lbm		
Controls Type	System P	resent (%)		HVAC	Room				Discharge	air enthalp	ру	23	3.4 Btu/lbm		
	All Pneum	natic		Equipmen	t Controls				Specific volur Design CFI	me of airant M	6F & 100%	R 1; 197	3.2 ft³/lbm 40		
	DDC/Pne	umatic							Total air cir	culation c	or Design ai	ir 🕶 3.30) l/s.m ²		
	All DDC														
	Total (sho	build add-up to 10	10%)												
			Prop	ortional	PI / PID	Total									
Control mode	Control M	lode	Eine d E	No. alta anna	Deret										
	Control S	trategy	FIXED L	Ischarge	Reset										
	o on all of o	lialogy					_								
Indoor Design Conditions		_			Room	· · · · ·	T		Supply Air			-			
	Summer	l emperature		21	°C	69.8	¶°F	13	°C	55.4	4]°⊢				
	Enthalpy	Humaity (78)		65.5	KJ/ka.	28.2	Btu/lbm	54.5	KJ/ka.	23.4	Btu/lbm				
	Winter Oc	cc. Temperature		21	°C	69.8	°F	15	°C	59	9°F	-			
	Winter Oc	cc. Humidity		30%		00.0	D1///	45%	14.10.00	40.0	D1//				
	Enthalpy Winter Lin		re	18.8	KJ/kg.	22.8	Btu/Ibm	45.5	KJ/kg.	19.6	Btu/Ibm				
	Winter Ur	occ. Humidity		30%		00.0	<u>.</u>								
	Enthalpy			50	KJ/kg.	21.5	Btu/lbm								
Damper Maintenance				Incidence	Frequency	1									
				(%)	(years)										
	Control A	rm Adjustment													
	Lubricatio	n al Renlacement													
	Diado Col	arropidoomoni			1	_									
					7										
Air Filter Cleaning	Changes/	Year													
						Incidence o	f Annual R	oom Contro	ols Maintena	ance		1			
Incidence of Annual HVAC Controls Maintenance	e											-			
		aintenance Taolo	2	Incidence	1				intenance T	asks		Incider) Ce		
		an acriance i dSK	-	(%)				, thirddi ivid		4010		(%))		
	Calibratio	n of Transmitters	3		1			Inspection/	/Calibration	of Room	Thermosta	at			
	Calibratio	n of Panel Gaug	es		4			Inspection	of PE Swite	ches		+			
	Inspection	n of Control Devi	rices		-			Inspection	of Control F	Devices (Valves	+	-		
				1	-			(Dampers,	VAV Boxes	s)		1			

EXISTING BUILDINGS: Schools	SIZE: All	COMMER	CIAL SECTOR E VINTAGE:	BUILDING F	PROFILE	E	F	REGION: _abrador Ir	terconnected	ł			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 44 0.85 14.7 W/m ²	6.5 ft-candles											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 85% 15%	Light Level (Lux) % Distribution Weighted Average		300	500 100%	700 T12	1000		тено	LED	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	70% 0.6 0.75 72	30% 0.6 0.80 88	0.6	0% 0.6 0.80 95	0% 0.6 0.80 90	100.0%	-	
Relamping Strategy & Incidence of Practice	Group Spot						·			E	UI	kWh/ft².yr	3.1
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	400 Lux 3 0.15 16.6 W/m ²	7.2 ft-candles										wi5/iiiyi	122
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 15%	Light Level (Lux) % Distribution Weighted Average		400 100%	500	700	1000		7510		Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		10% 0.7 0.65 15	0.7 0.65 50	112 15% 0.6 0.75 72	10% 0.6 0.80 88	0.6 0.80 65	20% 0.6 0.80 95	5% 0.6 0.80 90	100.0%	-	
Relamping Strategy & Incidence of Practice	Group Spot			FUI	= Load	XHrs XS	F X GI FF			E	UI	kWh/ft².yr M.I/m² yr	0.6
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 2'	7.9 ft-candles W/ft ²			FI	oor fractio	n check: s	should = 1.0	00	1.00			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 10%	Light Level (Lux) % Distribution Weighted Average		300 100%	500	700	1000				Total 100% 300		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	0.6 0.55 90	TOTAL		
Relamping Strategy & Incidence of Practice	Group Spot									E	UI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							(Overall LP	14.96 W/r	n² E	UI TOTAL	. kWh/ft².yr MJ/m².yr	4 147
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Computers	Monitors	Printers		Copie	rs	Serv	ers	Plug Load	ds			
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.05 0.3 W/m ² 0.0 W/ft ²	51 0.05 0.3 W/m ² 0.0 W/ft ²	100 0.02 0.2 W/m ² 0.02 W/ft ²		200 0.02 0.4 W 0.04 W	//m² //ft²	217 0.01 0.1 0.01	N/m² N/ft²	0.2 W/r 0.02 W/f	n² t²			
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 50% 2000 6760	90% 50% 2000 6760		90% 50% 2000 6760		100% 100% 2000 6760		100% 50% 3000 5760				
Total end-use load (occupied period) Total end-use load (unocc. period)	1.3 W/m ²	0.1 W/ft ² 0.1 W/ft ²	to see notes (cel	lls with red ir	ndicator	in upper rig	ght corner,	type "SHIF	T Camputer S	Servers E	UI	kWh/ft².yr MJ/m².yr	0.10 3.68
Usage during occupied period Usage during unoccupied period	100% 59%								20mputer Equ	Loads E	UI	kWh/tt².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.54 21.01 0.11 4.23
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fue	I Sh	Electricity Fuel S	Share: 10	00.0%	E	Fuel O	il / Propane Wh/ft².yr MJ/m².yr	EUI 0.2 8.0	E	AI	l Electric EUI kWh/ft².yr MJ/m².yr	0.1
REFRIGERATION Provide description below:]							E	UI] kWh/ft².yr M.1/m².yr	0.03
BLOCK HEATERS & MISCELLANE	ous												1.1
									Block H Miscella	leaters E aneous E	UI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.0 2 0.0 2

EXISTING BUILDINGS: Schools	SIZE: All	c	OMMERCIA VII	AL SECTO NTAGE:	or Buildi	NG PROFI	LE	l	REGION: Labrador I	nterconne	cted		
SPACE HEATING													
Heating Plant Type				Fue	I Oil / Propar	ne		Elec	tric			L	
			:	Boi Stan.	ers F High	Packaged Unit	A/A HP	W. S. HP I	H/R Chiller	Resistance	Total	1	
		System Present (%) Eff /COP		20% 70%	80%	70%	1 70	3.00	4 50	80%	100%	1	
		Performance (1 / Eff.)		1.43	1.25	1.43	0.59	0.33	0.22	1.00		1	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	41.1 417 W/m² MJ/m².yr	13.0 B 10.8 ki	8tu/hr.ft² Wh/ft².yr		I			<u> </u>			<u> </u>	All Flectric FUI	
Electric Fuel Share	80.0%	Fuel Oil / Propane Fuel Sh	20.0%	(Jil Fuel Shar	e]				kWh/ft².yr	10.8
Boiler Maintenance	Annual Ma	aintenance Tasks	In	cidence							l	MJ/IIF.yi	417
	Fire Side Water Sid Inspection Inspection Flue Gas	nspection e Inspection for Scale Buildup i of Controls & Safeties i of Burner Analysis & Burner Set-up	p	(%) 75% 100% 100% 90%								Huel OI / Propane E kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	UI 15.4 595 UI 11.7 453
SPACE COOLING													
A/C Plant Type		COP COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Cl Standard 2.5 0.40	hillers HE 5.4 0.19	Screw Chillers 4.4 0.23	Recproctir Open 3.6 0.28	ng Chillers DX 100.0% 2.7 0.37	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%	- - - -		
Control Mode		Incidence of Use Fi S Chilled Water Condenser Water	ixed Re Setpoint	eset									
Setpoint		Chilled Water Condenser Water Supply Air	7 °C 30 °C 13.0 °C		44.6 86 55.4	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	75 W/m² 68.1 MJ/m².yr	24 Btu/hr.ft ² 1.8 kWh/ft ² .yr	504 ft²/	/Ton									
Sizing Factor	1.00	0	Operation (oc	cc. perio	4000 H	nrs/year	Note value	e cannot be l	ess than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	2.0%												
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel Sh											
Chiller Maintenance	Annual Ma Inspect Ci Inspect Co Megger M Condense Vibration. Eddy Curr Spectrock	intenance Tasks prtrol, Safeties & Purge Unit pupling, Shaft Sealing and Be- lotors ir Tube Cleaning Analysis rent Testing permical Oil Analysis	arings	cidence (%)	Frequency (years)						ľ	All Electric EUI	
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma Inspectior Inspect/Se Megger M Inspect/Ve	intenance Tasks VClean Spray Nozzles arvice Fan/Fan Motors lotors erify Operation of Controls		cidence (%)	Frequency (years)						[KWh/tf2.yr MJ/m².yr Fuel Oil / Propane E KWh/tf2.yr MJ/m².yr Market Composite E KWh/tf2.yr	0.8 32 UI UI
												MJ/m².yr	32
											,		
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	I SHW Avg. Tank resent (%) 0.65				Boiler 0% 0.75		Fuel Share Blended Ef	ficiency	Fossil 0% 0.75		Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m².yr) (Tertiary Load)	17.3		·	AI	Electric EU			Fuel O	il / Propan	e EUI] [Market Composite F	UI
Wetting Use Percentage	90%			i I	Wh/ft².yr MJ/m².yr	0.5 19			«Wh/ft².yr MJ/m².yr	0.6		kWh/ft².yr MJ/m².yr	0.5 19.0



EXISTING BUILDINGS: Schools	COMMER SIZE: All	RCIAL SECTOR BUILDING PROFILE VINTAGE:	REGION: Labrador I	nterconnected	
HVAC FANS & PUMPS					
SUPPLY FANS		V	entilation and Exhaus	t Fan Operation &	Control
System Design Air Flow 3.3 System Static Pressure CAV 350 System Static Pressure VAV 350 Fan Efficiency 60% Fan Motor Efficiency 88%	L/s.m ² 0.65 CFM/t ² Pa 1.4 wg Pa 1.4 wg	Control F Incidence of Use Coperation C	Ventilation Fan ixed Variable Flow 100% Continuous Scheduled	Exhaust Fan Fixed Variabl Flow 100% Continuous Schedul	e ed
Fan Design Load CAV 2.2 Fan Design Load VAV 2.2	W/m ² 0.20 W/ft ² W/m ² 0.20 W/ft ²	Comments:	30% 30%	50% 50	<u>/0</u>
EXHAUST FANS		I			
Washroom Exhaust 100 Washroom Exhaust per gross unit area 0.1 Other Exhaust (Smoking/Conference) 0.1 Total Building Exhaust 0.2 Exhaust System Static Pressure 250 Fan Efficiency 25% Fan Motor Efficiency 75% Sizing Factor 1.0 Exhaust System Conference 0.1	L/s.washroom 212 CFM/washroom L/s.m2 0.01 CFM/tr2 L/s.m2 0.02 CFM/tr2 L/s.m2 0.03 CFM/tr2 Pa 1.0 wg W/m2 0.02 W/tr2	shroom			
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tower/Condenser Fans	3)			
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Co	0.020 0.020 1.50 0.020 0.020 0.020 0.020 0.020 0.020	0.07 kW/Ton 0.14 W/ft ²			
Condenser Pump					
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Motor Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.053 U/s.KW 0.004 U/s.m ² kPa 50% 80% 1.0 W/m ²	3.0 U.S. gpm/Ton 0.006 U.S. gpm/ft ² ft W/ft ²			
CIRCULATING PUMP (Heating & Cooling)					
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.003 L/s.m ² 100 kPa 50% 80% 0.8 0.6 W/m ²	0.0048 U.S. gpm/ft ² 2.4 U 33 ft 0.06 W/ft ²	J.S. gpm/Ton		
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption	2000 hrs./year 6760 hrs./year 11.8 kWh/m².yr				
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	2000 hrs./year 6760 hrs./year 1.1 kWh/m².yr				
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consum	hption 0.4 kWh/m².yr				
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	2000 hrs./year 0.3 kWh/m².yr				
Fans and Pumps Maintenance	Annual Maintenance Tasks Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors	Incidence Frequency (%) (years)			EUI kWh/ft2.yr 1.3 M.//m2.vr 48.9

			COMMERCIAL SECT	or Buildi	NG PROFILE					
EXISTING BUILDINGS:		SIZE:	VINTAGE:				REGION:			
Schools		All					Labrador Interconnecte	ed		
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:		15.6 kWh/ft².yr 603.0 MJ/m².yr		Fuel Oil / I	3.1 kWh/ft².yr	119.1 MJ/m ² .yr			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	3.1	121.9		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr			
ARCHITECTURAL LIGHTING	0.6	25.2	SPACE HEATING	8.6	333.4	3.1	119.1			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.6					
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0			
HVAC FANS & PUMPS	1.3	48.8	FOOD SERVICE EQUIPMENT	0.1	4.0					
REFRIGERATION	0.0	1.1								
MISCELLANEOUS	0.0	1.5								
BLOCK HEATERS	0.0	1.5								
COMPUTER EQUIPMENT	0.5	21.0								
COMPUTER SERVERS	0.1	3.7								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

			COMMER	CIAL SEC	TOR BUILD	ING PROP	ILE							
EXISTING BUILDINGS:	SIZE:			VINTAGE	:				REGION:		at a d			
Baseline	All			Existing					Labrador	Interconne	ctea			
CONSTRUCTION														
				_							1		٦.	
Wall U value (W/m².°C) 0	0.33 W/m ² .°C	0	.06 Btu/hr.ft ² .	°F		Typical B	uilding Size			6,506	m²	70,000	ft ²	
Roof U value (W/m².°C)	0.33 W/m².°C	0	.06 Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²)		3,253	m²	35,000	ft²	
Glazing U value (W/m².°C) 3	3.52 W/m².°C	0	.62 Btu/hr.ft ² .	۴		Percent C	Aspect Rati onditioned	o (L:W) Space		100%	1			
						Percent C	onditioned	Space		50%				
Window/Wall Ratio (WIWAR) (%) 0	0.30					Defined a	s Exterior Z	one			1			
Shading Coefficient (SC)).65					Floor to F	Stories loor Height	(m)		37	m	12.0	ft	
						1.001.001	loor rioigin	()		0.1	1	1210		
VENTIL ATION OVOTEM DUIL DING CONT														
VENTILATION STSTEM, BUILDING CONT	RULS & INL	JOOR CONDITIONS												
Ventilation System Type			CAV	CAVR	DDMZ	DDMZVV	VAV	VAVR	IL	J 100% O.A	TOTAL	I		
		System Present (%)	90%				10%				100%			
		(Minimum Throttled Ai	r Volume as P	ercent of F	ull Flow)		50%				1			
		·			1						1			
Occupancy or People Density		14 m²/pe	rson	151	tt²/person				%OA	16.85%	J			
Occupancy Schedule Unocc. Period					_									
Fresh Air Requirements or Outside Air		10 L/s.pe	erson	21	CFM/perso	n								
Fresh Air Control Type *(en	ter a 1, 2 or 3)	1 If Fres	h Air Control T	VDe = "2" e	nter % FA t	o the right.			34%	6			7	
(1 = mixed air control, 2 = Fixed fresh air, 3 1	100% fresh air)	If Fres	h Air Control T	ype = "3" e	nter Make-u	Air Ventil	ation and o	peration	0.5	5 L/s.m ²	0.10	CFM/ft ²		
Sizing Factor		10							50%	operation	(%)			
Total Air Circulation or Design Air Flow		1.6 4.24 L/s m	2	0.83	CFM/ft ²									
				0.00			Separate I	Make-up air	unit (100%	% OA)		L/s.m ²	C	FM/ft ²
Infiltration Rate	a accurate of	0.70 L/s.m	2	0.14	CFM/ft ²			Operation	occupied	period	50%			
hours only if the ventilation system shuts dow	occupiea vn)							Operation	unoccupie	a perioa	50%	1		
	,						-							
Economizer	Incidence	Ent	halpy Based	Dry-Bu	lb Based	Total		Cummon	of Deciso	Desemators			٦	
	Switchov	er Point	KJ/ka.	100%	°C	100%		Peak Desi	an Cooling	Load	########			
			Btu/lbm	64.4	°F	-		Peak Zone	Sensible	Load	784,929			
	Suctor F	Procent (%)	LIV/AC	Boom	1			Room air e	enthalpy		28.2	Btu/lbm		
Controls Type	System P	rieseni (%)	Equipmen	t Controls				Specific volu	me of air at:	7y 55F & 100% R	23.4	ft ³ /lbm		
	All Pneum	natic						Design CF	M		36,515			
	DDC/Pne	eumatic						Total air ci	rculation o	or Design air	4.24	l/s.m²		
	Total (sho	ould add-up to 100%)												
					Tatal	1								
Control mode	Control M	1ode P	roportional	PI/PID	I otal									
		Fixe	d Discharge	Reset		1								
	Control S	trategy]								
Indoor Design Conditions				Room				Supply Air			,	I		
Ũ	Summer	Temperature	24	°C	75.2	°F	13	°C	55.4	4 °F				
	Summer	Humidity (%)	50%	K I/ka	28 J	Btu/lbm	100%	K I/ka	23.4	Btu/lbm				
	Winter Oc	cc. Temperature	22	°C	71.6	°F	16	°C	60.8	B °F				
	Winter Oo	cc. Humidity	30%		00.0	D41/#	45%	K I/ke	10.0	D41.///				
	Enthalpy Winter Ur	nocc. Temperature	21	°C	22.8	°F	45.5	ĸJ/кg.	19.6	Btu/Ibm]			
	Winter Ur	nocc. Humidity	30%	, ,		л т								
	Enthalpy		50) KJ/kg.	21.5	Btu/lbm						l		
Damper Maintenance			Incidence	Frequency	1									
	Control A	rm Adjustment	(%)	(years)	1									
	Lubricatio	00			1									
	Blade Se	al Replacement]									
Air Filter Cleaning	Changes/	Year												
					Incidence -	f Approx D	oom Cost-	olo Mointr -	0000		1			
Incidence of Annual HVAC Controls Mainten	ance	٦			inclaence o	i Annual R	oom Contro	us mainten	ance	L	1			
	· · · ·			7								T		
	Annual M	aintenance Tasks	Incidence				Annual Ma	aintenance T	asks		Incidence			
	Calibratio	on of Transmitters	(70)	1			Inspection	/Calibration	of Room	Thermostat	(/0)	ł		
	Calibratio	n of Panel Gauges		1			Inspection	of PE Swit	ches			Į		
	Inspection	n of Auxiliary Devices		-			Inspection	of Auxiliary	Devices	Jalves		ł		
	Inspection	TO CONTO DEVICES					(Dampers	, VAV Boxe	is)	v dives,				
									'		·	1		

EXISTING BUILDINGS: University/College Baseline	SIZE: All	COMMERCIAL SECTOR BUILDI VINTAGE: Existing	NG PROFILE	REGION: Labrador Interconnected	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46 0.90 14.1 W/m ²	.5 ft-candles 3 W/ft²			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 90% 20%	Light Level (Lux) 300 % Distribution Weighted Average	500 700 11 100%		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU 0.7 LLF 0.65 Efficacy (LW) 15	60% 3 0.7 0.6 0 0.65 0.75 0 50 72 0	110 1310 1210 55% 5% 0% 0% 0.6 0.7 0.6 0.6 .80 0.80 0.80 0.80 88 65 95 90	100.0%
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 5.4 MJ/m².yr 207
ARCHITECTURAL LIGHTING CORI Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27 0.10 11.4 W/m² 1	9 ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 50%	Light Level (Lux) 300 % Distribution 100% Weighted Average			Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC System Present (%) 8% CU 0.7 LLF 0.65 Efficacy (LW) 15	CFL 112 10% 15% 6 0.7 0.6 0 0.65 0.75 0 50 72 7	Init ISBO LED 55% 0% 2% 0.6 0.6 0.6 80 0.80 0.80 0.80 88 65 95 90	100.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Load X Hrs. X SF X (31 FF	EUI kWh/ft².yr 0.7 M.J/m².yr 26
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	300.00 Lux 27 6.6 W/m ²	.9 ft-candles	Floor fraction che	ck: should = 1.00 1.00	I
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 % Distribution 100% Weighted Average			Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC System Present (%) CU 0.7 LLF 0.65 Efficacy (LW) 15	CFL 112 0%	18 HID 15HO LED 100% 0% <t< td=""><td>100.0%</td></t<>	100.0%
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 13.79 W/m ²	EUI TOTAL kWh/ft².yr 6 MJ/m².yr 233
OFFICE EQUIPMENT & PLUG LOA	DS				
Equipment Type	Computers	Monitors Printers	Copiers	Servers Plug Loads	
Measured Power (W/device) Density (device/occupant) Connected Load	54.55 0.31 1.2 W/m ² 0.1 W/ft ²	51 100 0.31 0.02 1.1 W/m² 0.1 W/t² 0.1 W/t²	200 2 0.02 0 0.3 W/m ² 0.03 W/ft ² 0	217 .01 0.1 W/m ² 1.3 W/m ² 0.12 W/ft ²	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 90% 50% 50% 2000 2000 6760 6760	90% 10 50% 10 2000 24 6760 6	00% 100% 00% 50% 600 2000 160 6760	
Total end-use load (occupied period) Total end-use load (unocc. period)	3.9 W/m ² 2.2 W/m ²	0.4 W/ft ² to see notes (cells with r 0.2 W/ft ²	ed indicator in upper right co	orner, type "SHIFT @@mputer Servers	EUI kWh/ft².yr 0.10 MJ/m².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 55%			Plug Loads	MJ/m².yr 51.73 EUI kWh/ft².yr 0.65 MJ/m².yr 25.18
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share:	100.0%	uel Oil / Propane EUI kWh/ft².yr 0.5 MJ/m².yr 20.0	All Electric EUI EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
REFRIGERATION Provide description below:					EUI kWh/ft².yr 0.5 MJ/m².yr 20.0
BLOCK HEATERS & MISCELLANE	DUS			Block Heaters Miscellaneous	EUI kWh/ft².yr 0.1 M.//m².yr 5 EUI kWh/ft².yr 0.1 M.//m².yr 5

EXISTING BUILDINGS: University/College Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDIN VINTAGE: Existing	IG PROFILE	REGION: Labrador Interconnected	
SPACE HEATING]
Heating Plant Type	Syster Eff //Cd Perfor (kW/kV	n Present (%) DP mance (1 / Eff.) V)	Fuel Oil / Propar Boilers F Stan. High 70% 80% 1.43 1.25	Image E Packaged A/A HP W. S. H Unit	Ilectric Ilectric IP H/R Chiller Resistance Total 0 100% 0 4.50 33 0.22	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	49.7 463 MJ/m ² .yr	15.8 Btu/hr.ft ² 12.0 kWh/ft ² .yr				All Electric EUI
Electric Fuel Share	100.0% Fuel Oil / Prop	ane Fuel Share	Oil Fuel Shar	9		kWh/ft².yr 12.0 MJ/m².yr 463
Boiler Maintenance	Annual Maintenan Fire Side Inspecti Water Side Inspe Inspection of Cor Inspection of Burn Flue Gas Analysis	ce Tasks on ttion for Scale Buildup trols & Safeties ler & Burner Set-up	Incidence (%) 75% 100% 100% 100% 90%			Fuel Oil / Propane EUI kWh/tt².yr MJ/m².yr Market Composite EUI kWh/tt².yr 12.0 MJ/m².yr 463
SPACE COOLING						
A/C Plant Type	Syster COP Perfon (kW/kk Additic Relate	Centrifuga Standard n Present (%) 4.7 mance (1 / COP) 0.21 V) unal Refrigerant d Information	Al Chillers Screw F HE Chillers 7 5.4 4.4 0.19 0.23	Deciprocating Chillers Absorpti Open DX W. H. 100.0% 3.6 2.6 0 0.28 0.38 1.	ion Chillers Total CW 100.0% .9 1 11 1.00	
Control Mode	Incider Chilled Conde	ice of Use Fixed Setpoint Water Inser Water	Reset			
Setpoint	Chilled Conde Supply	Water 7 nser Water 30 Air 13.0	°C 44.6 ° °C 86 ° °C 55.4 °	F F F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	81 W/m ² 76.4 MJ/m ² .yr	26 Btu/hr.ft ² 466 2.0 kWh/ft ² .yr	ft²/Ton			
Sizing Factor	1.00	Operation	(occ. perio 3000 h	ns/year Note value cannot l	be less than 2,900 hrs/year)	
A/C Saturation (Incidence of A/C)	25.0%					
Electric Fuel Share	100.0% Fuel Oil / Prop	ane Fuel Share]			
Chiller Maintenance	Annual Maintenan Inspect Control, S Inspect Coupling, Megger Motors Condenser Tube Vibration Analysis Eddy Current Tes Spectrochemical	ce Tasks afeties & Purge Unit Shaft Sealing and Bearings Cleaning ing Dil Analysis	Incidence Frequency (%) (years)			All Electric EUI kWh/tft.yr 0.9
Cooling Tower/Air Cooled Condense	r Maintenan Annual Maintenan Inspection/Clean Inspect/Service F Megger Motors Inspect/Verify Op	ce Tasks Spray Nozzles an/Fan Motors eration of Controls	Incidence Frequency (%) (years)			MJ/m².yr 33 Fuel Oil / Propane EUI KWh/ft².yr MJ/m².yr Market Composite EUI KWh/ft².yr 0.9 MJ/m².yr 33
SERVICE HOT WATER]
Service Hot Water Plant Type	Fossil Fuel SHW System Present (Eff./COP	Avg. Tank %)		Boiler 0% 0.75 Blended	Fossil are 0% Efficiency 0.75	Elec. Res. 100% 0.91
Service Hot Water load (MJ/m ² .yr) (Tertiary Load) Wetting Use Percentage	90%		All Electric EU kWh/ft².yr MJ/m².yr	0.6 25	el Oil / Propane EUI kWhyft2.yr 0.8 MJ/m2.yr 30	Market Composite EUI KWh/ft².yr 0.6 MJ/m².yr 25.0



			COMMER	CIAL SECT	FOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:			VINTAGE	:		REGION:					
University/College	All			Existing			Labrador	Interconne	ected			
Baseline												
HVAC FANS & PUMPS												
SUPPLY FANS						Ventilation	and Exhau	st Fan Ope	eration & Co	ontrol		
Contract Desciona Ala Flavu	10 1/2 m2	0.02	0.004/60	Q trail		Ventila	tion Fan	Exhau	ust Fan			
System Design Air Flow	4.2 L/S.m-	0.83	CFM/It ²	Control		Fixea	Variable	Fixea	Variable			
System Static Pressure VAV	500 Pa	2.0	wa	Incidence	oflice	90%	10%	100%	FIOW			
Fan Efficiency	60%] ••9	Operation	01 030	Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency	80%			C								
Sizing Factor	1.00		-	Incidence	of Use	75%	25%	75%	25%			
Fan Design Load CAV	4.4 W/m ²	0.41	W/ft ²		2							
Fan Design Load VAV	4.4 W/m ²	0.41	W/tt ²		Comments:							
EXHAUST FANS									I			
LAINGOLIANG												
Washroom Exhaust	100 L/s.wash	room	212 CFM/was	shroom								
Washroom Exhaust per gross unit area	0.1 L/s.m ²	1	0.01 CFM/ft ²									
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	1	0.02 CFM/ft ²									
Total Building Exhaust	0.2 L/s.m ²	1	0.03 CFM/tt ²									
Exhaust System Static Pressure	250 Pa	1	1.0 wg									
Fan Efficiency	25%											
Fan Motor Efficiency	/5%											
Sizing Factor	1.0 0.0 W/m2	0.02	J 141/642									
Exhaust Fan Connected Load	0.2 vv/m-	0.02	VV/It ²									
AUXILIARY COOLING EQUIPMENT (Condenser Pump a	and Cooling Tov	ver/Condenser Fans')								
Average Condenser Fan Power Draw		1	0.020 kW/kW		0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air C	Cooled Condenser)	1	1.62 W/m ²		0.15 W/ft ²							
Condenser Pump												
Dime Design Flaur			0.052 L/o K/M									
Pump Design Flow		1	0.053 L/S.K.vv		3.0 U.S. gpm/101							
Pump Design Flow per unit noor area		1	0.004 L/S.III-		0.006 0.5. gpm/n-							
Pump neau Pressure		1	50%		n							
Pump Enciency Pump Motor Efficiency		1	80%									
Sizing Factor		1	1.0									1
Pump Connected Load		1	1.0 W/m ²		W/ft ²							
		1	••/11.									
CIRCULATING PUMP (Heating & Cod	oling)		-									
			-									
Pump Design Flow @ 5 °C (10 °F) del	lta T	0.003	L/s.m ²	0.0052	U.S. gpm/ft ² 2	.4 U.S. gpm/	Ton					
Pump Head Pressure		100	kPa	50	ft							
Pump Efficiency		50%	-									
Pump Motor Efficiency		0.8	-									
Pump Connected Load		0.8	W/m ²	0.06	W//ft2							
Fullip Connected Load			VV/III-	0.00	WV/IL							
Supply Fan Occ. Period		4000	hrs./year									
Supply Fan Unocc. Period		4760	hrs./year									
Supply Fan Energy Consumption		31.9	kWh/m².yr									
Exhaust Fan Occ. Period		4000	hrs./year									
Exhaust Fan Unocc. Period		4760	hrs./year									1
Exhaust Fan Energy Consumption		1.6	kWh/m².yr									
Constants Dump Energy Consumption	-		1 + 4/h /m 2 + 10									
Condenser Pump Energy Consumption	Commission	0.4	kWn/m².yr									
Cooling Tower/Condenser Fans Energ	y Consumption	0.4	kVvn/m².yi									
Circulating Pump Yearly Operation		6000	hrs /vear									
Circulating Pump Energy Consumption		0000	kWh/m² vr									
Chould high any Energy Consumption] kuunun .yi									
Fans and Pumps Maintenance	Annual N	Aaintenance Task	KS	Incidence	Frequency							
				(%)	(years)							
	Inspect/S	ervice Fans & M	otors									
	Inspect/A	djust Belt Tensio	n on Fan Belts	<u> </u>					-			
	Inspect/S	ervice Pump & N	/lotors							EUI	<wh ft².yr<="" td=""><td>3.2</td></wh>	3.2
	·									1	MJ/m².yr	122.1

			COMMERCIAL SECT	OR BUILD	NG PROFILE				
EXISTING BUILDINGS:	:	SIZE:	VINTAGE:				REGION:		
University/College		All	Existing				Labrador Interconnect	ed	
Baseline									
EUI SUMMARY									
TOTAL ALL END-USES:	Electricity:		25.7 kWh/ft².yr 994.8 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane		
GENERAL LIGHTING	5.4	207.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr		
ARCHITECTURAL LIGHTING COR	F 0.7	26.2	SPACE HEATING	12.0	463.4				
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	8.3				
OTHER PLUG LOADS	0.7	25.2	SERVICE HOT WATER	0.6	25.0	0.0	0.0		
HVAC FANS & PUMPS	3.2	122.1	FOOD SERVICE EQUIPMENT	0.4	15.0				
REFRIGERATION	0.5	20.0							
MISCELLANEOUS	0.1	5.0							
BLOCK HEATERS	0.1	5.0							
COMPUTER EQUIPMENT	1.3	51.7							
COMPUTER SERVERS	0.1	3.7							
ELEVATORS									
OUTDOOR LIGHTING	0.4	17.0							

				COMMER	CIAL SEC	TOR BUILD	ING PROF	ILE							
EXISTING BUILDINGS:	SIZE:				VINTAGE					REGION:	Interconne	eted			
Baseline	All				Existing					Labrauor	Interconne	cieu			
CONSTRUCTION															
		Г	0.07	Du /h - (12)			Turker	ildia a Oia a			4.050	1	00.000	612	
Wall O Value (W/m².°C) 0.33 Roof LL value (W/m².°C) 0.33	8 W/m2 °C		0.07	Btu/hr.ft2	г >=		Typical Ec	anding Size	`		1,609	m2	20,000	ft2	
Clozing Livelue (W/IIF. C) 0.36	0 W/m2 °C		0.07	Dtu/III.It ⁻ .			Footprint) io (L-14/)		1,009		20,000		
Glazing U value (W/IIP. C) 3.52	2 100/11 C	L	0.02	Blu/III.II	Г		Percent C	onditioned	Space		100%	1			
	_						Percent C	onditioned	Space		45%]			
Window/Wall Ratio (WIWAR) (%) 0.09	5						Defined a	s Exterior Z	lone		1	1			
	, ,						Floor to F	loor Height	(m)		6.1	m	20.1	ft	
								-							
VENTILATION SYSTEM, BUILDING CONTRO	ols & ind		IS												
· _ · · · · · · · · · · · · · · · · · ·													T		
Ventilation System Type		Suctom Brocont ((0/)	CAV	CAVR	DDMZ	DDMZVV	VAV	VAVR	IL	J 100% O.A	TOTAL			
		Min. Air Flow (%)	(%)	100%				50%				100%	1		
		(Minimum Throttle	ed Air Vo	lume as Pe	ercent of Fi	ull Flow)						-			
Occupancy or People Density		100 п	n²/nerson		1076	ft²/nerson				% O A	6.49%	1			
Occupancy Schedule Occ. Period		90%	in /percen		1010	, in poloon				10011	0.1070	J			
Occupancy Schedule Unocc. Period			,			10514									
Fresh Air Requirements of Outside Air		15 L	s.persor	1	32	CFM/perso	11								
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If	Fresh Ai	r Control T	ype = "2" e	nter % FA. te	o the right:				1			1	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	lf	Fresh Ai	r Control T	ype = "3" e	nter Make-up	o Air Ventila	ation and o	peration	0.5	5 L/s.m ²	0.10	CFM/ft ²		
Sizing Factor		1								50%	olobelation	(70)		.1	
Total Air Circulation or Design Air Flow		2.31 L	/s.m²		0.45	CFM/ft ²							T		
Infiltration Pate		0.70	/c m2		0.14	CEM/ft2		Separate	Make-up ail	r unit (1009	% OA) period	50%	L/s.m ²	CF	·M/ft ²
(air infiltration is assumed to occur during unocc	upied	0.70 L	2/5.III-		0.14	CFW/IE			Operation	unoccupie	d period	50%			
hours only if the ventilation system shuts down)															
Economizer			Enthalo	/ Based	Dry-Bi	Ib Based	Total	T							
	Incidence	of Use	Entraip	Babba	100%	Daoou	100%		Summary	of Design	Parameters			7	
	Switchov	er Point		KJ/kg.	18	°C	-	1	Peak Desi	ign Cooling	g Load	254,531			
				Btu/Ibm	64.4	۲F		1	Peak Zone	enthalov	Load	195,583 28.2	Btu/lbm		
Controls Type	System F	resent (%)		HVAC	Room]			Discharge	air enthalp	ру	23.4	Btu/lbm		
		aatia		Equipment	Controls	-			Specific volu	me of air at	55F & 100% R	13.2	ft³/lbm		
	DDC/Pne	eumatic				1			Total air ci	irculation c	or Design air	· 2.31	l/s.m²		
	All DDC														
	Total (sho	ould add-up to 100%	%)]									
			Propo	rtional	PI / PID	Total	1								
Control mode	Control N	lode	Eine d Di		Derest		-								
	Control S	trategy	Fixed Di	scharge	Resei	-									
		37			1		1						T		
Indoor Design Conditions	Summer	Temperature			Room	71 6] ∘⊨	10	Supply Air	EE -	1 °F	1			
	Summer	Humidity (%)		50%	Ŭ	/ 1.0	1 '	100%	Ŭ		<u>,</u> ,				
	Enthalpy			65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	Btu/lbm	-			
	Winter O	cc. Lemperature		30%	-0	69.8	I '⊢	45%	1.0	60.8	5 °F				
	Enthalpy			53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm				
	Winter U	nocc. Temperature		21	°C	69.8	°F								
	Enthalov	IDEC. MUMIDITY		30%	KJ/ka.	21.5	Btu/lbm								
													<u>.</u>		
Damper Maintenance	· · · · ·			Incidence	Frequence	a									
				(%)	(years)										
	Control A	rm Adjustment				4									
	Blade Se	al Replacement				1									
	0					L									
Air Filter Cleaning	Changes	Vear			1										
	Undriges/	, cai			J										
		7				Incidence o	f Annual R	oom Contr	ols Mainten	ance]			
Incidence of Annual HVAC Controls Maintenand	e	_													
	Annual M	aintenance Tasks		Incidence	1			Annual Ma	aintenance 7	Tasks		Incidence	I		
	0-11	(T '''		(%)	-			lana 2	(O - 111- ···		Thomas	(%)	ļ		
	Calibratio	in of Transmitters			1			Inspection	of PF Swit	tches	ı nermostat		ł		
	Inspectio	n of Auxiliary Devic	ces		1			Inspection	of Auxiliar	y Devices			t		
	Inspectio	n of Control Device	es		J			Inspection	of Control	Devices (Valves,				
								(Dampers	, vav Boxe	es)			1		

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All	COMMERCIAL SECTOR E VINTAGE: Existing	3UILDING PROFILE	REGION: Labrador Interconnected	
LIGHTING HIGH BAY LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 37 0.90 10.5 W/m ² 1	2 ft-candles 0 W/ft ²			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 700 50% 50%	1000	Total 100% 400
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL T12 20% 0.7 0.6 0.65 0.65 0.75 15 50 72	T8 HID T5HO L 10% 60% 10%	ED TOTAL 100.0% 26 80 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 3.8 M.I/m² yr 146
OTHER, OFFICE LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46 0.10	5 ft-candles 9 W/ft ²			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 700 100%	1000	Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL T12 10% 5% 60% 0.7 0.7 0.6 0.65 0.65 0.75 15 50 72	T8 HID T5HO L 25% 0% 0% 0.0	ED TOTAL 0% 100.0% 0.6 80 90
Relamping Strategy & Incidence of Practice	Group Spot			X CLEE	EUI kWh/ft².yr 0.8
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles	Floor fraction o	check: should = 1.00 1.	00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500 700	1000	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL T12 0%	T8 MH H 0.6 0.6 0.6 0 0.80 0.80 0.55 0 84 88 65 65	PS TOTAL 0% 0.0% 0.6 55 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr M.J/m².yr
TOTAL LIGHTING				Overall LP 11.57 W/m ²	EUI TOTAL kWh/ft².yr 4.5 MJ/m².yr 175
OFFICE EQUIPMENT & PLUG LOA	DS				
Equipment Type	Computers	Monitors Printers	Copiers	Servers Plug Loads	7
Measured Power (W/device) Density (device/occupant) Connected Load	54.55 0.59 0.3 W/m ² 0.0 W/ft ²	51 100 0.59 0.03 0.3 W/m² 0.0 0.0 W/t² 0.00	200 0.03 0.1 W/m ² 0.01 W/ft ²	217 0.06 0.1 W/m ² 2 W/m ² 0.01 W/ft ² 0.19 W/ft ²	
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	90% 50% 2000 6760	90% 90% 50% 50% 2000 2000 6760 6760	90% 50% 2000 6760	100% 90% 100% 25% 2000 3500 6760 5260	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m ² 1.0 W/m ²	0.2 W/ft ² to see notes (cel 0.1 W/ft ²	ls with red indicator in upper right	t corner, type "SHIFT @@mputer Serv	rers EUI kWh/ft².yr 0.11 MJ/m².yr 4.42
Usage during occupied period Usage during unoccupied period	100% 39%			Plug Lo.	ads EUI kWh/ft².yr 0.83 MJ/m².yr 13.30 EUI kWh/ft².yr 0.83 MJ/m².yr 32.15
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity Fuel S	hare: 100.0% EUI	Fuel Oil / Propane EUI I kWh/ft².yr MJ/m².yr	All Electric EUI EUI kWh/ft².yr MJ/m².yr
REFRIGERATION Provide description below: Process					EUI kWh/ft².yr 1.5 MJ/m².yr 60.0
BLOCK HEATERS & MISCELLANE	ous			Block Heat Miscellane	Lers EUI kWh/ft².yr 0.1 MJ/m².yr 5 ous EUI kWh/ft².yr 0.1 MJ/m².yr 5

EXISTING BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All	COMME	RCIAL SECT VINTAGE: Existing	or Buildi	NG PROF	ILE	1	REGION: Labrador	Interconne	cted		
SPACE HEATING												
Heating Plant Type			Fue	el Oil / Propar	ne		Elec	tric			[
			Boiler	F Unit Heater	Packaged Rooftop	A/A HP	W. S. HP I	H/R Chiller	Resistanc	Total		
	Sys	stem Present (%)	700/	700/	700/	4 70	2.00	4.50	100%	100%		
	Pe	rformance (1 / Eff.)	1.43	1.43	1.43	0.59	0.33	4.50	1.00			
	<u>(kV</u>	V/kW)									l	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	48.0 W/m ² 427 MJ/m ² .yr	15.2 11.0 kWh/ft².y	r								All Electric EL	
Electric Fuel Share	100.0% Fuel Oil / F	Propane Fuel Share		Oil Fuel Shar	e]				kWh/ft².yr	11.0
Boiler Maintenance	Annual Mainte	enance Tasks	Incidence								₩J/HF.yi	427
	Fire Side Insp	ection	(%) 75%								Fuel Oil / Propane kWh/ft².yr	EUI
	Water Side In	spection for Scale Buildup	100%								MJ/m².yr	
	Inspection of I	Burner	100%							1	Market Composite	EUI
	Flue Gas Anal	lysis & Burner Set-up	90%								kWh/ft².yr MJ/m².yr	11.0 427
SPACE COOLING											*	
	Syr CC Pe (kV Ad Re	Centrifug Standard yP 4. rformance (1 / COP) 0.2 V/kW) ditional Refrigerant lated Information	al Chillers HE 7 5.4 1 0.19	Screw F Chillers 4.4 0.23	Reciprocat Open 3.6 0.28	ing Chillers DX 100.0% 2.6 0.38	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total			
Control Mode	Inc	idence of Use Fixed	Reset									
	Ch	illed Water										
	Co	ndenser Water										
Setpoint	Ch	illed Water 7 ondenser Water 30	7 °C) °C	44.6	°F °F							
	Su	ppiy Air 13.		55.4	F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	40 W/m ² 30.2 MJ/m ² .yr	13 Btu/hr.ft² 943 0.8 kWh/ft².yr	ft²/Ton									
Sizing Factor	1.00	Operatio	n (occ. perio	3000 H	nrs/year	Note value	e cannot be l	ess than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	5.0%											
Electric Fuel Share	100.0% Euel Oil / F	Propane Fuel Share	7									
				F								
	Annuai Mainte	nance lasks	(%)	(years)								
	Inspect Contro Inspect Coupli	ol, Safeties & Purge Unit ing, Shaft Sealing and Bearings										
	Megger Motor	rs te Cleaning										
	Vibration Anal	lysis										
	Eddy Current Spectrochemi	Testing ical Oil Analysis								1	All Electric EL	1
	opositioni										kWh/ft².yr	0.3
Cooling Tower/Air Cooled Condense	r Maintenan Annual Mainte	enance Tasks	Incidence	Frequency							MJ/m².yr	13
	Inspection/Cle	an Sprav Nozzles	(%)	(years)							Fuel Oil / Propane	EUI
	Inspect/Servic	ce Fan/Fan Motors									MJ/m².yr	
	Megger Motor Inspect/Verify	rs Operation of Controls								1	Market Composite	EUI
	<u> </u>	•									kWh/ft².yr	0.3
											wiJ/IIF.yl	13
Service Hot Water Plant Type	Fossil Fuel SI	HW Avg. Tank			Boiler	[Fossil		Elec. Res.	
	System Prese	ent (%)			0%		Fuel Share	ficiency	0%		100%	
Service Hot Water load (MJ/m ² .yr)	17.0	0.05	1 1		0.75	l	Diorideu El		0.75	I	0.01	
(Tertiary Load)			A	II Electric EU			Fuel O	il / Propar	e EUI		Market Composite	EUI
Wetting Use Percentage	90%			kWh/ft².yr MJ/m².yr	0.5 19			kWh/ft².yr MJ/m².yr	0.6 23		kWh/ft².yr MJ/m².yr	0.5 18.7

	COMMER	CIAL SECTOR BUILDING PROFILE			
EXISTING BUILDINGS: S	SIZE:	VINTAGE:	REGION:		
Warehouse/Wholesale	All	Existing	Labrador li	nterconnected	
Baseline					
HVAC FANS & PLIMPS					
SUPPLY FANS			Ventilation and Exhaus	t Fan Operation & C	ontrol
			Ventilation Fan	Exhaust Fan	
System Design Air Flow 2.3	L/s.m ² 0.45 CFM/ft ²	Control	Fixed Variable	Fixed Variable	
System Static Pressure CAV 300	Pa 1.2 wg		Flow	Flow	
System Static Pressure VAV 300	Pa 1.2 wg	Incidence of Use	100%	100%	_
Fan Efficiency 60%		Operation	Continuouscrieduleau	ontinuous Scheduled	
Sizing Eactor 1.00		Incidence of Lise	80% 20%	80% 20%	
Fan Design Load CAV 1.4	W/m ² 0.13 W/ft ²		2070	2070	<u> </u>
Fan Design Load VAV 1.4	W/m ² 0.13 W/ft ²	Comments:			
EXHAUST FANS					
Weekreem Exhaust		alara a m			
Washroom Exhaust 100	L/s.washroom 212 CFM/was	snroom			
Other Exhaust (Smoking/Conference) 0.1	L/s.m ² 0.02 CFM/ft ²				
Total Building Exhaust 0.2	L/s.m ² 0.04 CFM/ft ²				
Exhaust System Static Pressure 250	Pa 1.0 wg				
Fan Efficiency 25%					
Fan Motor Efficiency 75%					
Sizing Factor 1.0					
Exhaust Fan Connected Load 0.3	W/m ² 0.03 W/ft ²				
AUXILIARY COOLING EQUIPMENT (Condenser	r Pump and Cooling Tower/Condenser Fans)			
Average Condenser Fan Power Draw	0.020 kW/kW	0.07 kW/Ton			
(Cooling Tower/Evap. Condenser/ Air Cooled Con	ndenser) 0.80 W/m ²	0.07 W/ft ²			
Condenser Pump					
Burne Basim Flour					
Pump Design Flow	0.003 L/S.KW	3.0 U.S. gpm/10n			
Pump Design Flow per unit noor area	0.002 L/S.III-	0.003 0.5. gpm/n2			
Pump Efficiency	50%	11			
Pump Motor Efficiency	80%				
Sizing Factor	1.0				
Pump Connected Load	W/m²	W/ft ²			
		<u>_</u>			
CIRCULATING PUMP (Heating & Cooling)					
Dump Design Flow @ 5 °C (40 °F) date T	0.002 1 /a m2	0.0025 11 6 mm/#2 2.4			
Pump Design Flow @ 5 °C (10 °F) delta 1	0.002 L/s.m²	0.0025 0.5. gpm/n² 2.4	U.S. gpm/10h		
Pump Efficiency	50%	17 11			
Pump Motor Efficiency	80%				
Sizing Factor	0.8				
Pump Connected Load	0.2 W/m ²	0.02 W/ft ²			
	0500 1 /				
Supply Fan Occ. Period	3500 hrs./year				
Supply Fan Onocc. Period	11.1 kW/b/m².vr				
Supply Fair Energy Consumption					
Exhaust Fan Occ. Period	3500 hrs./vear				
Exhaust Fan Unocc. Period	5260 hrs./year				
Exhaust Fan Energy Consumption	2.1 kWh/m².yr				
Condenser Pump Energy Consumption	kWh/m².yr				
Cooling Tower /Condenser Fans Energy Consump	otion 0.2 kWh/m².yr				
Circulating Rump Vearly Operation	5000 brs /voor				
Circulating Pump Energy Consumption	k\Wh/m² vr				
Chouse any Energy Consumption	Kwitein .yi				
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency			
r and and r ampo mantonanoo					
r and r ampe marker and e		(%) (years)			
	Inspect/Service Fans & Motors	(%) (years)			
	Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts	(%) (years)			

			COMMERCIAL SECT	OR BUILD	NG PROFILE					
EXISTING BUILDINGS: Warehouse/Wholesale Baseline		SIZE: All	VINTAGE: Existing			REGION: Labrador Interconnected				
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	[20.8 kWh/ft².yr 806.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
HIGH BAY LIGHTING	3.8	146.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr			
OTHER, OFFICE LIGHTING	0.8	29.1	SPACE HEATING	11.0	427.0					
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.0	0.6					
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	18.7	0.0	0.0			
HVAC FANS & PUMPS	1.2	48.3	FOOD SERVICE EQUIPMENT							
REFRIGERATION	1.5	60.0								
MISCELLANEOUS	0.1	5.0								
BLOCK HEATERS	0.1	5.0								
COMPUTER EQUIPMENT	0.3	13.3								
COMPUTER SERVERS	0.1	4.4								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

				COMMER	CIAL SECT	TOR BUILD	ING PROF	ILE						
EXISTING BUILDINGS:	SIZE:				VINTAGE					REGION:				
Restaurant	All				Existing					Labrador I	nterconnecte	∋d		
CONSTRUCTION														
CONSTRUCTION														
Wall U value (W/m ² .°C) 0.28	W/m².°C		0.05	Btu/hr.ft ² .°F			Typical B	uildina Size		[929 m ²	2	10.000 ft ²	2
Roof U value (W/m².°C) 0.19	W/m².°C		0.03	Btu/hr.ft ² .°F			Typical Fe	notorint (m ²	2)		929 m ²	2	10.000 ft ²	2
Glazing LL value (W/m² °C) 3.52	W/m2 °C		0.62	Btu/br ft2 °F			Footprint	Aspect Pat	, tio (1.1M/)	-	1	L	10,000 11	
Glazing O value (W/III C) 3.52	W/III C		0.02	Blumine. F			Percent C	Conditioned	ISpace	-	100%			
							Percent C	onditioned	Space	-	45%			
Window/Wall Ratio (WIWAR) (%) 0.36	1						Defined a	s Exterior 2	Zone	L				
Shading Coefficient (SC) 0.58							Typical #	Stories			1			
							Floor to F	loor Height	t (m)	l	3.7 m	l	12.0 ft	
VENTILATION SYSTEM, BUILDING CONTRO	LS & IND	OOR CONDITIC	NS											
,														
Ventilation System Type		-		CAV	/ CAVR	DDM2	DDMZV	/ VAV	VAVR	IU	100% O.A	TOTAL		
		System Presen	t (%)	60%	b			000/	,		40%	100%		
		(Minimum Thro	%) ttled ∆ir \/o	lume as Perce	ant of Full Fl	low)		60%	0					
						1011)								
Occupancy or People Density		20	m²/person		215	ft²/person				%OA	9.29%			
Occupancy Schedule Occ. Period		90%			-									
Occupancy Schedule Unocc. Period			1/0 0		4.0									
riesh Air Requirements or Outside Air		8	∟/s.persor	1	16	CFIM/perso	711							
Fresh Air Control Type *(enter a	a 1, 2 or 3)	1	If Fresh Air	Control Type	e = "2" enter	r % FA. to th	e right:							
(1 = mixed air control, 2 = Fixed fresh air, 3 1009	% fresh air)		If Fresh Air	Control Type	= "3" enter	Make-up Ai	r Ventilatio	n and opera	ation		L/s.m ²		CFM/ft ²	
	,										operation (%)]	
Sizing Factor		1.3			0.70	0.000								
I otal Air Circulation or Design Air Flow		4.03	L/S.M ²		0.79	CFIM/Tt ²		Sonarato	Make-up air	unit (100%	04)		l/c m²	CEM/ft2
Infiltration Rate		0.40	L/s.m ²		0.08	CFM/ft ²		Separate	Operation	occupied pe	eriod	50%	L/3.111	OI W/IT
(air infiltration is assumed to occur during unoccu	pied								Operation	unoccupied	period	50%		
hours only if the ventilation system shuts down)														
Feenewizer			Entho	by Deced	Dec De	dh Deced	Tata	a						
Economizer	Incidence	of Lise	Enina	ру based	DIY-БС 100%	UD Daseu	100%	<u></u>	Summary	of Design P	arameters			
	Switchove	r Point		KJ/ka.	18	3°C	100 /		Peak Desi	an Coolina I	Load	210.389		
				Btu/lbm	64.4	↓°F	1		Peak Zone	Sensible L	oad	131,371		
						-			Room air e	enthalpy		28.2	Btu/lbm	
Controls Type	System P	resent (%)		HVAC	Room				Discharge	air enthalpy		23.4	Btu/lbm	
		atic		Equipment	Controis	-			Specific volu	me of air at 55 M	6F & 100% R	6 111	rt%/iDm	
	DDC/Pne	umatic				-			Total air ci	rculation or	Design air	4.03	l/s.m ²	
	All DDC										,	-		
	Total (sho	uld add-up to 10	0%)											
			Dres	ortional	םום / וח	Tata	٦							
Control mode	Control M	ode	FIU	Jonuonai	FITE	TOTAL								
	Control III	000	Fixed	Discharge	Reset		1							
	Control St	rategy		ÿ										
					_			1					e e e e e e e e e e e e e e e e e e e	
Indoor Design Conditions	Cummer T			2	Room	75 (1.	Supply Air	57.0	۰ -			
	Summer F	emperature		50%	+ °C	/5.4		08%	4 0	57.2	F			
	Enthalpy	furnicity (70)		65.5	5 KJ/ka.	28.2	Btu/lbm	54.5	5 KJ/ka.	23.4	Btu/lbm			
	Winter Oc	c. Temperature		2'	1°C	69.8	°F	15	5 °C	59	°F			
	Winter Oc	c. Humidity		30%	b		-	45%	6					
	Enthalpy		-	50	3 KJ/kg.	22.8	Btu/lbm	45.5	5 KJ/kg.	19.6	Btu/lbm			
	Winter Un	occ. Temperatur	e	20		69.8	5 °F							
	Enthalpy	occ. marnially		50%) KJ/ka.	21.5	Btu/lbm							
	-				-	-								
Damper Maintenance				Incidence	Frequency	/								
	Control Ar	m Adjustment		(%)	(years)	-								
	Lubricatio	n												
	Blade Sea	I Replacement												
Air Filter Cleaning	Changes	/00r	1		т									
All Filler Cleaning	Changes/	leal			1									
						Incidence c	f Annual R	Room Contr	rols Mainten	ance				
Incidence of Annual HVAC Controls Maintenance	е	Ι								L				
	A	(atau atau 🖛 🗧		land 2	т			A	-later -	I		ta a fata	i.	
	Annual Ma	untenance Tasks	5	Incidence	1			Annual Ma	aintenance T	asks				
	Calibratio	of Transmitter		(70)	+			Inspection	n/Calibration		hermostat	(70)		
	Calibration	of Panel Gaure	es		1			Inspection	n of PE Swit	ches	nonnoatat			
	Inspection	of Auxiliary Dev	rices		1			Inspection	n of Auxiliary	Devices				
	Inspection	of Control Devi	ces]			Inspection	n of Control	Devices (Va	alves,			
								(Dampers	s, VAV Boxe	is)				

EXISTING BUILDINGS: Restaurant Baseline	SIZE: All	COMME	RCIAL SECTOR BUILDIN VINTAGE: Existing	IG PROFILE	REGION: Labrador Int	erconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux	37.2 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	400 100%	550 650			Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7	0.7 0.0 0.65 0.7 50 7	NO NO % 80.0% 6 0.6 5 0.80 2 88	0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI k	:Wh/ft².yr	2.4
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 2 0.50 30.7 W/m ²	27.9 ft-candles					, n	<u>"J/II".yi</u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	200	300 40 1009	00 500 %		Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	60% 0.7 0.65 15	CFL 112 25% 0.7 0.4 0.65 0.75 0.7 50 72 72	18 HID 6 0.6 0.6 75 0.80 0.80 2 84 65	15HO LED 15% 15% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		6	EUI = Load X Hrs.	X SF X GLFF		EUI k	Wh/ft².yr MJ/m².yr	6.8 262
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles		Floor fra	action check: should = 1.00) 1.00]		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 70		MUL	Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.0 0.65 0.7 50 72	12 18 6 0.6 0.6 5 0.80 0.80 2 84 88	MH HPS 0.6 0.6 0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot						EUI k	:Wh/ft².yr MJ/m².vr	
TOTAL LIGHTING					Overall LP	20.72 W/m ²	EUI TOTAL k	Wh/ft².yr MJ/m².yr	9 354
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.16 0.4 W/m ² 0.0 W/ft ² 80%	51 0.16 0.4 W/m ² 0.0 W/ft ² 80%	100 0.01 0.1 W/m ² 0.00 W/ft ² 80%	200 W/m ² W/ft ²	217 0.06 0.1 W/m² 0.01 W/ft² 100%	1.15 W/m² 0.11 W/ft² 80%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760	50% 2000 6760	100% 2000 6760	50% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.8 W/m² 1.2 W/m²	0.2 W/ft² 0.1 W/ft²				Computer Servers	EUI k	.Wh/ft².yr ⁄IJ/m².yr	0.11 4.42
Usage during occupied period Usage during unoccupied period	100% 65%					Computer Equipment Plug Loads	EUI k EUI k	Wh/ft².yr <u>/J/m².yr</u> Wh/ft².yr /J/m².yr	0.41 <u>16.00</u> 0.60 23.23
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI 0.1 5.0	All E EUI k M	Electric EUI Wh/ft².yr /J/m².yr	34.3 1330.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant							EUI k	:Wh/ft².yr ⁄IJ/m².yr	16.8 650.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI k N EUI k	Wh/ft².yr 4J/m².yr Wh/ft².yr	0.1 5 0.1 5

EXISTING BUILDINGS: Restaurant Baseline	SIZE: All		COMMERCIAL SECT VINTAGE Existing	or Building Profi	ILE REGION: Labrador Interconn	lected
SPACE HEATING						
Heating Plant Type			Fu	el Oil / Propane	Electric	
			Bo Stan.	ilers Packaged High Unit	A/A HP W. S. HP H/R Chiller Resistan	ce Total
		System Present (%) Eff./COP	70%	80% 70%	1.70 3.00 4.50 1.00	6 <u>100%</u>
		Performance (1 / Eff.)	1.43	1.25 1.43	0.59 0.33 0.22 1.0	0
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	58.9 W/m² 492 MJ/m².yr	18.7 Btt 12.7 kW	u/hr.ft² /h/ft².yr			
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share		Oil Fuel Share		All Electric EUI kWb/ft².vr 12.7
Boiler Maintenance		aintenance Tasks	Incidence			MJ/m ² .yr 492
Doner manitenance			(%)			Fuel Oil / Propane EUI
	Water Side	Inspection le Inspection for Scale Buildup	100%			KWD/tt².yr MJ/m².yr
	Inspection Inspection	n of Controls & Safeties	100% 100%			Market Composite EUI
	Flue Gas	Analysis & Burner Set-up	90%			kWh/ft².yr 12.7 MJ/m².yr 492
SPACE COOLING						
A/C Plant Type						
		System Present (%) COP Performance (1 / COP) (kWkW) Additional Perficienant	Centrifugal Chillers Standard HE 4.7 5.4 0.21 0.19	WSHP Reciprocat Open 3.5 3.5 0.29 0.29	DX W. H. CW 100.0% 100.0% 100.0% 2.6 0.9 1 0.38 1.11 1.00	
		Related Information				
Control Mode		Incidence of Use Fix Se Chilled Water Condenser Water	ked Reset			
Setpoint		Chilled Water Condenser Water Supply Air	7 ℃ 30 ℃ 14.0 ℃	44.6 °F 86 °F 57.2 °F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	66 W/m ² 72.9 MJ/m ² .yr	21 Btu/hr.ft² 1.9 kWh/ft².yr	<u>570 </u> ft²/Ton			
Sizing Factor	1.00	Op	peration (occ. period)	3000 hrs/year	Note value cannot be less than 2,900 hrs/y	vear)
A/C Saturation (Incidence of A/C)	25.0%					
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share				
Chiller Maintenance	Annual Ma	aintenance Tasks	Incidence	Frequency		
	Inspect C	ontrol, Safeties & Purge Unit	(%)	(years)		
	Inspect C Megger M	oupling, Shaft Sealing and Bea lotors	irings			
	Condense	er Tube Cleaning				
	Eddy Cur	rent Testing				
	Spectrocr	nemical OII Analysis				kWh/ft².yr 0.8
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks	Incidence (%)	Frequency (years)		MJ/m².yr 32 Fuel Oil / Propane EUI
	Inspection Inspect/Section	v/Clean Spray Nozzles ervice Fan/Fan Motors				kWh/ft².yr MJ/m².yr
	Megger M Inspect/V	Notors erify Operation of Controls				Market Composite EUI
	mopoort	,	I			kWh/ft².yr 0.8
DOMESTIC HOT WATER						MJ/IIP.yi 32
Service Hot Water Plant Type	Fossil Fue	el SHW Tank		Boiler	Fossil	Elec. Res.
Service Hot Water load (MJ/m².yr)	System P Eff./COP 700.0	resent (%) 0.65		0% 0.75	Fuel Share 09 Blended Efficiency 0.75	6 100% 5 0.91
(Tertiary Load)			A	II Electric EUI	Fuel Oil / Propane EUI	Market Composite EUI
Wetting Use Percentage	90%			kWh/ft².yr 19.9 MJ/m².yr 769	kWh/ft².yr 24.1 MJ/m².yr 933	kWh/ft².yr 19.9 MJ/m².yr 769.2

EXISTING BUILDINGS: Restaurant Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: Existing	R	EGION: abrador I	nterconne	cted			
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation a	ind Exhau	st Fan Ope	ration & Con	trol		
System Design Air Flow System Static Pressure CAV System Static Pressure VAV	4.0 L/s.m ² 350 Pa 350 Pa	0.79 CFM/ft ² 1.4 wg 1.4 wg	Control Incidence of Use	Fixed V	/ariable Flow	Fixed	Variable Flow			
Fan Efficiency Fan Motor Efficiency Sizing Factor	52% 85% 1.00		Operation Incidence of Use	Continuou:S	Scheduled 25%	Continuous 75%	Scheduled 25%	6		
Fan Design Load CAV Fan Design Load VAV	3.2 W/m ² 3.2 W/m ²	0.30 W/ft ² 0.30 W/ft ²	Comments:							
EXHAUST FANS										
Washroom Exhaust Washroom Exhaust per gross unit are: Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wast 0.2 L/s.m² 0.1 L/s.m² 0.3 L/s.m² 250 Pa 40% 80% 1.0 0.2 W/m²	212 CFM/washroi 0.04 CFM/tt² 0.02 CFM/tt² 0.06 CFM/tt² 0.07 CFM/tt² 0.08 CFM/tt²	om							
AUXILIARY COOLING EQUIPMENT	(Condenser Pump a	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	0.020 1.30 W/m ²	0.07 kW/Ton 0.12 W/ft²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 0.004 0.004 0.004 0.07 0.07 0.07 0.07 0	3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft ² 30 ft 0.06 W/ft ²							
CIRCULATING PUMP (Heating & Co	oling)									
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	əlta T	0.003 L/s.m ² 150 kPa 55% 90% 0.5 0.4 W/m ²	0.0042 U.S. gpm/ft ² 50 ft 0.04 W/ft ²]U.S. gpm/Tc	on					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 14.3 kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 1.8 kWh/m².yr								
Condenser Pump Energy Consumptio Cooling Tower /Condenser Fans Energy	n gy Consumption	0.3 kWh/m².yr 0.4 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	ı	5000 hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/S	Aaintenance Tasks iervice Fans & Motors djust Belt Tension on Fan Belts iervice Pump & Motors	Incidence Frequency (%) (years)					EUI	kWh/ft².yr M.l/m² vr	1.6

COMMERCIAL SECTOR BUILDING PROFILE								
EXISTING BUILDINGS:	5	SIZE:	VINTAGE	:			REGION:	
Restaurant		All	Existing				Labrador Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		96.4 kWh/ft².yr 3,734.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	2.4	91.7		kWh/ft ² .yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	6.8	262.4	SPACE HEATING	12.7	492.0			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.2	7.9			
OTHER PLUG LOADS	0.6	23.2	DOMESTIC HOT WATER	19.9	769.2	0.0	0.0	
HVAC FANS & PUMPS	1.6	60.4	FOOD SERVICE EQUIPMENT	34.3	1,330.0			
REFRIGERATION	16.8	650.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.4	16.0						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per degree Fahrenheit (BTU/hr. f ² .°F) through walls, roofs
	and windows. The U-value is the reciprocal of the R- value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear glass
Window-to-wall ratio	Defines the ratio of window to insulated exterior wall area
General lighting	Defines the lighting types that are used within the main areas of a building, e.g., for a School, the area is classrooms and the lighting type is fluorescent; for a
	Lighting power density expressed in terms of W//tt ²
	The amount of visible light per square meter incident on
	a surface (lumen/m ²)
Inc	Incandescent lamps
CFL	Compact fluorescent lamps
T12	T12 fluorescent lamps with magnetic ballasts
<u>T8</u>	T8 fluorescent lamps with electronic ballasts
MH	Metal halide lamps
HPS	High-pressure sodium lamps
HID	High-intensity discharge lighting includes both MH and HPS
T5HO	T5 High Output fluorescent lamps
LED Generale multiple time	Light Emitting Diode lamps
Secondary lighting	Defines the lighting types that are used within the secondary areas of a building, e.g., for a School, the
Outdoor lighting	Defines the outdoor lighting including parking lot and
	façade
Overall LPD	The total floor weighted LPD that includes general, secondary, and outdoor
Fans	Defines the mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
Space heating	Defines the mix of heating equipment types found within the stock of buildings
ASHP	Air-source heat pump
WSHP	Water-source heat pump
Resistance	Electric resistance heating equipment including boilers and baseboard heaters
Fuel Oil / Propane	Fossil fuel fired equipment, including space heating, domestic hot water heating, and cooking equipment
Space cooling	Defines the mix of cooling equipment types found within the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
DX	Direct expansion cooling equipment that use small tonnage hermetic compressors

Appendix B Background-Section 4: Base Year Peak Load

Introduction

Appendix B provides additional detailed information related to each of the major steps employed in the generation of the Commercial sector Base Year peak loads. The discussion is organized as follows:

- Overview of peak load methodology
- Segmentation of commercial sub sectors
- Detailed results

B.1 Overview of Peak Load Profile Methodology

As noted in the main text, development of the electric peak load estimates employs four specific factors as outlined below:

- Monthly Usage Allocation Factor: This factor represents the percent of annual electric energy usage that is allocated to each month. This set of monthly fractions (percentages) reflects the seasonality of the load shape, whether a facility, process or end use, and is dictated by weather or other seasonal factors. This allocation factor can be obtained from either (in decreasing order of priority): (a) monthly consumption statistics from end-use load studies; (b) monthly seasonal sales (preferably weather normalized) obtained by subtracting a "base" month from winter and summer heating and cooling months; or (c) heating or cooling degree days on an appropriate base.
- Weekend to Weekday Factor: This factor is a ratio that describes the relationship between weekends and weekdays, reflecting the degree of weekend activity inherent in the facility or end use. This may vary by month or season. Based on this ratio, the average electric energy per day type can be computed from the corresponding monthly electric energy.
- Peak Day Factor: This factor reflects the degree of daily weather sensitivity associated with the load shape, particularly heating or cooling; it compares a peak (e.g., hottest or coldest) day to a typical weekday in that month.
- Per Unit Hourly Factor: The relationship of load among different hours of the day for each day type (weekday, weekend day, peak day) and for each month reflects the operating hours of the electric equipment or end use within facilities by sub sector. For example, for lighting, this would be affected by time of day, season (affected by daylight), and space type, where applicable. For the Base Year, lighting is treated on an aggregate basis by facility.

The four factors (sets of ratios) defined above provide the basis for converting annual energy to any hourly demand specified including the grouping of hours used in the four peak periods defined in this study. Exhibit 101, below, illustrates how each of the above four factors is applied sequentially to a known annual energy value to produce a peak load value, defined as a specific peak period. In the example, the 36-hour winter peak period is used. The winter peak is defined as follows:

The morning period from 7 am to noon and the evening period from 4 pm to 8 pm on the four coldest days in the December to March period; this is a total of 36 hours per year.³⁹

³⁹ Source: NL (Feb 2014) http://hydroblog.nalcorenergy.com/meeting-peak-demand/

Exhibit 101 Illustrative Application of Annual Energy to Peak Period Value Factors

The Winter Peak demand is computed based on the average demand for the 36-hour period. The NL peak is assumed to occur on the four coldest days in December and January.

The following steps are required:

- Step 1: The monthly usage allocation factor for December and January are applied to the annual energy use to calculate December and January energy use.
- Step 2: The average weekday in December and January is calculated based on the formula shown below, which adjusts the average day type use to reflect any difference in typical weekend use versus typical weekday use.

$$\frac{1}{(Days in Month) * \left(\frac{5}{7} + \left(\frac{2}{7} * Weekend Ratio\right)\right)}$$

- Step 3: The peak day factor is then applied to the average weekday electric energy use to
 determine the peak day use for the four peak days (as defined by the NL utilities).
- Step 4: The average peak over the 9 hours of peak period per day is then calculated based on allocating the peak day use according to the per unit hourly load factor for a peak winter day, using the percentage of use in those hours versus the daily usage for the peak day.

It should be noted that the methodology shown in Exhibit 101 produces aggregate diversified average loads for all customers or end uses in the defined sub sector.

Exhibit 102 provides a specific numeric example for the calculation of Winter Peak Period demand (kW). The example presented in Exhibit 102 is for secondary lighting use in large office buildings, prior to adjustment for fuel share. The example shows how the annual consumption of 10,000 kWh can be converted to a peak demand value for the Winter Peak Period by the calculation of a corresponding hours-use value.

Exhibit 102 Sample Hours-Use Calculation for Office Secondary Lighting

Winter Peak Period =

$$\frac{Annual \, kWh \, \times \, Mo. \, Allocation \, (Dec)}{Days \, in \, Month \times \left[\frac{5}{7} + \left(\frac{2}{7} \times \, Weekend \, Ratio\right)\right]} \times Peak \, Day \, Factor \, \times \, Peak \, Hour \, \% \, Daily \, kWh$$

Winter Peak Period =

$$\frac{10,000 \text{ [Ann. kWh]} \times 14.75\% \text{ [Mo. Alloc.]}}{62 \times \left[\frac{5}{7} + \left(\frac{2}{7} \times 1.0 \text{ [Dec. Wkend Ratio]}\right)\right]} \times 1.0 \text{ [Peak Day Fact.]} \times 0.06410 \text{ [Peak Hr \% Day kWh]}$$

= 1.525 kW

Hours-use Factor =

 $\frac{10,000 \text{ [annual kWh]}}{1.525 \text{ [Winter Peak Period]}} = 6,557 \text{ [Winter Peak Hours Use]}$

This means that any applicable Office annual secondary lighting kWh can be converted to average demand in kW during the 36-hour winter peak period by dividing by 6,557 hours.

B2 Segmentation of Commercial Buildings

The Commercial sector segmentation used to generate the electric peak load profiles is the same as that used for electric energy use. That is, there is a load profile that corresponds to each combination of sub sector and end use. Exhibit 103 shows the Commercial sub sectors and end uses that were addressed.

Exhibit 103 Commercial Segmentation Used for Electric Peak Load Calculations

Sub sectors (Large Office, Small Office, Large Non-Food Retail, Small Non-Food Retail, Food Retail, Large Accommodation, Small Accommodation, Healthcare, School, Universities and College, Warehouse/Wholesale, Restaurant)

End uses (general lighting, secondary lighting, outdoor lighting, computer equipment, computer servers, other plug load, food service equipment, refrigeration, elevator, miscellaneous equipment, space heating space cooling, HVAC fans & pumps, domestic hot water, block heaters, street lighting)

Exhibit 104 describes the assumptions and data sources for the load profile factors that were used to develop the corresponding hours-use factors. To produce a demand for a combination of sub sector and end use, the corresponding annual energy is divided by the hours-use factor for the peak period for the applicable load shape. For certain end uses that are assumed to have no usage during the winter months (e.g., cooling) the hours-use values are considered infinite (noted by 1E+15), resulting in virtually zero demand when divided into annual energy.

Most of the studies referenced in the exhibit are the same as those used to develop hours-use factors for the CDM Potential Study completed for NL in 2008 and are also the same as those used for studies in other provinces. For most end uses, hours-use factors remain very stable from year to year and across jurisdictions, as long as the peak period of interest is the same. The amount of energy consumed varies from year to year and from place to place, but the shape of the load – when the energy is used – remains very similar.

In this analysis, therefore, the initial estimate of peak demand used the hours-use factors from the 2008 CDM Potential Study. The results were within a few percent of utility measured values. The team then calibrated the model by adjusting the hours-use factors for the weather-sensitive end uses (such as space heating) for all three sectors simultaneously, until the model peak demand output agreed closely with the Utilities' measured peak demand.

Exhibit 104 Commercial End Use Load Shape Parameters

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2001	General lighting – Office	RG&E Office lighting	App. 0.50 RG&E Office lighting	1.00 assumed	Office lighting - RG&E 1991 Study ⁴⁰
2002	General lighting – Non-food Retail	RG&E Retail lighting	RG&E Retail lighting	1.00 assumed	RG&E Retail lighting
2003	General lighting – Food Retail	RG&E Grocery lighting	RG&E Grocery lighting	1.00 assumed	RG&E Grocery lighting
2004	General lighting – Accommodation	RG&E Hotel/Motel lighting	RG&E Hotel/Motel lighting	1.00 assumed	RG&E Hotel/Motel lighting
2005	General lighting – Healthcare	RG&E Hospital/Long- term Care lighting	RG&E Hospital/Long- term Care lighting	1.00 assumed	RG&E Hospital/Long-term Care lighting
2006	General lighting – Schools, Universities and Colleges	RG&E College lighting	RG&E College lighting	1.00 assumed	RG&E College lighting
2007	General lighting – Restaurant	RG&E Full- serve Restaurant lighting	RG&E Full-serve Restaurant lighting	1.00 assumed	RG&E Full-serve Restaurant lighting
2008	General lighting – Warehouse	RG&E Warehouse lighting	RG&E Warehouse lighting	1.00 assumed	RG&E Warehouse lighting
2009	General lighting – Small Office and Other Commercial	RG&E Office lighting	RG&E Office lighting (modified) ⁴¹	1.00 assumed	RG&E Office lighting (modified)
2010	General lighting – Small Non-food Retail	RG&E Small Non-food Retail lighting	RG&E Non-food Retail lighting (modified)	1.00 assumed	RG&E Non-food Retail lighting (modified)
2011	Secondary lighting – Office & Education	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2012	Secondary lighting – Retail & Restaurant	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-10 pm 100%, 50% evening, 10% overnight
2013	Secondary lighting – Health & Warehouse	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-10 pm 100%, 80% evening, 50% overnight
2014	Secondary lighting – all other	Architectural lighting model	1.00 assumed	1.00 assumed	Architectural lighting model 6 am-6 pm 100%, 50% evening, 10% overnight
2015	Refrigeration – Restaurant, Accommodation, Health	RG&E Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration	RG&E total Restaurant refrigeration
2016	Refrigeration – Food Retail	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration	RG&E Grocery refrigeration
2017	Refrigeration – Warehouse / Wholesale	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration	RG&E Warehouse refrigeration
2018	Refrigeration – Schools, Universities and Colleges	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration	RG&E School refrigeration
2019	Refrigeration – all Other Commercial	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration	RG&E total Commercial refrigeration
2020	Streetlighting	Based on dusk- to-dawn lighting model	1.00 assumed	1.00 assumed	Dusk-to-dawn model, average St. John's sunrise/ sunset

 ⁴⁰ Rochester Gas & Electric Company; 1991 DSM Evaluation Report Load Shape working papers.
 ⁴¹ Modifications for per-unit load shapes for Small Office and Small Non-food Retail reduced overnight loads by 50% after 6 pm (Office) and after 9 pm (Non-food Retail).

Exhibit 104 Commercial End Use Load Shape Parameters (cont'd...)

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2021	Outdoor lighting	Based on outdoor lighting model	1.00 assumed	1.00 assumed	Outdoor lighting model, with RG&E 1991 study factors (0.55 overnight, 0.1 day, 1.0 eve.)
2022	Space heating – Office	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand ⁴²	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 Study for Office Space Heating
2023	Space heating – Retail Food/Non-Food	10-year average St. John's HDD	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Retail Space heating
2024	Space heating – Accommodation/ Healthcare	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Hospital/Long-term care space heating
2025	Space heating – School / University and College	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for School space heating
2026	Space heating – Restaurant	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for total Restaurant space heating
2027	Space heating – all Other Commercial	St. John's Newfoundland 1971-2000 (30- year) Normal HDD; then calibrated to actual utility demand	1.00 assumed	10-year average ratio of peak/avg. HDD	RG&E 1991 study for Commercial space heating
2028	Food service equipment – Restaurant	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking	RG&E total Restaurant cooking
2029	Food service equipment – Accommodation / Healthcare	RG&E total Hospital/Long- term Care cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long- term Care Cooking	RG&E total Hospital/Long- term Care cooking
2030	Food service equipment – Food Retail	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking	RG&E Grocery cooking
2031	Food service equipment – School/University	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2032	Food service equipment – all Other Commercial	RG&E School cooking	RG&E School cooking	RG&E School cooking	RG&E School cooking
2033	Domestic hot water (DHW) – Restaurant	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat	RG&E Restaurant water heat
2034	Domestic hot water (DHW) – Accommodation / Health	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat	RG&E total Commercial water heat

⁴² Heating degree days on an 18°C base for period 2001 - 2010 for the St. John's weather station.

Load Shape #	End Use	Monthly Breakdown	Wkend / Wkday Ratio	Peak Day Factor	Hourly Profile
2035	DHW – Food Retail and Non-Food Retail	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat	RG&E Retail water heat
2036	DHW – School / University	RG&E School water heat	RG&E School water heat	RG&E School water heat	RG&E School water heat
2037	DHW – all Other Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial	RG&E water heat Commercial
2038	Space cooling – All Commercial	Assumed 100% off winter peak	1.00 various studies	Assumed 100% off winter peak	RG&E 1991 study for Commercial space cooling
2039	Computer, plug load	RG&E Office lighting	RG&E Office lighting	1.00 assumed	RG&E Office lighting
2040	Elevators	NYC subways	NYC subways (0.7881)	1.0 Assumed	NYC subways (6 am-6 pm), arch Office lighting (6 pm –6 am)
2041	Engine Block Heaters	Monthly shape for Labrador assumed similar to SK; then calibrated to actual utility demand	1.00 assumed	Peak Day factor assumed similar to SK	Flat, average 7.9 hrs/day for 90 days ⁴³

Exhibit 104 Commercial End Use Load Shape Parameters (cont'd...)

Exhibit 105 shows the distinct hour-use values developed for each combination of peak period, sector, sub sector and end use employed in this study, as generated from the applicable load shape.

The hours-use value represents the divisor to convert annual energy (e.g., MWh) to that peak period demand. For example, dividing the annual electricity consumed for general lighting in offices by the hours-use value for the Annual Peak Hour (i.e. 5,771) will convert annual MWh to demand at the annual system peak hour (6 pm).
Exhibit 105 Commercial Sector Load Shape Hours-Use Values

Region	Sub-sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting
	Large Office	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Small Office	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Large Non-food Retail	964	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,520	7,139
	Small Non-food Retail	964	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,520	7,139
	Food Retail	964	6,393	6,393	7,130	6,393	7,307	6,778	6,393	6,393	6,393	7,139	8,772	6,393	1.E+15	2,520	7,139
	Large Accomodation	964	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,386	7,139
	Small Accomodation	964	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,386	7,139
	Healthcare	964	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	3,386	7,139
	Schools	964	6,557	6,557	4,128	6,557	2,657	4,578	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,989	7,139
Island	Universities and Colleges	964	6,557	6,557	4,128	6,557	2,657	6,156	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,989	7,139
	Warehouse/Wholesale	964	7,488	7,488	6,207	7,488	2,657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	3,116	7,139
	Restaurants	964	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,294	7,139
	Labrador Isolated C/I Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Island Isolated C/I Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Large Other Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Small Other Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Other Institutional	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Non-Buildings	964	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,137	7,139
	Street Lighting	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139
	Large Office	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Small Office	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Large Non-food Retail	1,148	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	3,002	7,139
	Small Non-food Retail	1,148	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	3,002	7,139
	Food Retail	1,148	6,393	6,393	7,130	6,393	7,307	6,778	6,393	6,393	6,393	7,139	8,772	6,393	1.E+15	3,002	7,139
	Large Accomodation	1,148	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	4,033	7,139
	Small Accomodation	1,148	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	4,033	7,139
	Healthcare	1,148	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	4,033	7,139
	Schools	1,148	6,557	6,557	4,128	6,557	2,657	4,578	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	3,561	7,139
Labrador	Universities and Colleges	1,148	6,557	6,557	4,128	6,557	2,657	6,156	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	3,561	7,139
	Warehouse/Wholesale	1,148	7,488	7,488	6,207	7,488	2,657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	3,712	7,139
	Restaurants	1,148	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	3,924	7,139
	Labrador Isolated C/I Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Island Isolated C/I Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Large Other Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Small Other Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Other Institutional	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Non-Buildings	1,148	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	3,736	7,139
	Street Lighting	6,882	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	6,882	7,139

Exhibit 106 Commercial Sector Load Shape Hours-Use Values (cont'd...)

Region	Sub-sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting
	Large Office	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Small Office	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Large Non-food Retail	821	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,146	7,139
	Small Non-food Retail	821	6,393	6,393	7,130	6,393	2,657	5,790	6,393	6,393	6,393	7,139	8,453	6,393	1.E+15	2,146	7,139
	Food Retail	821	6,393	6,393	7,130	6,393	7,307	6,778	6,393	6,393	6,393	7,139	8,772	6,393	1.E+15	2,146	7,139
	Large Accomodation	821	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,883	7,139
	Small Accomodation	821	6,393	6,393	6,207	6,393	6,152	6,535	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,883	7,139
	Healthcare	821	7,488	7,488	6,207	7,488	6,152	6,800	7,488	7,488	7,488	7,139	8,490	7,488	1.E+15	2,883	7,139
	Schools	821	6,557	6,557	4,128	6,557	2,657	4,578	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,545	7,139
Isolated	Universities and Colleges	821	6,557	6,557	4,128	6,557	2,657	6,156	6,557	6,557	6,557	7,139	9,841	6,557	1.E+15	2,545	7,139
	Warehouse/Wholesale	821	7,488	7,488	6,207	7,488	2,657	5,387	7,488	7,488	7,488	7,139	7,801	7,488	1.E+15	2,653	7,139
	Restaurants	821	6,393	6,393	6,141	6,393	5,190	7,841	6,393	6,393	6,393	7,139	8,490	6,393	1.E+15	2,805	7,139
	Labrador Isolated C/I Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Island Isolated C/I Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Large Other Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Small Other Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Other Institutional	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Non-Buildings	821	6,557	6,557	6,207	6,557	2,657	5,771	6,557	6,557	6,557	7,139	8,453	6,557	1.E+15	2,671	7,139
	Street Lighting	3,137	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	7,139	3,137	7,139

Since the Utilities do not conduct regular class or end-use load analysis studies, there is no actual total (or sub sector) end-use load profile upon which to calibrate the load profile models developed for this study. The best option for calibrating NL-specific load profile parameters is the weather-sensitive loads, since that is the most area specific.

Since separately metered space heating end-use load data was not available from the Utilities, normal weather for the past 10 years was used to determine monthly allocations, and weekend/weekday ratios were developed from similar studies for another Canadian utility.

For peak day factors, analysis of the past 30 years' average vs. peak weather conditions (in heating degree days) for St. John's was analyzed to determine typical peak day factors for normal weather, which ranged from about 1.4 to 1.5 for winter months. For non weather-sensitive end uses, a factor of 1.0 was assumed, absent specific load study data.

B.3 Detailed Results

The following exhibits shows peak demand by region, sub sector and end use for the peak period identified for this study.

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Large Office	-	4	1	2	0	0	9	7	0	1	1	0	2	4	30	-	62
Small Office	-	3	1	2	-	-	7	3	0	1	1	0	1	3	24	-	45
Large Non-food Retail		0	0	1	-	1	6	4	0	0	0	1	1	1	11	-	27
Small Non-food Retail		0	0	1	-	-	7	4	0	1	1		1	2	16	-	33
Food Retail	-	0	0	1	-	3	3	2	0	0	0	10	0	1	7	-	29
Large Accomodation	-	0	0	6	0	1	1	1	0	0	0	0	1	0	5	-	16
Small Accomodation	-	0	0	3	-	0	1	0	0	0	0	0	0	0	3	-	7
Healthcare	-	0	0	3	0	3	1	4	0	1	0	0	3	1	16	-	33
Schools	-	1	0	2	-	1	9	1	0	0	1	0	1	0	26	-	43
Universities and Colleges	-	2	0	0	0	1	6	5	0	1	0	0	1	0	4	-	22
Warehouse/Wholesale	-	0	0	1	-	-	4	1	0	1	0	1	1	0	8	-	16
Restaurants	-	0	0	7	-	13	0	1	0	0	0	2	1	0	4	-	28
Large Other Buildings	-	1	0	3	0	3	5	3	0	1	0	2	1	1	14	-	35
Small Other Buildings	-	1	0	3	0	3	5	3	0	1	0	2	1	1	13	-	32
Other Institutional	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Buildings	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	30
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5
Grand Total	-	13	2	34	1	30	64	39	33	7	6	18	16	15	180	5	463
					-												

Exhibit 107 Commercial Sector Base Year (2014) Peak Hour Demand, Island Interconnected, by Sub Sector and End Use (MW)*

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Small Office	0.0	0.1	0.0	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	-	1
Large Non-food Retail	0.0	0.0	0.0	0.1	-	0.1	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.9		2
Small Non-food Retail	0.0	0.0	0.0	0.1	-	-	0.7	0.2	0.0	0.1	0.1	-	0.1	0.0	2.2	-	4
Food Retail	0.0	0.0	0.0	0.1	-	0.2	0.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.6	-	3
Large Accomodation	0.0	0.0	0.0	0.6	-	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.7	-	2
Small Accomodation	0.0	0.0	0.0	0.1	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-	0
Healthcare	0.1	0.1	0.0	0.7	0.0	0.4	0.1	0.5	0.0	0.1	0.1	0.0	0.4	0.0	0.8	-	3
Schools	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	3
Universities and Colleges	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4		1
Warehouse/Wholesale	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1		2
Restaurants	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3		2
Large Other Buildings	0.1	0.2	0.0	2.0	0.0	1.8	1.4	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1		15
Small Other Buildings	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3		10
Other Institutional	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	2.7	-	9
Non-Buildings	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-			1
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0
Grand Total	1	1	0	7	0	5	7	4	1	1	1	2	3	0	23	0	56

Exhibit 108 Commercial Sector Base Year (2014) Peak Hour Demand, Labrador Interconnected, by Sub Sector and End Use (MW)*

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Exhibit 109 Commercial Sector Base Year (2014) Peak Hour Demand, Isolated, by Sub Sector and End Use (MW)*

Sub Sector	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
Labrador Isolated C/I																	
Buildings	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	3.0
Island Isolated C/I																	
Buildings	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
Street Lighting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
Grand Total	0.1	0.2	-	0.1	-	0.2	1.3	0.2		0.1	0.1	0.4	0.3	-	0.2	0.1	3.3

*Results are measured at the customer's point-of-use and do not include line losses. Any differences in totals are due to rounding.

Appendix C Background-Section 5: Reference Case Electricity Use

Introduction

Appendix C provides additional detailed information related to the construction of the Commercial sector Reference Case. The appendix discusses the following:

- Natural change assumptions
- Expected growth in building stock
- CEEAM archetype summaries new buildings

C.1 Natural Change Assumptions

For the purposes of this study, "natural" changes to electricity consumption are defined as those changes to electricity usage patterns that occur without incentive or other intervention. Expected natural changes in electricity consumption patterns over the study period take into account four major factors:

- Naturally-occurring improvements in equipment efficiency
- Expected stock penetration by more efficient equipment
- Changes in equipment density, e.g., computers and plug loads, etc.
- Changes in electric share in end uses for which fuel may vary, such as space heating and water heating.

Note that the first two factors will have the effect of reducing electricity consumption, while the third and fourth factor may result in either increased or decreased electricity demand.

Based on the assessment of current trends, the most significant natural changes are expected to involve the following end uses:

- Space cooling
- Lighting
- Computer equipment and other plug loads
- Water heating
- Space heating

Further discussion of these changes follows and, in each case, the discussion identifies the technical change, the major driver(s) and the assumed electricity impact.

Space Cooling

As a result of natural conservation and efficiency gains, it is assumed that new space cooling equipment will provide improved electricity performance compared to existing equipment. Packaged rooftop units are available on the market with energy-efficiency ratios (EER) exceeding 12.0.⁴⁴ Similarly, new VFD centrifugal chillers achieve performance efficiencies in the region of 0.35 kW/ton. The combined effects of natural conservation and efficiency gains are estimated to result in a decrease of 5% in space cooling EUI over the length of the study. At the same time, the saturation of cooling equipment in new buildings will increase.

⁴⁴ See <u>http://www.energence.com/res/pdf/52W81_energence_58937_0709.pdf</u> for example. Current federal energyefficiency regulations require a minimum EER of 10.3 for rooftop air conditioning units with a capacity of 5.5 - 11 tons.

As illustrated in Exhibit 110, the net effect of efficiency gains and increased space cooling saturation is expected to reduce energy consumption for space cooling in existing commercial buildings. Increases in overall space cooling energy use through time are expected to be due entirely to the construction of new building stock (Exhibit 111).

Exhibit 110 Reference Case Space Cooling Electricity Use in Existing Buildings by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	10,209	10,107	10,005	9,903	9,801	9,699
Small Office	7,928	7,849	7,769	7,690	7,611	7,532
Large Non-food Retail	3,224	3,192	3,160	3,128	3,095	3,063
Small Non-food Retail	4,984	4,935	4,885	4,835	4,785	4,735
Food Retail	1,610	1,594	1,577	1,561	1,545	1,529
Large Accomodation	1,210	1,198	1,186	1,174	1,162	1,150
Small Accomodation	411	407	403	399	394	390
Healthcare	2,446	2,397	2,373	2,349	2,325	2,300
Schools	279	277	274	271	268	265
Universities and Colleges	1,341	1,328	1,315	1,301	1,288	1,274
Warehouse/Wholesale	114	113	112	110	109	108
Restaurants	1,007	997	987	977	967	957
Labrador Isolated C/I Buildings	0	0	0	0	0	0
Island Isolated C/I Buildings	0	0	0	0	0	0
Large Other Buildings	2,936	2,906	2,877	2,848	2,818	2,789
Small Other Buildings	2,711	2,672	2,645	2,618	2,591	2,564
Other Institutional	219	217	214	212	210	208
Non-Buildings	0	0	0	0	0	0
Street Lighting	0	0	0	0	0	0
Grand Total	40,630	40,187	39,781	39,375	38,969	38,564

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	0	356	850	1,527	2,012	2,569
Small Office	0	213	751	1,220	1,555	1,940
Large Non-food Retail	0	101	312	497	635	791
Small Non-food Retail	0	77	323	574	768	985
Food Retail	0	26	105	181	236	299
Large Accomodation	0	28	105	177	229	289
Small Accomodation	0	6	34	64	85	110
Healthcare	0	17	99	188	254	329
Schools	0	23	91	159	211	269
Universities and Colleges	0	91	243	380	491	613
Warehouse/Wholesale	0	5	17	27	35	43
Restaurants	0	19	74	124	159	200
Labrador Isolated C/I Buildings	0	0	0	0	0	0
Island Isolated C/I Buildings	0	0	0	0	0	0
Large Other Buildings	0	80	269	442	570	716
Small Other Buildings	0	1	109	260	378	507
Other Institutional	0	2	4	6	7	9
Non-Buildings	0	0	0	0	0	0
Street Lighting	0	0	0	0	0	0
Grand Total	0	1,046	3,387	5,826	7,626	9,669

Exhibit 111 Reference Case Space Cooling Electricity Use in New Buildings by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Lighting

As a result of natural conservation, it is assumed that the replacement of existing T12 fluorescent lighting and electromagnetic ballasts with new T8 fluorescent lamps and electronic ballasts and even some LED lamps and fixtures will continue. Similarly, CFLs and LED lamps will continue to increase their market share over incandescent lamps, particularly in sub sectors such as Hotel/Motel and Non-food Retail. In addition, LED fixtures designed for outdoor applications will gain market share from MH and HPS fixtures.

The continued growth of CFLs, T8 lighting/electronic ballasts, and LED lamps and fixtures is being driven by:

- Recent improvements in LED lighting efficacy combined with rapidly declining costs
- Increased consumer recognition of the operating cost savings
- Energy regulations that are gradually removing electromagnetic fluorescent ballasts and incandescent lighting products from the marketplace

Overall, the Reference Case assumes that by 2030 the energy intensity of general and secondary lighting in the existing building stock will decrease by 10%, while the energy intensity of outdoor lighting will decrease by 20%.

Exhibit 112 shows the impact of these EUI improvements on indoor lighting⁴⁵ energy consumption, while Exhibit 113 shows indoor lighting energy use by sub sector and milestone year in new construction. Exhibit 114 and Exhibit 115 show the energy consumption in existing and new construction for outdoor lighting. Again, all increases in overall lighting energy use through time are expected to be due entirely to the construction of new building stock.

Exhibit 112 Reference Case Indoor Lighting Electricity Use by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	69,866	68,469	67,072	65,674	64,277	62,880
Small Office	46,547	45,616	44,685	43,754	42,824	41,893
Large Non-food Retail	40,054	39,252	38,451	37,650	36,849	36,048
Small Non-food Retail	50,833	49,816	48,799	47,783	46,766	45,749
Food Retail	23,933	23,454	22,976	22,497	22,018	21,540
Large Accomodation	15,282	14,977	14,671	14,365	14,060	13,754
Small Accomodation	5,890	5,772	5,654	5,536	5,418	5,301
Healthcare	30,169	28,722	28,136	27,550	26,964	26,377
Schools	55,194	54,090	52,987	51,883	50,779	49,675
Universities and Colleges	45,256	44,351	43,446	42,541	41,636	40,731
Warehouse/Wholesale	24,656	24,163	23,670	23,177	22,684	22,191
Restaurants	10,710	10,496	10,281	10,067	9,853	9,639
Labrador Isolated C/I Buildings	8,517	8,246	8,078	7,910	7,741	7,573
Island Isolated C/I Buildings	800	771	756	740	724	708
Large Other Buildings	50,707	49,693	48,679	47,665	46,651	45,636
Small Other Buildings	44,114	43,065	42,186	41,307	40,429	39,550
Other Institutional	17,273	16,927	16,582	16,236	15,891	15,545
Grand Total	539,801	527,882	517,109	506,336	495,563	484,790

Sub-Sector	2017	2020	2023	2026	2029
Large Office	1,527	3,646	6,549	8,628	11,017
Small Office	801	2,836	4,608	5,879	7,336
Large Non-food Retail	849	2,623	4,170	5,328	6,645
Small Non-food Retail	570	2,412	4,284	5,743	7,368
Food Retail	296	1,211	2,084	2,715	3,435
Large Accomodation	192	707	1,192	1,548	1,952
Small Accomodation	34	182	336	450	579
Healthcare	137	797	1,516	2,048	2,647
Schools	730	2,857	4,993	6,608	8,429
Universities and Colleges	426	1,140	1,784	2,307	2,880
Warehouse/Wholesale	436	1,414	2,274	2,919	3,649
Restaurants	122	475	795	1,024	1,286
Labrador Isolated C/I Buildings	0	1,144	1,510	1,859	2,209
Island Isolated C/I Buildings	0	125	160	195	230
Large Other Buildings	615	2,044	3,351	4,324	5,424
Small Other Buildings	13	922	2,135	3,095	4,140
Other Institutional	116	233	351	469	589
Grand Total	6,863	24,767	42,091	55,138	69,816

Exhibit 113 Reference Case Indoor Lighting Electricity Use by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	4,524	4,343	4,162	3,981	3,800	3,619
Small Office	3,756	3,606	3,455	3,305	3,155	3,005
Large Non-food Retail	3,583	3,440	3,296	3,153	3,010	2,866
Small Non-food Retail	5,305	5,093	4,881	4,669	4,456	4,244
Food Retail	2,612	2,507	2,403	2,298	2,194	2,089
Large Accomodation	1,172	1,125	1,079	1,032	985	938
Small Accomodation	523	502	481	460	439	418
Healthcare	4,036	3,764	3,608	3,451	3,294	3,137
Schools	6,281	6,030	5,779	5,528	5,276	5,025
Universities and Colleges	3,289	3,157	3,026	2,894	2,763	2,631
Warehouse/Wholesale	2,385	2,289	2,194	2,098	2,003	1,908
Restaurants	474	455	436	417	398	379
Labrador Isolated C/I Buildings	739	701	671	642	613	584
Island Isolated C/I Buildings	69	66	63	60	57	55
Large Other Buildings	4,741	4,551	4,362	4,172	3,982	3,793
Small Other Buildings	4,365	4,174	4,000	3,827	3,653	3,479
Other Institutional	1,406	1,350	1,294	1,237	1,181	1,125
Grand Total	49,260	47,154	45,189	43,224	41,260	39,295

Exhibit 114 Reference Case Outdoor Lighting Electricity Use by Sub Sector and Milestone Year – Existing Buildings (MWh/yr.)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	126	300	539	710	907
Small Office	79	280	456	581	725
Large Non-food Retail	101	311	495	633	789
Small Non-food Retail	68	289	513	688	882
Food Retail	54	219	378	492	623
Large Accomodation	21	78	132	172	217
Small Accomodation	5	26	48	65	83
Healthcare	22	129	246	332	429
Schools	96	377	658	871	1,111
Universities and Colleges	37	99	155	201	251
Warehouse/Wholesale	50	161	259	333	416
Restaurants	8	30	50	65	81
Labrador Isolated C/I Buildings	0	142	188	231	274
Island Isolated C/I Buildings	0	16	20	24	29
Large Other Buildings	71	236	388	500	627
Small Other Buildings	2	114	262	380	508
Other Institutional	12	25	37	50	62
Grand Total	752	2,834	4,825	6,327	8,016

Exhibit 115 Reference Case Outdoor Lighting Electricity Use by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Computer Equipment, Computer Servers and Other Plug Loads

Computer equipment and other plug loads will continue to grow as a result of increased density of computers and peripherals per occupant, increased use of server load, and growth in other peripherals, such as telephone network equipment. Increased penetration of laptops, more efficient server hardware and higher penetration of ENERGY STAR® rated computer equipment and other plug loads is expected to counterbalance the effect of increasing hardware density to some degree.

Overall, the Reference Case assumes that by 2030 the energy intensity of computer equipment and plug loads in the existing building stock will increase by 10%. The impact on electricity use in existing buildings and new buildings is shown in Exhibit 116 and Exhibit 117, below.

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	36,032	36,752	37,473	38,194	38,914	39,635
Small Office	29,916	30,514	31,112	31,711	32,309	32,907
Large Non-food Retail	5,119	5,222	5,324	5,426	5,529	5,631
Small Non-food Retail	7,580	7,731	7,883	8,035	8,186	8,338
Food Retail	5,152	5,255	5,358	5,461	5,564	5,667
Large Accomodation	2,769	2,824	2,880	2,935	2,990	3,046
Small Accomodation	1,240	1,264	1,289	1,314	1,339	1,364
Healthcare	13,131	13,012	13,267	13,522	13,777	14,032
Schools	10,708	10,922	11,136	11,350	11,564	11,778
Universities and Colleges	15,622	15,935	16,247	16,559	16,872	17,184
Warehouse/Wholesale	7,009	7,149	7,289	7,429	7,569	7,709
Restaurants	1,169	1,193	1,216	1,239	1,263	1,286
Labrador Isolated C/I Buildings	1,728	1,741	1,775	1,809	1,843	1,878
Island Isolated C/I Buildings	162	163	166	169	172	176
Large Other Buildings	15,065	15,366	15,668	15,969	16,270	16,572
Small Other Buildings	13,485	13,700	13,969	14,238	14,506	14,775
Other Institutional	3,287	3,353	3,418	3,484	3,550	3,616
Grand Total	169,173	172,096	175,470	178,845	182,219	185,593

Exhibit 116 Computer and Plug Load Energy Use in by Sub Sector and Milestone Year –Existing Buildings (MWh/yr.)

Sub-Sector	2017	2020	2023	2026	2029
Large Office	1,002	2,392	4,295	5,659	7,226
Small Office	631	2,234	3,630	4,631	5,779
Large Non-food Retail	144	445	708	904	1,128
Small Non-food Retail	98	413	733	983	1,261
Food Retail	71	290	499	650	822
Large Accomodation	49	180	304	394	497
Small Accomodation	11	60	111	149	191
Healthcare	71	410	779	1,052	1,360
Schools	164	642	1,122	1,485	1,894
Universities and Colleges	176	471	737	953	1,190
Warehouse/Wholesale	146	473	761	977	1,222
Restaurants	19	74	123	159	199
Labrador Isolated C/I Buildings	0	292	386	475	564
Island Isolated C/I Buildings	0	32	41	50	59
Large Other Buildings	230	770	1,263	1,629	2,044
Small Other Buildings	4	331	774	1,122	1,502
Other Institutional	26	53	79	106	133
Grand Total	2,841	9,561	16,344	21,378	27,070

Exhibit 117 Computer and Plug Load Energy Use in by Sub Sector and Milestone Year – New Buildings (MWh/yr.)

Water Heating

Electricity consumption for water heating is expected to stay constant within the existing building stock. However, it will grow within the new building stock, as electric water heating fuel shares are expected to be higher in new buildings than in existing ones. This is largely driven by an expected increase in electric space heating in the new building stock (see below), and the fact that buildings rarely maintain oil or propane service for water heating alone.

Exhibit 118 illustrates the increased difference in electric water heating penetration between existing and new buildings. This leads to a growth in electricity use for water heating, which will outpace growth in floor area.

Sub Sector	Island - Existing Buildings	Island - New Buildings	Labrador - Existing Buildings	Labrador - New Buildings
Large Office	90%	100%	100%	100%
Small Office	95%	100%	100%	100%
Large Non-Food Retail	90%	100%	100%	100%
Small Non-Food Retail	95%	100%	100%	100%
Food Retail	90%	100%	100%	100%
Large Accomodation	90%	100%	100%	100%
Small Accomodation	90%	100%	100%	100%
Healthcare	60%	100%	100%	100%
Schools	80%	100%	100%	100%
Universities and Colleges	25%	100%	100%	100%
Warehouse / Wholesale	80%	100%	100%	100%
Restaurant	95%	100%	100%	100%

Exhibit 118 Electric DHW Share by Sub Sector – Existing and New Buildings (%)

It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

Space Heating

In recent years, electric space heating penetrations in new commercial construction have exceeded the historical average, a trend that is presently expected to continue. Similar to the discussion of water heating energy above, electricity consumption for space heating is expected to stay constant within the existing building stock, but to grow rapidly within the new building stock. The penetration of high performance, electrically powered heating equipment is expected to remain low over the study period.

Exhibit 119 illustrates the increased difference in electric space heating penetration between existing and new buildings. This leads to a growth in electricity use for space heating, which will outpace growth in floor area.

Sub Sector	Island - Existing Buildings	Island - New Buildings	Labrador - Existing Buildings	Labrador - New Buildings
Large Office	85%	100%	100%	100%
Small Office	90%	100%	100%	100%
Large Non-Food Retail	85%	100%	100%	100%
Small Non-Food Retail	85%	100%	100%	100%
Food Retail	85%	100%	100%	100%
Large Accomodation	90%	100%	100%	100%
Small Accomodation	90%	100%	100%	100%
Healthcare	50%	100%	100%	100%
Schools	75%	100%	100%	100%
Universities and Colleges	20%	100%	90%	100%
Warehouse / Wholesale	75%	100%	80%	100%
Restaurant	90%	100%	100%	100%

Exhibit 119 Electric Space Heating Share by Sub Sector – Existing and New Buildings (%)

It should be noted that the electric fuel share and space cooling saturation was not estimated for all sub sectors. Rather, the end use EUIs for the other sub sectors was derived based on a weighted average of the EUIs for specific sub sectors. Section 5.3 includes more details on how this approach was implemented.

Overall Impact of Natural Changes

As illustrated in Exhibit 120, the overall impact of the natural changes in energy usage patterns described above are very minimal, as load growth is anticipated by the Utilities in each milestone year. Virtually all growth in electricity use through the study period occurs within the new building stock.

Sub-Sector	2014	2017	2020	2023	2026	2029
Large Office	273,262	272,302	271,343	270,383	269,423	268,463
Small Office	193,065	192,503	191,941	191,379	190,816	190,254
Large Non-food Retail	123,515	122,641	121,767	120,892	120,018	119,144
Small Non-food Retail	148,847	147,719	146,592	145,465	144,338	143,211
Food Retail	173,352	172,856	172,360	171,864	171,368	170,871
Large Accomodation	69,655	69,346	69,036	68,727	68,418	68,109
Small Accomodation	28,191	28,073	27,955	27,837	27,719	27,601
Healthcare	161,941	157,667	157,155	156,643	156,131	155,619
Schools	174,289	173,145	172,001	170,857	169,714	168,570
Universities and Colleges	124,745	124,007	123,270	122,532	121,794	121,057
Warehouse/Wholesale	79,216	78,766	78,317	77,867	77,418	76,968
Restaurants	105,467	105,248	105,028	104,808	104,588	104,368
Labrador Isolated C/I Buildings	17,062	16,693	16,530	16,366	16,203	16,040
Island Isolated C/I Buildings	1,505	1,466	1,451	1,435	1,420	1,405
Large Other Buildings	217,045	216,113	215,181	214,249	213,318	212,386
Small Other Buildings	182,923	181,429	180,617	179,806	178,995	178,184
Other Institutional	45,979	69,261	85,623	85,285	84,947	84,608
Non-Buildings	204,856	207,490	214,805	221,041	225,350	230,330
Street Lighting	37,127	36,851	36,931	36,999	37,043	37,086
Grand Total	2,362,042	2,373,575	2,387,902	2,384,436	2,379,020	2,374,274

Exhibit 120 Total Energy Use by Sub Sector and Milestone Year – Existing Sub sectors (MWh/yr.)

C.2 Expected Growth in Building Stock

The next step in developing the Reference Case involved the development and application of estimated levels of floor space growth in each building sub sector over the study period. The stock growth rates were derived from the sales forecast data provided by the Utilities. The derivation of floor space data in each of the milestone periods applied the following steps:

- As described above for the existing building stock, estimate and apply the expected impact of natural changes within the new building stock over the study period. Efficiency improvements are expected to be more moderate within the new building stock through time. Computer and other plug load growth are expected to be consistent in both existing and new buildings.
- Add floor space at a rate consistent with the utility forecast of electricity consumption growth for each combination of sub sector and milestone year.

A summary of the total new commercial floor space at each milestone period is provided in Exhibit C11.

Sub-Sector	2017	2020	2023	2026	2029
Large Office	287,000	686,000	1,231,000	1,622,000	2,071,000
Small Office	181,000	640,000	1,040,000	1,328,000	1,656,000
Large Non-food Retail	115,000	356,000	565,000	722,000	901,000
Small Non-food Retail	78,000	330,000	586,000	785,000	1,007,000
Food Retail	41,000	169,000	291,000	379,000	479,000
Large Accomodation	49,000	179,000	302,000	392,000	495,000
Small Accomodation	11,000	60,000	110,000	148,000	190,000
Healthcare	25,000	144,000	273,000	369,000	477,000
Schools	220,000	860,000	1,503,000	1,989,000	2,537,000
Universities and Colleges	85,000	226,000	354,000	458,000	572,000
Warehouse/Wholesale	113,000	368,000	591,000	759,000	949,000
Restaurants	18,000	68,000	114,000	147,000	185,000
Labrador Isolated C/I Buildings	0	354,000	467,000	575,000	683,000
Island Isolated C/I Buildings	0	39,000	49,000	60,000	71,000
Large Other Buildings	127,000	422,000	693,000	894,000	1,121,000
Small Other Buildings	3,000	190,000	443,000	642,000	859,000
Other Institutional	23,000	45,000	68,000	91,000	115,000
Grand Total	1,374,000	5,136,000	8,682,000	11,361,000	14,370,000

Exhibit 121 New Commercial Building Floor Space, by Sub Sector and Milestone Year (ft2)

C.3 Results by Region

This section of the appendix presents the reference case electricity consumption for the three regions.

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	24,326	4,319	5,999	1,033	1,067	53,893	46,186	2,666	7,386	4,524	1,067	15,973	10,209	94,614	0	273,262
	2017	0	25,489	4,526	6,179	1,062	1,096	54,127	47,938	2,740	7,739	4,469	1,096	15,870	10,463	96,854	0	279,648
Large Office	2020	0	26,914	4,779	6,427	1,101	1,137	54,868	50,370	2,843	8,172	4,462	1,137	15,850	10,855	99,960	0	288,877
Large Onice	2023	0	28,686	5,093	6,768	1,156	1,194	56,281	53,700	2,984	8,710	4,520	1,194	15,942	11,430	104,216	0	301,873
	2026	0	30,093	5,343	7,013	1,195	1,234	56,989	56,085	3,085	9,137	4,510	1,234	15,916	11,813	107,265	0	310,912
	2029	0	31,637	5,617	7,293	1,240	1,280	57,962	58,826	3,201	9,606	4,526	1,280	15,935	12,268	110,768	0	321,441
	2014	0	19,802	3,516	5,155	0	0	39,734	19,864	2,170	6,012	3,682	868	5,902	7,866	74,726	0	189,299
	2017	0	20,624	3,662	5,268	0	0	39,687	20,687	2,217	6,262	3,614	868	5,837	8,000	76,011	0	192,738
Small Office	2020	0	22,091	3,922	5,552	0	0	40,774	22,759	2,335	6,708	3,666	868	5,852	8,457	79,243	0	202,226
Sillali Ollice	2023	0	23,420	4,158	5,799	0	0	41,617	24,563	2,437	7,111	3,692	868	5,850	8,844	82,057	0	210,419
	2026	0	24,483	4,347	5,976	0	0	41,994	25,852	2,510	7,434	3,669	868	5,815	9,099	84,069	0	216,118
	2029	0	25,645	4,553	6,179	0	0	42,544	27,333	2,594	7,787	3,664	868	5,792	9,403	86,379	0	222,741
	2014	0	1,886	435	1,685	0	3,817	33,975	27,191	985	2,456	3,344	5,725	3,596	3,168	27,391	0	115,655
	2017	0	1,980	457	1,740	0	3,930	34,073	27,841	1,015	2,578	3,309	5,895	3,579	3,236	27,913	0	117,546
Largo Non-food Potail	2020	0	2,135	493	1,858	0	4,169	35,037	29,214	1,076	2,780	3,384	6,253	3,621	3,415	29,015	0	122,450
Large Non-1000 Retail	2023	0	2,276	525	1,959	0	4,377	35,788	30,409	1,130	2,963	3,433	6,565	3,649	3,566	29,974	0	126,614
	2026	0	2,390	552	2,036	0	4,532	36,175	31,301	1,170	3,112	3,435	6,797	3,651	3,671	30,690	0	129,511
	2029	0	2,515	581	2,122	0	4,708	36,712	32,317	1,215	3,275	3,456	7,062	3,664	3,795	31,505	0	132,927
	2014	0	2,733	631	2,577	0	0	41,215	28,604	1,428	3,559	4,845	0	4,845	4,863	39,263	0	134,563
	2017	0	2,825	652	2,614	0	0	40,907	28,989	1,447	3,678	4,717	0	4,783	4,890	39,807	0	135,310
Small Non food Potail	2020	0	2,996	691	2,729	0	0	41,689	30,189	1,508	3,900	4,729	0	4,794	5,077	41,499	0	139,801
Sinali Non-1000 Ketali	2023	0	3,169	732	2,847	0	0	42,512	31,420	1,570	4,127	4,746	0	4,808	5,270	43,236	0	144,436
	2026	0	3,315	765	2,938	0	0	42,950	32,363	1,618	4,316	4,714	0	4,796	5,406	44,566	0	147,748
	2029	0	3,472	801	3,040	0	0	43,544	33,423	1,671	4,521	4,702	0	4,794	5,565	46,061	0	151,595
	2014	0	2,199	322	3,279	0	8,744	19,666	11,213	729	2,369	2,473	87,439	3,103	1,584	18,821	0	161,939
	2017	0	2,274	333	3,332	0	8,871	19,534	11,373	739	2,451	2,427	88,630	3,074	1,594	19,013	0	163,644
Food Potail	2020	0	2,415	354	3,495	0	9,262	19,944	11,866	772	2,604	2,492	92,300	3,115	1,657	19,604	0	169,881
roou ketali	2023	0	2,551	374	3,651	0	9,637	20,320	12,337	803	2,753	2,551	95,809	3,152	1,717	20,169	0	175,824
	2026	0	2,661	390	3,763	0	9,906	20,480	12,677	826	2,873	2,565	98,337	3,161	1,756	20,577	0	179,972
	2029	0	2,781	408	3,892	0	10,214	20,719	13,064	851	3,004	2,595	101,222	3,180	1,802	21,041	0	184,773

Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.)

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Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	1,104	232	14,755	244	3,090	6,841	5,480	631	1,205	1,070	1,892	7,169	1,153	17,745	0	62,610
	2017	0	1,146	241	15,076	249	3,120	6,787	5,582	643	1,253	1,048	1,910	7,131	1,170	18,081	0	63,437
Large Accomodation	2020	0	1,222	258	15,946	262	3,202	6,876	5,858	676	1,341	1,062	1,960	7,275	1,234	18,994	0	66,167
Large Accomodation	2023	0	1,295	275	16,766	274	3,279	6,951	6,118	708	1,426	1,073	2,008	7,402	1,294	19,853	0	68,720
	2026	0	1,354	288	17,364	283	3,336	6,969	6,308	731	1,494	1,069	2,042	7,456	1,335	20,481	0	70,508
	2029	0	1,418	302	18,046	293	3,400	7,009	6,524	757	1,568	1,071	2,082	7,538	1,383	21,196	0	72,586
	2014	0	525	110	7,022	0	750	3,690	1,397	300	574	509	450	2,047	402	9,485	0	27,262
	2017	0	541	114	7,097	0	757	3,633	1,412	303	591	494	454	2,023	405	9,570	0	27,393
Small Accomodation	2020	0	571	120	7,417	0	788	3,633	1,475	315	626	494	473	2,054	428	9,932	0	28,326
	2023	0	602	127	7,752	0	820	3,636	1,541	328	662	496	492	2,088	453	10,313	0	29,310
	2026	0	628	133	7,998	0	844	3,619	1,590	338	691	491	506	2,102	470	10,593	0	30,004
	2029	0	656	139	8,278	0	871	3,609	1,645	348	723	489	523	2,124	491	10,910	0	30,805
	2014	0	3,645	844	8,124	807	8,332	4,604	27,075	1,042	7,008	3,534	1,562	21,812	2,338	54,806	0	145,533
	2017	0	3,741	866	8,207	812	8,383	4,544	27,256	1,048	7,192	3,415	1,572	21,480	2,332	55,087	0	145,934
lealthcare	2020	0	3,919	907	8,598	835	8,624	4,605	28,107	1,078	7,534	3,379	1,617	21,536	2,389	56,406	0	149,535
	2023	0	4,107	950	9,026	861	8,887	4,681	29,036	1,111	7,896	3,352	1,666	21,638	2,454	57,848	0	153,511
	2026	0	4,264	987	9,340	879	9,080	4,712	29,719	1,135	8,199	3,295	1,703	21,597	2,495	58,908	0	156,313
	2029	0	4,433	1,026	9,694	900	9,299	4,759	30,490	1,162	8,522	3,249	1,744	21,607	2,545	60,104	0	159,534
	2014	0	7,376	1,293	5,337	0	1,404	42,801	8,422	1,053	1,486	5,957	1,053	9,582	267	76,730	0	162,762
	2017	0	7,640	1,339	5,443	0	1,427	42,544	8,597	1,070	1,540	5,813	1,070	9,509	287	78,070	0	164,350
Schools	2020	0	8,131	1,425	5,753	0	1,492	43,437	9,108	1,119	1,639	5,852	1,119	9,666	352	81,980	0	171,072
	2023	0	8,622	1,511	6,064	0	1,558	44,340	9,622	1,168	1,738	5,892	1,168	9,825	417	85,912	0	177,836
	2026	0	9,029	1,583	6,299	0	1,607	44,809	10,009	1,205	1,820	5,863	1,205	9,897	465	88,874	0	182,665
	2029	0	9,470	1,660	6,564	0	1,663	45,449	10,446	1,247	1,909	5,861	1,247	10,004	520	92,219	0	188,258
	2014	0	1,742	579	1,958	0	0	19,171	4,292	1,310	4,212	2,223	7,861	3,812	108	24,251	0	71,518
	2017	0	1,816	603	2,016	0	0	19,199	4,363	1,339	4,389	2,183	8,034	3,756	112	24,817	0	72,627
Warehouse/Wholesale	2020	0	1,936	643	2,144	0	0	19,727	4,521	1,403	4,679	2,203	8,419	3,724	122	26,071	0	75,593
	2023	0	2,046	680	2,257	0	0	20,144	4,660	1,460	4,945	2,210	8,757	3,688	131	27,172	0	78,147
	2026	0	2,136	710	2,341	0	0	20,357	4,763	1,501	5,164	2,192	9,009	3,641	137	27,993	0	79,943
	2029	0	2,234	742	2,436	0	0	20,651	4,880	1,549	5,401	2,184	9,295	3,598	145	28,925	0	82,041
	2014	0	410	113	18,743	0	33,431	2,352	3,434	256	545	435	16,672	7,540	989	11,925	0	96,846
	2017	0	426	118	19,090	0	34,019	2,345	3,484	261	565	425	16,965	7,471	998	12,259	0	98,426
Restaurants	2020	0	455	126	20,077	0	35,690	2,411	3,627	274	603	430	17,799	7,552	1,042	13,210	0	103,295
	2023	0	481	133	20,971	0	37,205	2,466	3,757	285	639	432	18,554	7,612	1,081	14,072	0	107,689
	2026	0	503	139	21,605	0	38,280	2,492	3,850	294	667	429	19,090	7,610	1,106	14,684	0	110,749
	2029	0	526	145	22,334	0	39,514	2,529	3,956	303	698	427	19,705	7,630	1,136	15,386	0	114,290

Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0	6,633	1,116	7,707	356	7,918	28,123	21,288	1,335	3,972	3,382	16,038	9,791	2,667	42,605	0	152,930
	2017	0	6,888	1,159	7,884	363	8,062	28,012	21,697	1,360	4,125	3,312	16,320	9,715	2,717	43,401	0	155,014
Large Other Buildings	2020	0	7,318	1,231	8,314	379	8,409	28,545	22,688	1,420	4,383	3,336	17,005	9,809	2,877	45,329	0	161,045
Large Other Dunuings	2023	0	7,722	1,299	8,706	394	8,726	28,982	23,593	1,475	4,625	3,346	17,630	9,878	3,020	47,088	0	166,485
	2026	0	8,055	1,355	8,994	404	8,959	29,154	24,258	1,515	4,824	3,318	18,089	9,877	3,119	48,380	0	170,301
	2029	0	8,414	1,416	9,322	416	9,224	29,426	25,014	1,561	5,040	3,304	18,612	9,903	3,234	49,851	0	174,736
	2014	0	6,124	1,028	6,768	196	7,039	26,977	17,711	1,293	3,876	3,410	15,178	8,068	2,502	40,739	0	140,908
	2017	0	6,216	1,044	6,736	195	7,005	26,309	17,625	1,286	3,934	3,258	15,105	7,868	2,465	40,541	0	139,586
Small Other Buildings	2020	0	6,480	1,088	6,932	200	7,168	26,329	18,073	1,316	4,101	3,205	15,438	7,834	2,532	41,519	0	142,214
onnan otnor Bananigo	2023	0	6,812	1,144	7,224	206	7,411	26,622	18,740	1,361	4,312	3,192	15,934	7,861	2,644	42,975	0	146,438
	2026	0	7,094	1,191	7,444	211	7,595	26,712	19,245	1,395	4,490	3,150	16,309	7,842	2,723	44,075	0	149,476
	2029	0	7,393	1,241	7,690	217	7,799	26,874	19,807	1,432	4,680	3,118	16,726	7,839	2,814	45,300	0	152,930
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 2 2 2 2 2	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2014	0	0	0	0	0	0	0	0	199,788	0	0	0	0	0	0	0	199,788
	2017	0	0	0	0	0	0	0	0	202,428	0	0	0	0	0	0	0	202,428
Non-Buildings	2020	0	0	0	0	0	0	0	0	209,684	0	0	0	0	0	0	0	209,684
	2023	0	0	0	0	0	0	0	0	215,870	0	0	0	0	0	0	0	215,870
	2026	0	0	0	0	0	0	0	0	220,132	0	0	0	0	0	0	0	220,132
	2029	0	0	0	0	0	0	0	0	225,065	0	0	0	0	0	0	0	225,065
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,828	34,828
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
	2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34,448	34,448
	2014	0	88,376	15,241	90,302	3,375	78,454	362,591	257,551	216,895	49,463	42,624	159,621	108,235	39,433	544,430	34,828	2,091,418
	2017	0	91,785	15,837	91,928	3,428	79,565	360,841	262,546	219,826	51,251	41,629	161,780	107,035	40,062	553,168	34,448	2,115,128
Grand Total	2020	0	97,147	16,790	96,580	3,539	82,892	366,864	274,072	227,786	54,213	41,771	168,321	107,594	41,969	575,210	34,448	2,189,196
	2023	0	102,723	17,780	101,210	3,665	86,092	373,116	286,179	234,689	57,226	41,937	174,644	108,266	43,977	597,963	34,448	2,263,916
	2026	0	107,274	18,585	104,598	3,758	88,412	375,865	295,079	239,480	59,706	41,619	179,242	108,190	45,348	614,744	34,448	2,316,347
	2029	0	112.213	19.459	108.450	3,863	91.054	379.961	305.198	245.013	62.388	41.485	184.476	108.393	46,961	633.796	34.448	2.377,160

Exhibit 122 - Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	22	395	70	108	0	0	793	189	22	120	74	0	118	62	1,793	0	3,766
	2017	22	403	72	108	0	0	777	190	22	122	71	0	115	61	1,794	0	3,757
Small Office	2020	22	422	75	111	0	0	781	195	22	128	70	0	114	64	1,867	0	3,871
Sinali Onice	2023	23	439	78	114	0	0	781	199	23	133	68	0	113	65	1,931	0	3,968
	2026	23	456	81	116	0	0	781	203	23	139	67	0	112	67	1,992	0	4,062
	2029	24	473	84	119	0	0	781	207	24	144	66	0	111	69	2,053	0	4,154
	2014	35	135	31	134	0	273	2,234	1,154	35	176	239	410	248	56	2,699	0	7,860
	2017	36	139	32	135	0	275	2,205	1,165	36	181	231	413	245	57	2,716	0	7,863
Lorgo Nen food Datail	2020	36	142	33	136	0	277	2,175	1,176	36	185	224	416	241	57	2,733	0	7,867
Large Non-rood Retail	2023	36	146	34	137	0	279	2,146	1,187	36	190	216	419	237	58	2,751	0	7,870
	2026	36	150	35	138	0	281	2,117	1,198	36	195	208	421	233	59	2,768	0	7,875
	2029	37	153	35	139	0	283	2,088	1,209	37	200	200	424	229	59	2,786	0	7,879
	2014	68	260	60	258	0	0	4,295	1,163	68	338	460	0	478	121	6,716	0	14,283
	2017	68	266	61	259	0	0	4,227	1,174	68	346	444	0	469	121	6,743	0	14,247
Crucil New feed Detail	2020	70	280	65	267	0	0	4,261	1,242	70	364	441	0	468	131	6,923	0	14,581
Small Non-food Retail	2023	72	292	67	275	0	0	4,281	1,303	72	381	435	0	466	139	7,082	0	14,865
	2026	74	305	70	282	0	0	4,299	1,362	74	397	430	0	464	147	7,239	0	15,144
	2029	76	317	73	289	0	0	4,318	1,422	76	413	425	0	461	155	7,395	0	15,422
	2014	21	124	5	205	0	493	1,031	309	21	133	139	4,105	133	25	4,669	0	11,414
	2017	21	127	5	206	0	493	1,012	310	21	136	134	4,112	131	25	4,671	0	11,403
Example (1)	2020	21	130	5	207	0	497	997	316	21	140	130	4,142	129	25	4,680	0	11,441
Food Retail	2023	21	133	6	208	0	500	982	321	21	144	126	4,168	127	26	4,688	0	11,472
	2026	21	136	6	210	0	503	967	327	21	147	121	4,194	125	26	4,696	0	11,501
	2029	21	140	6	211	0	506	952	332	21	151	117	4,220	123	26	4,704	0	11,530
	2014	30	90	22	1,572	0	302	585	466	30	116	103	181	687	57	2,803	0	7,044
	2017	30	92	23	1,578	0	303	575	469	30	118	99	182	675	57	2,812	0	7,044
	2020	30	94	23	1,584	0	305	564	472	30	121	95	182	663	57	2,822	0	7,043
Large Accomodation	2023	31	96	24	1,589	0	306	554	476	31	124	91	183	651	57	2,831	0	7,042
	2026	31	98	24	1,595	0	307	543	479	31	127	88	183	639	56	2,841	0	7,041
	2029	31	100	25	1,601	0	308	533	482	31	129	84	184	627	56	2,850	0	7,041
	2014	4	12	3	208	0	20	98	38	4	15	14	12	55	9	438	0	929
	2017	4	12	3	208	0	20	96	38	4	16	13	12	53	8	438	0	927
0	2020	4	13	3	214	0	21	96	40	4	16	13	12	53	9	452	0	950
Small Accomodation	2023	4	13	3	219	0	21	95	41	4	17	13	13	53	9	464	0	969
	2026	4	14	3	224	0	22	94	41	4	18	12	13	53	9	476	0	988
	2029	4	14	4	229	0	22	93	42	4	18	12	13	53	9	488	0	1,007

Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr)

Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	222	518	120	1,924	57	1,184	654	3,671	74	996	502	222	3,099	108	3,057	0	16,408
	2017	171	407	94	1,483	44	913	494	2,829	57	783	372	171	2,341	83	2,356	0	12,598
Healthcare	2020	171	417	97	1,491	44	917	487	2,851	57	802	358	172	2,305	83	2,368	0	12,621
	2023	172	427	99	1,498	45	922	480	2,872	58	822	345	173	2,268	83	2,379	0	12,642
	2026	172	437	101	1,506	45	927	472	2,893	58	841	331	174	2,231	84	2,391	0	12,662
	2029	172	447	104	1,513	45	931	465	2,914	58	860	318	175	2,194	84	2,403	0	12,683
	2014	29	402	70	363	0	76	2,331	933	29	81	324	21	481	12	6,374	0	11,527
	2017	29	411	72	365	0	77	2,293	937	29	83	313	21	474	12	6,402	0	11,518
Schools	2020	29	424	74	369	0	78	2,270	945	29	85	304	22	470	13	6,471	0	11,583
	2023	29	436	76	373	0	79	2,245	953	29	88	294	23	465	14	6,534	0	11,639
	2026	30	449	79	377	0	79	2,220	961	30	90	285	23	461	14	6,597	0	11,693
	2029	30	461	81	381	0	80	2,195	969	30	93	275	24	456	15	6,659	0	11,748
	2014	15	157	11	76	0	46	631	372	15	77	52	61	80	25	1,410	0	3,028
	2017	15	161	11	76	0	46	620	373	15	78	50	61	78	25	1,416	0	3,028
Universities and Colleges	2020	15	165	12	77	0	46	610	374	15	80	48	61	77	26	1,421	0	3,027
Ŭ	2023	15	169	12	77	0	46	599	376	15	82	46	62	76	26	1,426	0	3,027
	2026	15	173	12	77	0	46	589	377	15	84	44	62	74	26	1,432	0	3,027
	2029	16	176	13	78	0	47	578	378	16	86	42	62	73	26	1,437	0	3,027
	2014	48	127	42	178	0	0	1,396	461	48	307	162	572	278	6	4,074	0	7,698
	2017	48	130	43	179	0	0	1,372	462	48	314	156	574	272	6	4,082	0	7,685
Warehouse/Wholesale	2020	49	134	45	182	0	0	1,365	467	49	325	152	584	268	6	4,131	0	7,756
	2023	49	139	46	185	0	0	1,356	472	49	336	148	592	263	6	4,175	0	7,816
	2026	50	143	48	188	0	0	1,347	476	50	346	144	600	258	7	4,218	0	7,874
	2029	51	148	49	190	0	0	1,337	481	51	357	140	609	254	7	4,260	0	7,932
	2014	12	37	10	1,776	0	3,071	212	140	12	54	39	1,501	606	18	1,136	0	8,622
	2017	12	38	10	1,777	0	3,073	208	140	12	55	38	1,502	594	18	1,137	0	8,612
Restaurants	2020	12	39	11	1,801	0	3,114	206	141	12	57	37	1,522	587	19	1,150	0	8,707
	2023	12	40	11	1,822	0	3,150	204	143	12	58	35	1,539	580	19	1,161	0	8,787
	2026	12	41	11	1,842	0	3,184	202	144	12	60	34	1,556	573	20	1,172	0	8,865
	2029	12	42	12	1,862	0	3,219	200	145	12	62	33	1,573	565	20	1,183	0	8,941
	2014	358	1,384	272	5,426	50	4,743	7,904	6,537	229	1,689	1,359	6,162	4,889	269	22,842	0	64,115
	2017	359	1,418	279	5,447	50	4,762	7,774	6,572	230	1,729	1,311	6,186	4,807	269	22,912	0	64,104
Large Other Buildings	2020	360	1,451	285	5,469	50	4,780	7,644	6,606	231	1,770	1,262	6,210	4,724	269	22,982	0	64,094
	2023	361	1,484	292	5,490	51	4,799	7,513	6,641	232	1,810	1,213	6,234	4,642	270	23,053	0	64,084
	2026	362	1,517	298	5,512	51	4,818	7,383	6,676	233	1,850	1,164	6,259	4,560	270	23,123	0	64,076
	2029	363	1,550	305	5,533	51	4,837	7,253	6,711	234	1,891	1,116	6,283	4,478	270	23,194	0	64,068

Exhibit 123 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Labrador Interconnected (MWh/yr) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneou s Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	238	1,099	212	2,757	31	2,645	6,188	3,936	157	1,147	955	3,513	2,881	209	16,047	0	42,015
	2017	238	1,123	217	2,761	31	2,649	6,074	3,945	158	1,172	919	3,519	2,828	208	16,070	0	41,910
Small Other Buildings	2020	242	1,177	227	2,842	32	2,726	6,108	4,102	162	1,228	909	3,622	2,837	222	16,450	0	42,889
omail other buildings	2023	246	1,226	237	2,912	33	2,793	6,122	4,239	166	1,280	897	3,711	2,838	234	16,781	0	43,715
	2026	250	1,275	247	2,980	34	2,859	6,132	4,372	170	1,331	883	3,798	2,837	246	17,104	0	44,518
	2029	254	1,324	256	3,048	34	2,923	6,141	4,504	174	1,382	869	3,885	2,836	258	17,424	0	45,313
	2014	412	1,212	0	2,407	0	537	12,713	8,247	412	2,075	1,406	1,763	4,559	219	10,017	0	45,979
	2017	415	1,246	0	2,423	0	542	12,550	8,319	415	2,133	1,362	1,775	4,494	218	33,698	0	69,591
Other Institutional	2020	418	1,280	0	2,438	0	547	12,387	8,392	418	2,191	1,318	1,788	4,428	218	50,460	0	86,285
	2023	421	1,314	0	2,454	0	552	12,225	8,466	421	2,250	1,274	1,801	4,362	218	50,522	0	86,281
	2026	425	1,348	0	2,470	0	558	12,063	8,540	425	2,308	1,231	1,814	4,297	217	50,585	0	86,280
	2029	428	1,382	0	2,486	0	563	11,902	8,615	428	2,366	1,187	1,827	4,232	217	50,648	0	86,282
	2014	0	0	0	0	0	0	0	0	5,068	0	0	0	0	0	0	0	5,068
	2017	0	0	0	0	0	0	0	0	5,063	0	0	0	0	0	0	0	5,063
Non-Buildings	2020	0	0	0	0	0	0	0	0	5,121	0	0	0	0	0	0	0	5,121
····· _ ·····	2023	0	0	0	0	0	0	0	0	5,171	0	0	0	0	0	0	0	5,171
	2026	0	0	0	0	0	0	0	0	5,218	0	0	0	0	0	0	0	5,218
	2029	0	0	0	0	0	0	0	0	5,264	0	0	0	0	0	0	0	5,264
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,756	1,756
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,845	1,845
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,912	1,912
	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,967	1,967
	2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,998	1,998
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,030	2,030
	2014	1,512	5,951	929	17,392	138	13,390	41,065	27,616	6,224	7,323	5,828	18,523	18,592	1,197	84,075	1,756	251,513
	2017	1,467	5,971	923	17,005	125	13,154	40,276	26,922	6,206	7,267	5,511	18,528	17,576	1,171	107,246	1,845	271,194
Grand Total	2020	1,480	6,167	955	17,188	127	13,309	39,951	27,320	6,279	7,494	5,360	18,733	17,365	1,199	124,911	1,912	289,749
	2023	1,493	6,355	985	17,353	128	13,447	39,583	27,686	6,341	7,714	5,202	18,917	17,142	1,224	125,779	1,967	291,316
	2026	1,506	6,543	1,016	17,516	129	13,584	39,211	28,049	6,401	7,933	5,043	19,098	16,917	1,248	126,634	1,998	292,823
	2029	1,518	6,729	1,046	17,678	130	13,719	38,838	28,411	6,459	8,152	4,884	19,278	16,692	1,272	127,485	2,030	294,321

Exhibit 124 Reference Case Electricity Consumption by Sub sector, End Use and Milestone Year, Isolated (MWh/yr.)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	305	1,051	0	149	0	496	6,909	1,132	0	677	739	3,416	1,608	0	580	0	17,062
	2017	301	1,059	0	148	0	490	6,689	1,118	0	682	701	3,375	1,557	0	573	0	16,693
Labrador Isolated C/I	2020	351	1,258	0	172	0	573	7,498	1,409	0	810	813	3,931	1,724	0	650	0	19,187
Buildings	2023	367	1,335	0	180	0	599	7,663	1,501	0	860	830	4,109	1,756	0	674	0	19,874
	2026	382	1,410	0	187	0	624	7,815	1,590	0	908	844	4,279	1,785	0	698	0	20,521
	2029	397	1,486	0	194	0	650	7,968	1,679	0	956	858	4,449	1,814	0	721	0	21,173
	2014	0	99	0	0	0	47	649	106	0	64	69	321	151	0	0	0	1,505
	2017	0	99	0	0	0	46	626	105	0	64	66	316	146	0	0	0	1,466
Island Isolated C/I	2020	0	120	0	0	0	55	716	136	0	78	78	377	164	0	0	0	1,725
Buildings	2023	0	128	0	0	0	57	732	145	0	82	80	393	168	0	0	0	1,786
	2026	0	135	0	0	0	60	748	154	0	87	82	411	171	0	0	0	1,847
	2029	0	143	0	0	0	62	765	163	0	92	83	428	174	0	0	0	1,910
	2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	544	544
	2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	557	557
Street Lighting	2020	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	571	571
ooor	2023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	584	584
	2026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	596	596
	2029	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	609	609
	2014	305	1,150	0	149	0	542	7,558	1,238	0	740	808	3,737	1,759	0	580	544	19,112
	2017	301	1,158	0	148	0	536	7,315	1,223	0	746	766	3,691	1,703	0	573	557	18,716
Grand Total	2020	351	1,378	0	172	0	627	8,214	1,545	0	887	892	4,308	1,889	0	650	571	21,483
	2023	367	1,463	0	180	0	656	8,396	1,647	0	942	910	4,502	1,924	0	674	584	22,244
	2026	382	1,546	0	187	0	684	8,563	1,744	0	995	925	4,689	1,956	0	698	596	22,965
	2029	397	1,628	0	194	0	712	8,733	1,842	0	1,048	941	4,877	1,988	0	721	609	23,691

C.4 CEEAM Archetype Summaries – New Buildings

This section includes summary profiles of the twelve new building archetypes constructed for this study. **Exhibit 125** presents a table of contents for the CEEAM building profiles that follow. A glossary of terms and acronyms used in the building profiles is included at the end of this appendix.

Region	Sub Sector	Page #
Island Interconnected	Large Office	C – 23
Island Interconnected	Small Office	C – 28
Island Interconnected	Food Retail	C – 33
Island Interconnected	Small Non-food Retail	C – 38
Island Interconnected	Small Non-food Retail	C – 43
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Labrador Interconnected	Large Accommodation	C – 108
Labrador Interconnected	Small Accommodation	C – 113
Labrador Interconnected	Healthcare	C – 118
Labrador Interconnected	Schools	C – 123
Labrador Interconnected	Universities and Colleges	C – 128
Labrador Interconnected	Warehouse / Wholesale	C – 133
Labrador Interconnected	Restaurant	C – 138
N/A	Terms Used in Building Profiles	C – 143

Exhibit 125 Table of Contents - New CEEAM Building Profiles

COMMERCIAL SECTOR BUILDING PROFILE														
NEW BUILDINGS:	SIZE:				VINTAGE	:				REGION				
Large Office	> 100 kW	1			New					Island Int	erconnected	i		
CONSTRUCTION														
CONCINCTION														
Wall U value (W/m ² .°C) 0.42	W/m².°C		0.07	Btu/hr.ft ² .°F			Typical B	uildina Size			3.717 r	m²	40.000 ft	2
Roof U value (W/m ² .°C) 0.19	W/m ² .°C		0.03	Btu/hr.ft ² .°F			Typical Fo	notorint (m ²	•)		1.859 r	m²	20.000 ft	2
Glazing LL value (W/m² °C) 2.80	W/m2 °C		0.40	Btu/br ft2 °E			Eootorint	Aspect Rat	, io (L·W/)		1,000		20,000	
	W/IIF. C		0.49	Blumine . F			Percent C	onditioned	Space		100%			
							Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%) 0.60	1						Defined a	s Exterior Z	Zone					
Shading Coefficient (SC) 0.58							Typical #	Stories			3			
							Floor to F	loor Height	(m)		3.7 r	m	12.0 ft	
VENTILATION SYSTEM. BUILDING CONTROL	LS & IND		NS											
,			-											
Ventilation System Type				CAV	CAVR	DDM2	DDMZVV	VAV	VAVR	K IL	J 100% O.A	TOTAL		
		System Presen	t (%)	50%				50%	6			100%		
		Min. Air Flow (%	6) tled Air Va	lume as Perce	nt of Full F	ow)		60%	0					
						011)								
Occupancy or People Density		26	m²/persor	ı	274	ft²/person				%OA	13.04%			
Occupancy Schedule Occ. Period		90%				-								
Occupancy Schedule Unocc. Period														
Fresh Air Requirements or Outside Air		20	L/s.perso	n	42	CFM/pers	on							
Fresh Air Control Type *(enter	a 1. 2 or 3)	1	lf Fresh ∆i	r Control Type	= "2" enter	% FA to th	e riaht [.]			1	T		j	
(1 = mixed air control, 2 = Fixed fresh air. 3 1009	// fresh air	L I	If Fresh Ai	r Control Type	= "3" enter	Make-up Ai	r Ventilation	n and opera	ation		L/s.m ²		CFM/ft ²	
									-		operation (%	%)		
Sizing Factor		1.5												
Total Air Circulation or Design Air Flow		6.01	L/s.m ²		1.18	CFM/ft ²								
Infiltration Data		0.70	1/0 m2		0.14	CEN /642		Separate	Make-up ai	r unit (100%	% OA)	500/	L/s.m ²	CFM/tt ²
air infiltration kate	nied	0.70	L/S.m ²		0.14	CFIVI/IT ²			Operation	unoccupiea	period	50%		
hours only if the ventilation system shuts down)									oporation	anoooupro		0070		
								_						
Economizer			Entha	lpy Based	Dry-Bi	ulb Based	Total		1-					
	Incidence	of Use			100%		100%		Summary	of Design	Parameters			
	Switchove	er Point		KJ/kg.	18	°C			Peak Des	ign Cooling	g Load	1,586,900		
				Blunbill	04.4	F			Room air	enthalov	Luau	28.2	Btu/lbm	
Controls Type	System P	Present (%)		HVAC	Room				Discharge	air enthalp	ру	23.4	Btu/lbm	
	-			Equipment	Controls				Specific volu	ume of air at	55F & 100% R	13.2	ft³/lbm	
	All Pneum	natic							Design Cl	FM		31,585		
	DDC/Pne	umatic							Total air c	circulation c	or Design air	6.01	l/s.m ²	
	Total (shr	ould add-up to 10	0%)											
	Total (She		070)											
			Pro	portional	PI / PID	Tota	1							
Control mode	Control M	lode												
			Fixed	Discharge	Reset									
	Control S	trategy												
Indoor Design Conditions					Room				Supply Ai	r				
	Summer -	Temperature		24	°C	75.2	°F	14	l°C	57.2	2 °F			
	Summer I	Humidity (%)		50%)		-	98%	5					
	Enthalpy			65.5	KJ/kg.	28.2	Btu/lbm	54.5	5 KJ/kg.	23.4	Btu/lbm			
	Winter Oc	cc. Temperature		23	°C	73.4	1 °F	15	°C	59	9°F			
	Fotbalov	cc. Humidity		30%	k I/ka	22.8	Btu/lbm	45%	s K I/ka	10.6	Btu/lbm			
	Winter Ur	nocc. Temperatur	е	23	°C	73.4	1°F	40.0	rto/ttg.	10.0	Diarioni			
	Winter Ur	nocc. Humidity		30%	,									
	Enthalpy			50) KJ/kg.	21.5	Btu/lbm							
Damper Maintenance				Incidence	Frequence	7								
Dampel Maintenance				(%)	(vears)	1								
	Control A	rm Adjustment		() = /	() = = = = ()									
	Lubricatio	on												
	Blade Sea	al Replacement												
Air Filter Cleaning	Changes/	Voar			T									
All Filler Cleaning	Changes/	ieai			1									
						Incidence of	of Annual R	oom Contr	ols Mainter	nance				
Incidence of Annual HVAC Controls Maintenance	e]									·			
					т					- .				
	Annual M	aintenance Tasks		Incidence				Annual Ma	aintenance	I asks		Incidence		
	Calibratio	n of Transmitter		(%)	ł			Inspection	/Calibratio	n of Room	Thermostat	(70)		
	Calibratio	n of Panel Gaun	es		†			Inspection	of PE Swi	itches	monitoaidi			
	Inspection	n of Auxiliary Dev	ices		1			Inspection	n of Auxiliar	y Devices				
	Inspection	n of Control Devi	ces		1			Inspection	of Control	Devices (Valves,			
								(Dampers	, VAV Box	es)				

NEW BUILDINGS: Large Office Baseline	SIZE: > 100 kW	COMMER	CIAL SECTOR BUILDI VINTAGE: New	NG PROFILE	REGION: Island Interco	onnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	500 Lux	46.5 ft-candles							
Connected Load Occ. Period(Hrs./yr.)	12.9 W/m ²	1.2 W/ft ² Light Level (Lux)	300	500 700	1000		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5460 95% 20%	% Distribution Weighted Average	INC	100%	T8 HID	T5HO LED	100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LAM)	0.7	0.7 0.6 0.65 0.75 50 72	100% 0.6 0.6 0.80 0.80 88 65	0% 0% 0.6 0.6 0.80 0.80	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		10	00 12	00 00		EUI	kWh/ft².yr	4.6
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 0.10 15.1 W/m ²	32.5 ft-candles					<u> </u>	MJ/m².yr	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3400 5360 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 400 40% 40%	500 10%		Total 100% 350		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 10% 0.7 0.65 15	CFL 112 30%	18 HID 40% 5% 0.6 0.6 0.80 0.80 88 65	15HO LED 15% 0% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		I	EUI = Load X Hrs X	SE X GLEE	I	EUI	kWh/ft².yr M.I/m² yr	0.8
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m ²	ft-candles		Floor fraction	on check: should = 1.00	1.00]		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LW)	0.7 0.65	CFL T12 0.7 0.6 0.65 0.75 50 72	T8 0.6 0.6 0.80 0.80 84 88	MH HPS 0.6 0.6 0.55 0.55 65 90	TOTAL		
Relamping Strategy & Incidence of Practice	Group Spot						EUI	kWh/ft².yr M.I/m² yr	
TOTAL LIGHTING					Overall LP	13.13 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	5 206
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	55 0.9 1.9 W/m ² 0.2 W/t ² 80% 50% 2000	51 0.9 1.8W/m ² 0.2W/ft ² 80% 50% 2000	100 0.15 0.6 W/m ² 0.05 W/ft ² 80% 50% 2000	200 0.1 0.8 W/m ² 0.07 W/ft ² 80% 50% 2000	50 0.26 0.5 W/m ² 0.05 W/ft ² 100% 100% 2000	1.5 W/m ² 0.14 W/ft ² 80% 50% 2500			
Operation Unocc. Period (hrs./year) Total end-use load (occupied period)	6760 5.8 W/m ²	6760	6760	6760	6760	6260 Computer Servers	ے EUI	kWh/ft².yr	0.42
Total end-use load (unocc. period) Usage during occupied period Usage during unoccupied period	3.8 W/m² 100% 66%	0.4 W/ft ²				Computer Equipmen Plug Loads	t EUI s EUI	MJ/m ² .yr kWh/ft ² .yr MJ/m ² .yr kWh/ft ² .yr	16.20 2.36 91.24 0.72
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane E EUI kWh/ft².yr MJ/m².yr	UI 0.1 5.0	All	Electric EUI kWh/ft².yr MJ/m².yr	0.10
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant]				EUI	kWh/ft².yr MJ/m².yr	0.10
BLOCK HEATERS & MISCELLANE	DUS					Block Heaters Miscellaneous	EUI EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.26

NEW BUILDINGS:	SIZE:		COMMER	CIAL SECT VINTAGE	OR BUILDIN	ig profi	LE		REGION:				
Large Office Baseline	> 100 kW			New					Island Inte	rconnected	1		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Ele	ctric				
				Bo Stan.	ilers I High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		70%	80%	75%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.33	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	53.1 W/m ² 302 MJ/m ² .yr	16.9 7.8	Btu/hr.ft² kWh/ft².yr					I	L				
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		1	Oil Fuel Shar	e]			-	All Electric EUI kWh/ft².yr	7.8
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence	1							MJ/m².yr	302
	Fire Side Water Sid Inspection Inspection Flue Gas	Inspection e Inspection for Scale Build of Controls & Safeties of Burner Analysis & Burner Set-up	dup	(%) 75% 100% 100% 100% 90%								Fuel Oil / Propane EU kWh/ft².yr MJ/m².yr Market Composite EL kWh/ft².yr MJ/m².yr	JI 7.8 302
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifugal Standard 4.7 0.21	Chillers HE 20.0% 7 5.4 0.19	WSHP 3.5 0.29	Reciprocat Open 3.5 0.29	ing Chillers DX 80.0% 2.7 0.37	Absorptio W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air	7 30 14.0	с С С	44.6 86 57.2	'F 'F 'F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	125 W/m ² 129.0 MJ/m ² .yr	40 Btu/hr.ft ² 3.3 kWh/ft ² .yr	302	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	nrs/year	Note value	e cannot be	less than 2	,900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		1									
Chiller Maintenance	Annual Ma Inspect Co Inspect Co Megger M Condense Vibration Eddy Curr	intenance Tasks ontrol, Safeties & Purge Ur oupling, Shaft Sealing and I lotors r Tube Cleaning Analysis ent Testing	it 3earings	Incidence (%)	Frequency (years)						-	All Elostrio El II	
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma Inspection Inspect/St Megger M Inspect/Vt	intenance Tasks /Clean Spray Nozzles arvice Fan/Fan Motors lotors arify Operation of Controls		Incidence (%)	Frequency (years)							All Electric EOI KVNVft².yr MJ/m².yr Fuel Oil / Propane EU KWh/ft².yr MJ/m².yr Market Composite EU KVNvft².yr MJ/m².yr	1.4 53 II JI 1.4 53
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Std. Tank resent (%) 0.550	PV Tank 0.600	Cond. Tnk 0.900	Std. Boiler 0.750	Cnd. Boil. 0.900		Fuel Share Blended E	fficiency	Fossil #DIV/0!		Elec. Res. 100% 0.94	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	22.8												
Wetting Use Percentage	90%			A	M Electric EU kWh/ft².yr MJ/m².yr	0.6 24		Fuel	wh/ft².yr MJ/m².yr	e EUI #DIV/0! #DIV/0!		Market Composite EL kWh/ft².yr #E MJ/m².yr #E)) V/0!) V/0!



		COMMER	CIAL SECTOR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:		VINTAGE:		REGION:					
Large Office	> 100 kV	v	New		Island Inte	rconnecte	d			
Baseline										
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	eration & Contr	ol		
				Ventilat	ion Fan	Exh	aust Fan			
System Design Air Flow	6.0 L/s.m ²	1.18 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV	750 Pa	3.0 wg	Insidence of Lice	E09/	FIOW	100%	Flow			
Ean Efficiency	750 Pa	3.0 Wg	Operation	50%	Scheduled	100%	Scheduled	•		
Fan Motor Efficiency	85%		operation	Continuou	Concourca	oonanaoaa	Concourco			
Sizing Factor	1.00		Incidence of Use	75%	25%	75%	25%			
Fan Design Load CAV	10.2 W/m ²	0.95 W/ft ²								
Fan Design Load VAV	10.2 W/m ²	0.95 W/ft ²	Comments:							
EVHALLST EANS								L		
EXHAUST FANS										
Washroom Exhaust	100 L/s.wash	nroom 212 CFM/washroo	om							
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.02 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²								
Total Building Exhaust	0.2 L/s.m ²	0.04 CFM/ft ²								
Exhaust System Static Pressure	250 Pa	1.0 wg								
Fan Efficiency	40%									
Fan Motor Efficiency	80%									
Exhaust Fan Connected Load	0.2 W/m ²	0.02 W/ft ²								
	0.2 000	0.02								
AUXILIARY COOLING EQUIPMENT (C	Condenser Pump a	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.018 kW/kW	0.06 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air C	cooled Condenser)	2.24 W/m ²	0.21 W/ft ²							
Condenser Pump										
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.007 L/s.m ²	0.010 U.S. gpm/ft ²							
Pump Head Pressure		100 kPa	33.333333 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		1.0	0.40 \\\\\\\\\							
Pump Connected Load		1.34 W/m ²	0.12 W/tt ²							
CIRCULATING PUMP (Heating & Cool	lina)									
·····g - ···										
Pump Design Flow @ 5 °C (10 °F) delt	a T	0.005 L/s.m ²	0.0079 U.S. gpm/ft ² 2.4	U.S. gpm/	Ton					
Pump Head Pressure		150 kPa	50 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5	0.08 \///#2							
Pump Connected Load		0.8 \\//11-	0.08 00/112							
Supply Fan Occ. Period		3500 hrs./year								
Supply Fan Unocc. Period		5260 hrs./year								
Supply Fan Energy Consumption		62.2 kWh/m².yr								
Exhaust Fan Occ. Period		3500 hrs./year								
Exhaust Fan Unocc. Period		5260 hrs./year								
Exhaust Fan Energy Consumption		1.2 KVVN/m².yr								
Condenser Pump Energy Consumption		1.7 kWb/m² vr								
Cooling Tower /Condenser Fans Energy	Consumption	0.6 kWh/m².vr								
Circulating Pump Yearly Operation		5000 hrs./year								
Circulating Pump Energy Consumption		kWh/m².yr								
Free and Dames Maintenance	A	Asiata association	In state of the second second							
Fans and Pumps Maintenance	Annual N	viaintenance lasks								
	Inenect/9	Service Fans & Motors	(70) (years)							
	Inspect/A	Adjust Belt Tension on Fan Belts	<u> </u>							
	Inspect/S	Service Pump & Motors						EUI	kWh/ft².yr	6.1
			· · · · · · · · · · · · · · · · · · ·					-	MJ/m².vr	236.4

COMMERCIAL SECTOR BUILDING PROFILE											
NEW BUILDINGS: SIZE: Large Office > 100 kW			VINTAGE: New	:	REGION: Island Interconnected						
Dasenne											
EUISUMMARY											
TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 990.8 MJ/m².yr	Fuel Oil /	Propane:	#DIV/0! kWh/ft².yr	#DIV/0! MJ/m².yr				
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane				
GENERAL LIGHTING	4.6	176.9		kWh/ft².yr	MJ/m ² .yr	kWh/ft2.yr	MJ/m².yr				
ARCHITECTURAL LIGHTING	0.8	29.2	SPACE HEATING	7.8	302.1						
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.2	48.0						
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	#DIV/0!	#DIV/0!				
HVAC FANS & PUMPS	6.1	236.4	FOOD SERVICE EQUIPMENT	0.1	4.0						
REFRIGERATION	0.1	4.0									
MISCELLANEOUS	0.3	10.0									
BLOCK HEATERS											
COMPUTER EQUIPMENT	2.4	91.2									
COMPUTER SERVERS	0.4	16.2									
ELEVATORS	0.1	3.9									
OUTDOOR LIGHTING	0.4	17.0									

	COMMERCIAL SECTOR BUILDING PROFILE													
NEW BUILDINGS:	SIZE:				VINTAGE	:				REGION	:			
Small Office	< 100 kW				New					Island In	terconnected			
CONSTRUCTION														
CONSTRUCTION														
Wall Livalue (W/m ² °C)	0.28 W/m ² °C		0.05	Btu/br ft2 °F			Typical B	ilding Size			1 859	n ²	20.000	ft2
Deef Livelye (W/m2.9C)	0.10 W/m2.8C		0.00	Dtu/hr.ft2 °F			Turnical Ed		^		1,000		20,000	412 412
Roor O value (w/m C)	0.19 0//11 0		0.03					ouprint (m-	·) 		929	11 -	10,000	11-
Glazing U value (W/m ² .°C)	2.80 W/m ² .°C		0.49	Btu/hr.ft ² .°F			Footprint A	Aspect Rat	io (L:W)		100%			
							Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%)	0.35						Defined a	s Exterior Z	Zone		4378			
Shading Coefficient (SC)	0.58						Typical #	Stories			3			
							Floor to F	loor Height	(m)		3.7	n	12.0	ft
VENTILATION SYSTEM, BUILDING CO	NTROLS & IND	OOR CONDITIC	INS											
Ventilation System Type				CAV	CAVR		עעדאַמַס			2		τοται	1	
Volkildilori Oyotolli Typo		System Presen	t (%)	100%	0,111	Dome	BBIILETT	50%			0 10070 0	150%	-	
		Min. Air Flow (%	6)					60%	5					
		(Minimum Thro	ttled Air Vo	lume as Perce	nt of Full Flo	ow)								
			- /			1								
Occupancy or People Density		26	m²/persor	1	274	ft²/person				%OA	13.99%			
Occupancy Schedule Unocc. Period		90%												
Fresh Air Requirements or Outside Air		20	L/s.persor	h	42	CFM/perso	n							
						J								
Fresh Air Control Type *(enter a 1, 2 or 3)	1	If Fresh Ai	r Control Type	= "2" enter	% FA. to the	e right:]	
(1 = mixed air control, 2 = Fixed fresh air, 3	3 100% fresh air)		If Fresh Ai	r Control Type	= "3" enter	Make-up Air	Ventilation	n and opera	ation		L/s.m ²		CFM/ft ²	
		0									operation (%)		
Sizing Factor		1.5	1 /2		4.40	0514/62								
Total Air Circulation or Design Air Flow		5.61	L/s.m ²		1.10	CFM/ft ²		Soporato	Maka up ai	ir upit (100	٥ ۵ ()] /o m²	CEM/#2
Infiltration Rate		0.70	1 /s m ²		0.14	CEM/ft ²		Separate	Operation	n unit (100	neriod	50%	L/S.III-	CFW/II-
(air infiltration is assumed to occur during t	unoccupied	0.70	L/3.111		0.14	OTWINE			Operation	n unoccupie	ed period	50%	1	
hours only if the ventilation system shuts d	own)												J	
								-						
Economizer			Entha	lpy Based	Dry-Bu	lb Based	Total		-		_			
	Incidence	of Use			100%		100%	1	Summary	of Design	Parameters	770 400		
	Switchove	r Point		KJ/kg.	18	°C °E			Peak Des	ign Coolin	g Load	770,463		
				Blu/IDITI	04.4	F			Room air	enthalov	Load	28.2	Btu/lbm	
Controls Type	System P	esent (%)		HVAC	Room	1			Discharge	air enthal	DV	23.4	Btu/lbm	
	-,			Equipment	Controls				Specific vol	ume of air at	55F & 100% R	13.2	ft³/lbm	
	All Pneum	atic							Design Cl	FM		14,723		
	DDC/Pneu	matic							Total air o	circulation	or Design air	5.61	l/s.m²	
	All DDC			-		-								
	Total (sho	uid add-up to 10	0%)			J								
			Pror	ortional	PI / PID	Total	1							
Control mode	Control M	ode	110	Jordona										
			Fixed	Discharge	Reset									
	Control St	rategy												
					_								т	
Indoor Design Conditions	Cummer T	a man a sati ura		24	Room	75.0	l or		Supply Ai	r 57	2 or			
	Summer H	umidity (%)		50%		/5.2		98%		57.	2 1			
	Enthalpy	iumuny (70)		65.5	KJ/ka.	28.2	Btu/lbm	54.5	5 KJ/ka.	23.4	1 Btu/lbm			
	Winter Oc	c. Temperature		23	°C	73.4	°F	15	°C	5	9 °F			
	Winter Oc	c. Humidity		30%			-	45%	0					
	Enthalpy			53	KJ/kg.	22.8	Btu/lbm	45.5	5 KJ/kg.	19.6	6 Btu/lbm			
	Winter Un	occ. Temperatur	e	23	°C	73.4	°F							
	Fotbolov	SCC. Humidity		30%	K I/ka	21.5	Btu/lbm							
	спшару			50	NJ/Ky.	21.0	Blu/IDITI						1	
Damper Maintenance				Incidence	Frequency									
				(%)	(years)									
	Control Ar	m Adjustment				-								
	Lubrication) I Denlessment				-								
	Blade Sea	Replacement				J								
Air Filter Cleaning	Changes/	/ear			T									
-	-				-									
		т				Incidence o	f Annual R	oom Contr	ols Mainter	nance				
Incidence of Annual HVAC Controls Maint	enance	l												
	A	intenens - T- ·		الممتعا	т			A mm :- 1 * *		Teels		la aj al como	1	
	Annual Ma	mienance Lasks	i i	Incidence				Annual Ma	aintenance	I ASKS				
	Calibration	of Transmitters		(/0)	1			Inspection	/Calibratio	n of Room	Thermostat	(/0)	1	
	Calibration	of Panel Gaun	es		1			Inspection	of PE Sw	itches			1	
	Inspection	of Auxiliary Dev	rices		1			Inspection	of Auxiliar	y Devices]	
	Inspection	of Control Devi	ces		1			Inspection	of Contro	I Devices (Valves,			
								(Dampers	, VAV Box	es)			l	

NEW BUILDINGS: Small Office Baseline	SIZE: < 100 kW	COMMER	RCIAL SECTOR BUILDING PROFILI VINTAGE: New	E REGION: Island Interc	onnected								
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46 0.95 12.9 W/m ² 1	.5 ft-candles .2 W/ft ²											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 20%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	700 1000 T12 T8 HID	Tota 10 15H0 LED TO	I 00% 500 TAL							
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0.65 0.65 15 50	100% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0% 0% 100 0.6 0.6 0.80 0.80 95 90 <	.0%							
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr 4.1							
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 32 0.05 12.9 W/m ² 1	.5 ft-candles .2 W/ft ²				MJ/II ⁻ .yi 160							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 300 10% 40%	400 500 40% 10%		l 00% 350							
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 5% 30% 0.7 0.7 0.65 0.65 15 50	112 18 HID 40% 5% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	15HO LED 101 15% 5% 100 0.6 0.6 0.80 0.80 95 90	<u>AL</u> .0%							
Relamping Strategy & Incidence of Practice	Group Spot		Elli- Lood		EUI	kWh/ft².yr 0.3							
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m ²	ft-candles W/ft²	EUI = Luad	loor fraction check: should = 1.00	0 1.00	Mani-yi ii							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500	700 1000	Tota								
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 0.7 0.7 0.65 0.65 15 50	T12 T8 0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	MH HPS TO 0.6 0.6 0.55 0.55 65 90	<u>TAL</u>							
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr							
TOTAL LIGHTING				Overall LP	12.92 W/m ² EUI TO	TAL kWh/ft².yr 4 MJ/m².yr 172							
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Computers	Monitors	Printers Copie	ers Servers	Plug Loads								
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.9 1.9 W/m ² 0.2 W/ft ²	51 0.9 1.8 W/m ² 0.2 W/ft ²	100 200 0.15 0.1 0.6 W/m² 0.8 0.05 W/ft² 0.07	50 0.26 //m² 0.5 //t² 0.05	1.5 W/m² 0.14 W/ft²								
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	80% 50% 2000 6760	80% 50% 2000 6760	80% 80% 50% 50% 2000 2000 6760 6760	100% 100% 2000 6760	80% 50% 2500 6260								
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m² 3.8 W/m²	0.5 W/ft ² 0.4 W/ft ²			Computer Servers EUI	kWh/ft².yr 0.42 MJ/m².yr 16.20							
Usage during occupied period Usage during unoccupied period	100% 66%				Plug Loads EUI	kWh/tt².yr 2.36 MJ/m².yr 91.24 kWh/tt².yr 0.72 MJ/m².yr 27.70							
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share: 100.0%	Fuel Oil / Propane I EUI KWh/ft².yr MJ/m².yr	EUI	All Electric EUI kWh/ft².yr MJ/m².yr							
REFRIGERATION Provide description below:					EUI	kWh/ft².yr MJ/m².yr							
BLOCK HEATERS & MISCELLANE	DUS				Block Heaters EUI Miscellaneous EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr 0.26 MJ/m².yr 10.00							
			COMMER	CIAL SECT	or Buildin	IG PROFI	LE						
--	---	--	--------------------------	-----------------	------------------------	--------------------	--------------------	--------------------	-------------------------	--------------	-------	-------------------------------------	-------------
NEW BUILDINGS: Small Office Baseline	SIZE: < 100 kW			VINTAGE: New	:				REGION: Island Inter	connected	i		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Ele	ctric				
				Bo Stan.	ilers I High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		70%	80%	75%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / Eff.) (kW/kW)		1.43	1.25	1.33	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	48.9 W/m ² 275 MJ/m ² .yr	15.5 7.1	Btu/hr.ft² kWh/ft².yr	1			1			1		All Electric El II	
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share]	Oil Fuel Shar	e]			-	kWh/ft².yr	7.1
Boiler Maintenance	Annual M	aintenance Tasks		Incidence							L	MJ/m².yr	275
	Fire Side	Inspection		(%) 75%							-	Fuel Oil / Propane EL kWh/ft².yr	I
	Water Sic Inspection	le Inspection for Scale Buil of Controls & Safeties	dup	100%								MJ/m².yr	
	Inspection Flue Gas	n of Burner Analysis & Burner Set-up		100%							F	Market Composite El	UI 71
	140 040	nanyolo a Bantor oot ap		0070								MJ/m².yr	275
SPACE COOLING													
A/C Plant Type		-											
			Centrifugal Standard	HE	WSHP	Reciprocat Open	ing Chillers DX	Absorptio W. H.	n Chillers CW	Total			
		System Present (%) COP	4.7	20.0%	3.5	3.5	80.0%	0.9) 1	100.0%			
		Performance (1 / COP) (kW/kW)	0.21	0.19	0.29	0.29	0.37	1.11	1.00				
		Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint										
		Condenser Water											
				Tee		-							
Setpoint		Condenser Water	30	°C	44.6	°F							
		Supply Air	14.0	0]°C	57.2	Ϋ́F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	121 W/m ² 122.1 MJ/m ² .yr	39 Btu/hr.ft ² 3.2 kWh/ft ² .yr	312	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	nrs/year	Note value	e cannot be	e less than 2,	900 hrs/yea	ar)		
A/C Saturation	90.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share]									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge U	nit .	(78)	(years)								
	Megger N	oupling, Shaft Sealing and lotors	Bearings										
	Condense Vibration	er Tube Cleaning Analysis											
	Eddy Cur Spectrock	rent Testing									г	All Electric EUI	
	operation	ionnoul on rankyolo									-	kWh/ft².yr	1.3
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency						L	MJ/IIIyi	51
	Inspection	√Clean Spray Nozzles		(%)	(years)						-	Fuel Oil / Propane EL kWh/ft².yr	JI
	Inspect/S Megger M	ervice Fan/Fan Motors									L	MJ/m².yr	
	Inspect/V	erify Operation of Controls									F	Market Composite El	UI 13
												MJ/m².yr	51
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue System P	el SHW Std. Tank Present (%) 100.00%	PV Tank	Cond. Tnk	Std. Boiler	Cnd. Boil.		Fuel Share	e efficiency	Fossil 0%		Elec. Res.	
Service Hot Water load (MJ/m ² .yr)	22.8	0.550	0.000	0.900	0.750	0.900	1		mulency	5000.00		0.94	
(Teruary Load)				A	II Electric EU	I		Fuel	Oil / Propane	EUI	[Market Composite EL	UI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	0.6 24			kWh/ft².yr MJ/m².yr	0.0 0		kWh/ft².yr MJ/m².yr	0.6 24.2

	COMMER	CIAL SECTOR BUILDING PROFILE	
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Baseline	< 100 KW	New	Island Interconnected
· · · · · · · · · · · · · · · · · · ·			
HVAC FANS & PUMPS			
SUPPLY FANS			Ventilation and Exhaust Fan Operation & Control
		-	Ventilation Fan Exhaust Fan
System Design Air Flow 5.	.6 L/s.m ² 1.10 CFM/ft ²	Control	Fixed Variable Fixed Variable
System Static Pressure VAV 75	50 Pa 3.0 wg	Incidence of Use	100% 50% 100%
Fan Efficiency 52	%	Operation	Continuous Scheduled Continuous Scheduled
Fan Motor Efficiency 85	<u>196</u>		
Sizing Factor 0.5 Ean Design Load CAV 4	0 44 W/ft ²	Incidence of Use	75% 25% 75% 25%
Fan Design Load VAV 4.	.8 W/m ² 0.44 W/ft ²	Comments:	
EXHAUST FANS			
Washroom Exhaust 10	00 L/s.washroom 212 CFM/washro	oom	
Washroom Exhaust per gross unit area 0	.2 L/s.m ² 0.04 CFM/ft ²		
Other Exhaust (Smoking/Conference) 0. Total Building Exhaust 0.	.1 L/s.m ² 0.02 CFM/ft ²		
Exhaust System Static Pressure 25	50 Pa 1.0 wg		
Fan Efficiency 40	1%		
Fan Motor Efficiency 80 Sizing Eactor	5		
Exhaust Fan Connected Load 0	0.1 W/m ² 0.01 W/ft ²		
AUXILIARY COOLING FOUIPMENT (Conden	oser Pump and Cooling Tower/Condenser Fans)		
	iser i unip and cooling rower/condenser i ans)		
Average Condenser Fan Power Draw	0.018 kW/kW	0.06 kW/Ton	
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser) 2.17 W/m ²	0.20 W/ft ²	
Condenser Pump			
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton	
Pump Design Flow per unit floor area	0.006 L/s.m ²	0.009 U.S. gpm/tt ²	
Pump Efficiency	55%	00.000000 11	
Pump Motor Efficiency	90%		
Sizing Factor	0.5	0.06 \W/#2	
Pump Connected Load	0.05	0.00 W/12	
CIRCULATING PUMP (Heating & Cooling)			
Pump Design Flow @ 5 °C (10 °F) delta T	0.005 L/s.m ²	0.0077 U.S. gpm/ft ² 2.4	U.S. gpm/Ton
Pump Head Pressure	150 kPa	50 ft	
Pump Efficiency	55%		
Sizing Factor	90%		
Pump Connected Load	0.8 W/m ²	0.07 W/ft ²	
Supply Fan Occ. Period	3500 hrs./year		
Supply Fan Unocc. Period	5260 hrs./year		
Supply Fan Energy Consumption	46.7 kWh/m².yr		
Exhaust Ean Occ. Period	3500 brs /vear		
Exhaust Fan Unocc. Period	5260 hrs./year		
Exhaust Fan Energy Consumption	0.9 kWh/m².yr		
Condenser Rump Energy Consumption	0.8 kW/b/m² vr		
Cooling Tower /Condenser Fans Energy Consul	umption 0.6 kWh/m².yr		
<u> </u>			
Circulating Pump Yearly Operation	5000 hrs./year		
Circulating Pump Energy Consumption	kvvh/m².yr		
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency	
		(%) (years)	
	Inspect/Service Fans & Motors	+	
	Inspect/Service Pump & Motors	+	EUI kWh/ft².yr 4.6
		· · · ·	M I/m ² vr 176.4

COMMERCIAL SECTOR BUILDING PROFILE										
:	SIZE:	VINTAGE	:			REGION:				
	< 100 KW	New				Island Interconnected				
Electricity:		22.1 kWh/ft².yr 855.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr				
kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane				
4.1	160.2		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr				
0.3	11.3	SPACE HEATING	7.1	275.2						
		SPACE COOLING	1.2	45.6						
0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0				
4.6	176.4	FOOD SERVICE EQUIPMENT								
0.3	10.0									
2.4	91.2									
0.4	16.2									
0.4	17.0									
	Electricity: kWh/ft²yr 4.1 0.3 0.7 4.6 0.3 2.4 0.4 0.4	SIZE: <100 kW Electricity: kWh/ft?yr 4.1 160.2 0.3 11.3 0.7 27.7 4.6 176.4 0.3 10.0 2.4 91.2 0.4 16.2 0.4 17.0	Electricity: 22.1 kWh/ft².yr 855.1 MJ/m².yr kWh/ft².yr MJ/m².yr END USE: 4.1 160.2 0.3 11.3 SPACE HEATING SPACE COOLING 0.7 27.7 DOMESTIC HOT WATER 4.6 176.4 FOOD SERVICE EQUIPMENT 0.3 10.0 2.4 91.2 0.4 16.2 0.4 17.0	COMMERCIAL SECTOR BUILDI SIZE: VINTAGE: < 100 kW	COMMERCIAL SECTOR BUILDING PROFILE SIZE: VINTAGE: < 100 kW New Electricity: 22.1 kWh/ft².yr 855.1 MJ/m².yr Fuel Oil / Propane: kWh/ft².yr MJ/m².yr END USE: Electricity 4.1 160.2 KWh/ft².yr KWh/ft².yr MJ/m².yr 0.3 11.3 SPACE HEATING 7.1 275.2 SPACE COOLING 1.2 45.6 0.7 27.7 DOMESTIC HOT WATER 0.6 24.2 4.6 176.4 FOOD SERVICE EQUIPMENT 0.6 24.2 0.3 10.0 2.4 91.2 4 16.2 0.4 17.0 47.0 17.0 17.0	COMMERCIAL SECTOR BUILDING PROFILE VINTAGE: VINTAGE: New SIZE: VINTAGE: New Electricity: 22.1 kWh/ft².yr 855.1 MJ/m².yr Fuel Oil / Propane: 0.0 kWh/ft².yr KWh/ft².yr MJ/m².yr Electricity Electricity Fuel Oil / Propane: 0.0 kWh/ft².yr KWh/ft².yr MJ/m².yr END USE: Electricity Fuel Oil / Propane: 0.0 kWh/ft².yr 0.3 11.3 SPACE HEATING 7.1 275.2 SPACE COOLING 1.2 45.6 0.0 0.7 27.7 DOMESTIC HOT WATER 0.6 24.2 0.0 0.3 10.0 24 91.2 4 16.2 4 16.2 4 17.0	COMMERCIAL SECTOR BUILDING PROFILE SIZE: VINTAGE: REGION: < 100 kW			

	617E.		COMMER		OR BUILDI	NG PROFI	LE					
NEW BUILDINGS: Food Retail Baseline	All			VINTAGE	New			K İs	sland Interconn	ected		
CONSTRUCTION												
Wall U value (W/m².°C)	0.28 W/m ² .°C		0.05 Btu/hr.ft ² .	°F		Typical Bu	ilding Size		2,	788 m²	30,000	ft²
Roof U value (W/m ² .°C)	0.19 W/m².°C		0.03 Btu/hr.ft ² .	°F		Typical Fo	otprint (m ²)		1,	225 m²	13,181	ft²
Glazing U value (W/m ² .°C)	2.80 W/m ² .°C		0.49 Btu/hr.ft ² .	°F		Footprint / Percent C	Aspect Ratio onditioned S	(L:W) pace	1	1		
Window/Wall Ratio (WIWAR) (%) Shading Coefficient (SC)	0.11 0.69					Defined as Typical # 5	s Exterior Zo Stories	ne		1	40.7	6
						Floor to Fl	oor Height (m)		6.0 m	19.7	ft
VENTILATION SYSTEM, BUILDING CON	ITROLS & INDO	OR CONDITION	S									
Ventilation System Type	5	System Present (%	CA %) 100	V CAVR	DDMZ	DDMZVV	VAV	VAVR	IU 100%	0.A TO 10	TAL 00%	
	<u> </u> (Min. Air Flow (%) Minimum Throttle	ed Air Volume as P	ercent of Full	Flow)		50%					
Occupancy or People Density	F	45 m	n²/person	484	ft²/person			%	60A 15.	81%		
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period	_	90%		10	locu							
Fresh Air Requirements or Outside Air		20 L/	/s.person	42	CFM/perso	n		······				1
(1 = mixed air control, 2 = Fixed fresh air, 3	anter a 1, 2 or 3) 100% fresh air)	1 If F	Fresh Air Control T Fresh Air Control T	ype = "2" en ype = "3" en	ter % FA. to ter Make-up	the right: Air Ventilat	ion and oper	ation	0.5 L/s.m 50% opera	² (0.10 CFM/ft ²	
Sizing Factor Total Air Circulation or Design Air Flow	F	3 2.81 L/	/s.m²	0.55	CFM/ft ²			4				
Infiltration Rate	Γ	0.70 L/	/s.m²	0.14	CFM/ft ²		Separate M	ake-up air u Operation or	unit (100% OA) ccupied period	5	L/s.m ²	CFM/ft ²
(air infiltration is assumed to occur during u hours only if the ventilation system shuts do	noccupied own)				-		C	Operation ur	noccupied perio	d E	50%	
Economizer	Incidence of	fllse	Enthalpy Based	Dry-Bu 100%	lb Based	Total		Summary of	Design Parame	eters		1
	Switchover	Point	KJ/kg. Btu/lbm	18	℃ °F		F	Peak Desigr Peak Zone S	n Cooling Load Sensible Load	232,0 118,9	012 985	
Controls Type	System Pre	sent (%)	HVAC	Room]	1	F	Room air en Discharge ai	nthalpy ir enthalpy	2	8.2 Btu/lbm 3.4 Btu/lbm	
	All Pneumat	ic	Equipmer	t Controls	-		S	Specific volume	ne of air at 55F & 10 1	0% R 5,5	13.2 ft³/lbm 535	
	All DDC	natic	()		-			otal air circ	culation or Desig	nair 2.8	1 l/s.m²	
	i otai (snoui	d add-up to 100%	6)		Tatal	ī						
Control mode	Control Mod	de	Final Discharge	PI/PID	I otai	-						
	Control Stra	ategy	Fixed Discharge	Reset								
Indoor Design Conditions	Summer Te	mperature		Room	71.6	l∘F	13 °	Supply Air	55.4 °F			
	Summer Hu	midity (%)	50	%] -] -,	100%		·			
	Enthalpy Winter Occ.	Temperature	65	5 KJ/kg. 2 °C	28.2	°F	54.5	°C	23.4 Btu/lb 60.8 °F	m		
	Winter Occ.	Humidity	30	% 2 K I/ka	22.0	Btu/lbm	45%	K I/ka	10.6 Ptu/lb	-		
	Winter Uno	cc. Temperature	2	1 °C	69.8	°F	45.5	NJ/Kg.	19.0 DIU/ID	ern		
	Winter Unoo Enthalpy	cc. Humidity	30 ⁴	% 0 KJ/kg.	21.5	Btu/lbm						
Domnor Meintenener			Le et al e	Freeser	1							
Damper Mannenance	Control A	Adjustment	(%)	(years)	-							
	Lubrication				-							
	Diade Seal	Replacement]							
Air Filter Cleaning	Changes/Ye	ear										
Incidence of Annual HVAC Controls Mainte	enance				Incidence of	t Annual R	oom Control:	s Maintenar	nce			
	Annual Mair	ntenance Tasks	Incidence (%)	9			Annual Mair	ntenance Ta	isks	Incide (%	nce)	
	Calibration	of Transmitters	(,,)]			Inspection/C	Calibration o	of Room Thermo	ostat		
	Calibration of Inspection of	of Panel Gauges	es	-			Inspection of	of PE Switch	hes Devices		_	
	Inspection of	of Control Devices	s	1			Inspection o	of Control D	evices (Valves,			
							(Dampers, \	VAV Boxes))			

NEW BUILDINGS: Food Retail Baseline	SIZE: Ali	COMMER	CIAL SECTOR BUILDIN VINTAGE: New	G PROFILE	REGION: Island Inter	rconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.90 13.2 W/m ² 1.2	j ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5000 3760 100% 20%	Light Level (Lux) % Distribution Weighted Average	400	500 6 100%			Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	2% 0.7 0.65 15	OFE T 3% 0.7 0 0.65 0.7 0 50 7 7	12 13 HID 55% 10% .6 0.6 0.7 75 0.80 0.80 72 88 65	15HO LED 30% 0% 0.6 0.6 0.80 0.80 95 90	100.0%		
of Practice	Group Spot						EUI I	Wh/ft².yr MJ/m².yr	6.4 246
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46.5 0.10 12.8 W/m² 1.2	5 ft-candles 2 W/ft ²							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	5000 3760 100% 50%	Light Level (Lux) % Distribution Weighted Average	300	500 7 100%	00 1000		Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0 0.65 0.7 50 7	12 18 HID 80% 5% .6 0.6 0.6 75 0.80 0.80 72 88 65	15HO LED 15% 0% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		E	UI = Load X Hrs	X SF X GLFF		EUI I	(Wh/ft².yr MJ/m².yr	0.8
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor fra	action check: should = 1.	00 1.00		<u></u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 7	00 1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL T 0.7 0 0.65 0.7 50 7	12 T8 .6 0.6 0.6 75 0.80 0.80 72 84 88	MH HPS 0% 0% 0.6 0.6 0.55 0.55 65 90	<u>TOTAL</u> 0.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI	(Wh/ft².yr MJ/m².yr	
TOTAL LIGHTING					Overall LP	13.18 W/m ²	EUI TOTAL I	Wh/ft².yr vJ/m².yr	7 278
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	55 0.65 0.8 W/m ² 0.1 W/t ² 90% 50% 2000	51 0.65 0.7 W/m ² 0.1 W/ft ² 90% 50% 2000	100 0.01 0.00 W/m ² 0.00 W/ft ² 90% 50% 2000	200 0.01 0.0 W/m ² 0.00 W/ft ² 90% 50% 2000	217 0.03 0.1 W/m ² 100% 100% 2600	1.5 W/m ² 0.14 W/tt ² 90% 50% 4100			
Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period)	6760 2.9 W/m ² 1.7 W/m ²	6760 0.3 W/ft ² 0.2 W/ft ²	to see notes (cells with n	6760 ed indicator in upp	6160 ber right corner, type "SHII	4660	EUI F	(Wh/ft².yr MJ/m².yr	0.11
Usage during occupied period Usage during unoccupied period	100% 58%					Computer Equipment Plug Loads	EUI F EUI F	Wh/ft².yr <u>AJ/m².yr</u> Wh/ft².yr NJ/m².yr	0.76 29.56 0.84 32.51
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	2.6 100.0	All EUI I	Electric EUI Wh/ft².yr MJ/m².yr	3.1 120.0
REFRIGERATION Provide description below: Commercial refrigeration display case	is						EUI F	‹Wh/ft².yr ∕JJ/m².yr	29.0 1125.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI F	:Wh/ft².yr MJ/m².yr (Wh/ft².yr	0.3

			COMMER	CIAL SECT	OR BUILDIN	IG PROFI	LE						
NEW BUILDINGS: Food Retail Baseline	SIZE: All	All New Island Interconnected											
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Ele	ctric				
				Bo Stan	ilers I High	Packaged Roofton	A/A HP	W. S. HP	H/R Chiller	ResistanceTota			
		System Present (%)		0000	- ngn	05%	0.00	0.00	4.50	100%	100%		
		Performance (1 / Eff.)		80%	88% 1.14	95%	3.20	0.33	4.50	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load)	32.0 W/m ² 181 MJ/m ² .yr	10.1 4.7	Btu/hr.ft ² kWh/ft ² .yr										
Sizing Factor	1.00			-			r	-			All	Electric EUI	
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share			Oil Fuel Shai	re		1				<wh ft².yr<br="">MJ/m².yr</wh>	4.7 181
Boiler Maintenance	Annual Ma	aintenance Tasks		Incidence							Fuel O	il / Propane El	11
	Fire Side	Inspection	ale an	75%								«Wh/ft².yr	
	Inspection	of Controls & Safeties	dup	100%								viJ/m².yr	
	Inspection Flue Gas	of Burner Analysis & Burner Set-up		100% 90%							Market	Composite EL kWh/ft².yr	JI 4.7
												MJ/m².yr	181
SPACE COOLING													
A/C Plant Type													
			Centrifugal Standard	Chillers	Screw I Chillers	Reciprocat Open	ting Chillers	Absorptior	n Chillers CW	Total			
		System Present (%)	otandard		Of milers	Open	100.0%			100.0%			
		Performance (1 / COP)	4.7	0.19	4.4	3.2 0.31	2.7	0.9 1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed Setpoint	Reset									
		Chilled Water											
		Condensel water											
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water	30	°C	86 55.4	°F ∘⊨							
			13.0		55.4								
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	24 W/m ² 77.8 MJ/m ² .yr	2.0 kWh/ft².yi	1552	ft ² / I on									
Sizing Factor	1.00		Operation (occ. period	4000	hrs/year	Note valu	e cannot be	less than 2	,900 hrs/year)			
A/C Saturation	80.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0%	Fuel Oil / Propane Fuel S	h]									
Chiller Maintenance	Annual Ma	aintenance Tasks		Incidence	Frequency								
	Inspect Co	ontrol, Safeties & Purge U	nit	(%)	(years)								
	Inspect Co	oupling, Shaft Sealing and	Bearings										
	Condense	r Tube Cleaning											
	Vibration Eddy Curr	Analysis ent Testing											
	Spectroch	emical Oil Analysis									All	Electric EUI	0.0
												MJ/m².yr	30
Cooling Tower/Air Cooled Condens	er Maintenan Annual Ma	aintenance Tasks		Incidence (%)	Frequency (years)						Fuel O	il / Propane EU	JI
	Inspection	/Clean Spray Nozzles										(Wh/ft².yr M I/m² yr	
	Megger N	lotors										vio/iii .yi	
	Inspect/Ve	erity Operation of Controls									Market	Composite EL kWh/ft ² .yr	0.8
												MJ/m².yr	30
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue	el SHW Std. Tanl	V Tank	Cond. Tnk	Std. Boiler	Cnd. Boil.	I			Fossil	Elec. Res.		
	System P Eff /COP	resent (%) 0.00%	0 600	0.900	0.750	0.900		Fuel Share Blended F	e fficiency	0%	100%		
Service Hot Water load (MJ/m ² .yr)	45.5	3.00	0.000	0.000	000	5.000	1			0.50	0.01		
(Tentary Load)				A	II Electric EU	1		Fuel 0	Dil / Propar	ne EUI	Market	Composite EL	JI
Wetting Use Percentage	90%				kWh/ft².yr MJ/m².yr	1.3 50			kWh/ft ² .yr MJ/m ² .yr	2.1 83		<wh ft².yr<br="">MJ/m².yr</wh>	1.3 50.0

		COMMER	CIAL SECTOR BUILDING PROFILE			
NEW BUILDINGS: Food Retail Baseline	SIZE: All		VINTAGE: New	REGION: Island Interce	onnected	
HVAC FANS & PUMPS						
SUPPLY FANS				Ventilation and Exhaust	Fan Operation & Con	trol
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency Fan Motor Efficiency Sizing Factor Fan Design Load CAV En Design Load CAV	2.8 L/s.m ² 750 Pa 750 Pa 30% .00 4.4 W/m ²	0.55 CFM/ft ² 3.0 wg 3.0 wg	Control Incidence of Use Operation Incidence of Use	Fixed Variable Flow 100% Continuous Scheduled Co 100%	Fixed Variable Flow 100% 100%	
EXHAUST FANS	4.4 10/11	0.41	Continents.			
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.washi 0.2 L/s.m² 1.1 L/s.m² 0.3 L/s.m² 250 Pa 25% 1.0 0.4 W/m²	room 212 CFM/wash 0.03 CFM/t ² 0.02 CFM/t ² 0.05 CFM/t ² 1.0 wg	iroom			
AUXILIARY COOLING EQUIPMENT (Cond	enser Pump a	nd Cooling Tower/Condenser Fans)				
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Coole	d Condenser)	0.020 kW/kW 0.49 W/m²	0.07 kW/Ton 0.05 W/ft²			
Condenser Pump						
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 0.001 L/s.KW //s.m ² kPa 50% 80% 1.0 W/m ²	3.0 U.S. gpm/Ton 0.002 U.S. gpm/ft ² ft W/ft ²			
CIRCULATING PUMP (Heating & Cooling)						
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Hefficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.001 L/s.m ² kPa 50% 80% 0.8 W/m ²	0.0015 U.S. gpm/ft ² 2.4 50 ft W/ft ²	U.S. gpm/Ton		
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		5000 hrs./year 3760 hrs./year 38.5 kWh/m².yr				
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		5000 hrs./year 3760 hrs./year 3.1 kWh/m².yr				
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Cor	sumption	kWh/m².yr 0.4 kWh/m².yr				
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000 hrs./year kWh/m².yr				
Fans and Pumps Maintenance	Annual M Inspect/So Inspect/So	laintenance Tasks ervice Fans & Motors djust Belt Tension on Fan Belts ervice Pump & Motors	Incidence Frequency (%) (years)		E	UI KWh/ff2.yr 3.9 M //m2.yr 151.1

	COMMERCIAL SECTOR BUILDING PROFILE											
NEW BUILDINGS:	:	SIZE:	VINTAGE	:			REGION:					
Food Retail		All		New			Island Interconnected					
Baseline												
EUI SUMMARY												
TOTAL ALL END-USES:	Electricity:		53.1 kWh/ft².yr 2,056.5 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr					
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane					
GENERAL LIGHTING	6.4	246.5		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr					
SECONDARY LIGHTING	0.8	31.6	SPACE HEATING	4.7	181.2							
TERTIARY LIGHTING			SPACE COOLING	0.6	24.2							
OTHER PLUG LOADS	0.8	32.5	DOMESTIC HOT WATER	1.3	50.0	0.0	0.0					
HVAC FANS & PUMPS	3.9	151.1	FOOD SERVICE EQUIPMENT	3.1	120.0							
REFRIGERATION	29.0	1,125.0										
MISCELLANEOUS	0.3	10.0										
BLOCK HEATERS												
COMPUTER EQUIPMENT	0.8	29.6										
COMPUTER SERVERS	0.1	4.4										
ELEVATORS												
OUTDOOR LIGHTING	1.3	50.4										

	COMMERCIAL SECTOR BUILDING PROFILE										
NEW BUILDINGS:	SIZE:		VINTAG	E:		REGION:					
Baseline	> 100 KW		New			Island Interconnected					
CONSTRUCTION											
			1	_							
Wall U value (W/m².°C)	0.28 W/m².°C	0.05	Btu/hr.ft ² .°F	Typica	Building Size	1,859 m ²	20,000 ft ²				
Roof U value (W/m².ºC)	0.19 W/m².°C	0.03	Btu/hr.ft ² .°F	I ypical	Footprint (m²)	1,859 m²	20,000 ft ²				
Glazing U value (W/m².°C)	2.80 vv/m².°C	0.49	Btu/hr.ft ² .°F	Percen	int Aspect Ratio (L:W) it Conditioned Space	100%					
				Percen	t Conditioned Space	45%					
Window/Wall Ratio (WIWAR) (%)	0.10			Defined	d as Exterior Zone						
Shading Coefficient (SC)	J.78			Floor to	p Floor Height (m)	6.0 m	19.7 ft				
					- · · · · · · · · · · · · · · · · · · ·						
VENTILATION SYSTEM BUILDING CONT											
VENTILATION STSTEM, BUILDING CONT	KOLS & INDOOR	K CONDITIONS									
Ventilation System Type	_		CAV CAV	R DDMZ DDMZ	VV VAV VAVR	IU 100% O.A TOTAL					
	Sys	vstem Present (%)	100%		50%	100%					
	(Mi	linimum Throttled Air Vo	olume as Percent of I	Full Flow)	5078						
				, 							
Occupancy or People Density		25 m²/persor	n 269	9 ft²/person		%OA 15.06%					
Occupancy Schedule Unocc. Period		3070									
Fresh Air Requirements or Outside Air		20 L/s.perso	n 42	2 CFM/person							
Fresh Air Control Type *(en	ter a 1, 2 or 3)	1 If Fresh Ai	ir Control Type = "?"	enter % FA, to the rid	ht:	34%					
(1 = mixed air control, 2 = Fixed fresh air, 3 1	100% fresh air)	If Fresh Ai	ir Control Type = "3"	enter Make-up Air Ve	ntilation and operation	0.5 L/s.m ² 0.10 Cl	FM/ft ²				
Oleiner Frieden						50% operation (%)					
Sizing Factor Total Air Circulation or Design Air Flow		2 5.31 L/s.m ²	1.0	5 CFM/ft ²							
· · · · · · · · · · · · · · · · · · ·					Separate Make-up ai	r unit (100% OA)	s.m ² CFM/ft ²				
Infiltration Rate		L/s.m ²		CFM/ft ²	Operation	occupied period 50%					
hours only if the ventilation system shuts down	vn)				Operation	unoccupied period 50%					
	·	T			<u> </u>						
Economizer	Insidence of L	Enthalp	y Based Dry-E	Bulb Based To	otal	of Docign Peromotors					
	Switchover Po	oint	KJ/kg. 1	8°C	Peak Desi	ign Cooling Load 533,548					
			Btu/lbm 64.	.4 °F	Peak Zone	e Sensible Load 224,846					
Controls Type	System Prese	ant (%)	HVAC Room		Room air Discharge	enthalpy 28.2 Btu air enthalpy 23.4 Btu	u/lbm u/lbm				
Controls Type	Gystern rese	51ii (70)	Equipment Controls	s	Specific volu	ume of air at 55F & 100% R 13.2 ft ³ /	lbm				
	All Pneumatic				Design CF	FM 10,460					
	All DDC	atic		_	l otal air c	irculation or Design air 5.31 l/s	m²				
	Total (should a	add-up to 100%)									
		Dropp		Total							
Control mode	Control Mode	e		TOTAL							
		Fixed D	ischarge Reset								
	Control Strate	egy									
Indoor Design Conditions			Room		Supply Air						
_	Summer Tem	perature	21 °C	69.8 °F	14 °C	57.2 °F					
	Summer Humi	hidity (%)	50%	28.2 Btu/lbr	100%	23.4 Btu/lbm					
	Winter Occ. T	emperature	21 °C	69.8 °F	15 °C	59 °F					
	Winter Occ. H	lumidity	30%	22.0 Dtu/lbs	45%	10.6 Div/lbm					
	Winter Unocc.	. Temperature	21 °C	69.8 °F	11 45.5 KJ/Kg.	19.6 Blu/ibm					
	Winter Unocc.	. Humidity	30%								
	Enthalpy		50 KJ/kg.	21.5 Btu/lbr	n						
Damper Maintenance			Incidence Frequence	^y							
	Control Arm A	Adiustment	(%) (years)	4							
	Lubrication	lajuotinioni									
	Blade Seal Re	eplacement									
Air Filter Cleaning	Changes/Year	r									
				Incidence of April	Room Controle Mointer	22000					
Incidence of Annual HVAC Controls Mainten	ance			moluence of Annual	TOOM CONTROLS WAINTER	ID ICC					
			· · · · · · · · · · · · · · · · · · ·		L						
	Annual Mainte	enance Tasks	Incidence		Annual Maintenance	Lasks Incidence					
	Calibration of	Transmitters	(/0 /		Inspection/Calibration	n of Room Thermostat					
	Calibration of	Panel Gauges	\vdash		Inspection of PE Swi	tches					
	Inspection of A	Auxiliary Devices	+		Inspection of Auxilian	Devices Devices (Valves,					
	mapadion of v	22.80.201000	LJ		(Dampers, VAV Boxe	es)					
						.					

NEW BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMME	RCIAL SECTOR BUILDING VINTAGE: New	PROFILE	REGION: Island Interco	nnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.95 15.9 W/m ² 1.5	5 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 95% 15%	Light Level (Lux) % Distribution Weighted Average	300 INC	500 700 100%	1000 T8 HID	тано сер	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)) 5% 5% 0.7 0.65 15	OTE TTE 10%	10 110 55% 10% 0.6 0.7 0.80 0.80 88 65	1310 LLD 20% 0% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI kW	/h/ft².yr	6.9
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46.5 0.05	5 ft-candles						<u>, , , , , , , , , , , , , , , , , , , </u>	201
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 95% 50%	Light Level (Lux) % Distribution Weighted Average	300	500 700 100%	1000 T8 HID	T5HO LED	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)) 5% 0.7 0.65 15	012 112 10%	20% 10% 0.6 0.6 0.80 0.80 88 65	50% 5% 50% 5% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		FII	I – Load X Hrs X	SE X GLEE		EUI kW	/h/ft².yr	0.5
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor fraction	on check: should = 1.00	1.00	[<u></u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)) 0.7 0.65 15	CFL T12 0.7 0.6 0.65 0.75 50 72	18 0.6 0.6 0.80 0.80 84 88	MH HPS 0.6 0.6 0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot		i	i	i		EUI kW	/h/ft².yr	
TOTAL LIGHTING					Overall LP	15.88 W/m²	EUI TOTAL kW	/h/ft².yr J/m².yr	7 285
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	55 0.22 0.5 W/m ² 0.0 W/ft ² 90% 50% 2000	51 0.22 0.4 W/m ² 0.0 W/ft ² 90% 50% 2000	100 0.01 0.0 W/m ² 0.00 W/t ² 90% 50% 2000	200 0.01 0.1 W/m ² 0.01 W/ft ² 90% 50% 2000	217 0.02 0.1 W/m ² 100% 100% 2000	1.15 W/m ² 0.11 W/ft ² 90% 50% 4100			
Operation Unocc. Period (hrs./year) Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m ² 1.2 W/m ²	0.2 W/ft ²	to see notes (cells with red	6760 indicator in upper r	6760	4660 E@mputer Servers	EUI kW M.	/h/ft².yr J/m².yr	0.11
Usage during occupied period Usage during unoccupied period	100% 59%				Co	mputer Equipment Plug Loads	EUI KV M. EUI KV M.	/h/ft².yr J/m².yr /h/ft².yr J/m².yr	0.49 <u>19.14</u> 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel S	5 Share:	Electricity Fuel Share:	100.0%	Fuel Oil / Propane E EUI kWh/ft².yr MJ/m².yr	UI	All El EUI KW M.	ectric EUI /h/ft².yr J/m².yr	1.0 38.7
REFRIGERATION Provide description below:							EUI kW M.	/h/ft².yr J/m².yr	1.5 58.1
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI KW M. EUI KW M.	/h/ft².yr J/m².yr /h/ft².yr J/m².yr	0.3

		COMMERC	IAL SECTO	r Buildin	G PROFI	LE						
NEW BUILDINGS: Large Non-Food Retail	SIZE: > 100 kW		VINTAGE: New					REGION: Island Inte	rconnected	ł		
Baseline												
SPACE HEATING												
Heating Plant Type			Fuel C Boiler	Dil / Propane rs Pa	e ackaged	A/A HP	Elec W. S. HP	tric I/R Chiller	Resistance	Total		
	System Preser	nt (%)	Stan.	High F	Rooftop				100%	100%		
	Eff./COP	1 / Eff)	75%	80%	75%	3.20	3.50	4.50	1.00			
	(kW/kW)	17 Ell.)	1.55	1.25	1.55	0.31	0.29	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load)	33.1 W/m ² 179 MJ/m ² .yr	10.5 Btu/hr.ft ² 4.6 kWh/ft ² .yr										
Sizing Factor	1.00				-						All Electric EUI	
Electric Fuel Share	100.0% Fuel Oil / Propane Fue	I Share	Oi	I Fuel Share	L						kWh/ft².yr MJ/m².yr	4.6 179
Boiler Maintenance	Annual Maintenance Task	3	Incidence (%)							Γ	Fuel Oil / Propane EL	JI
	Fire Side Inspection Water Side Inspection for	Scale Buildun	75%								kWh/ft².yr M.l/m² yr	
	Inspection of Controls & S	afeties	100%								Market Composite El	
	Flue Gas Analysis & Burn	er Set-up	90%								kWh/ft².yr	4.6
											MJ/m².yr	179
SPACE COOLING												
A/C Plant Type		Centrifugal	Chillers Sc	rew F	Recproctir	ng Chillers	Absorption	Chillers	Total			
	System Preser	Standard	HE Cł	hillers	Open	DX 100.0%	W. H.	CW	100.0%			
	COP Borformanaa	4.8 1 (COP) 0.21	5.4	4.4	3.7	2.7	0.9	1				
	(kW/kW)	17COF) 0.21	0.19	0.23	0.27	0.37	1.11	1.00				
	Additional Refr Related Inform	igerant ation										
Control Mode	Incidence of U	se Fixed Setpoint	Reset									
	Chilled Water	ter										
	oondenser wa											
Setpoint	Chilled Water	7	°C	44.6 °F	-							
	Condenser Wa Supply Air	ter 30 14.0	°C	86 °F 57.2 °F	-							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	84 W/m² 27 115.1 MJ/m².yr 3.0	Btu/hr.ft ² 450 t kWh/ft ² .yr	ft²/Ton									
Sizing Factor	1.00											
A/C Saturation	90.0%											
(Incidence of A/C)												
Electric Fuel Share	100.0% Fuel Oil / Propane Fue	I Share										
Chiller Maintenance	Annual Maintenance Task	3	Incidence Fi	requency								
	Inspect Control, Safeties	& Purge Unit	(%)	(years)								
	Megger Motors	aling and Bearings										
	Condenser Tube Cleaning Vibration Analysis											
	Eddy Current Testing Spectrochemical Oil Analy	sis								Γ	All Electric EUI	
	<i>,</i>										kWh/ft².yr M.l/m² yr	1.0 38
Cooling Tower/Air Cooled Condense	er Maintenan Annual Maintenance Task	3	Incidence Fi	requency							Eucl Oil / Proposo El	
	Inspection/Clean Spray N	ozzles	(78)	(years)							kWh/ft².yr	51
	Megger Motors	lotors								L	MJ/m².yr	
	Inspect/Verify Operation of	f Controls								_	Market Composite El kWh/ft².yr	UI 1.0
											MJ/m².yr	38
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fuel SHW	Std. Tank PV Tank	Cond. Tnk S	td. Boiler C	nd. Boil.		Fuel Share		Fossil	I	Elec. Res.	
Convice Liet Weter In al. (MUV: C.)	Eff./COP	0.550 0.600	0.900	0.750	0.900		Blended Ef	ficiency	0.55		0.91	
(Tertiary Load) (MJ/m ² .yr)	17.3	-	8-85									
Wetting Use Percentage	90%	-	All E kV	Liectric EUI Vh/ft ² .yr	0.5		Fuel O	ıı / Propan «Wh/ft².yr	e EUI 0.8	╞	Market Composite El kWh/ft².yr	UI 0.5
			M	J/m².yr	19			MJ/m².yr	31		MJ/m².yr	19.0

		COMMER	CIAL SECTOR BUILDING PROFILE				
NEW BUILDINGS:	SIZE:		VINTAGE:	REGION:			
Large Non-Food Retail	> 100 kV	v	New	Island Inte	rconnected		
Baseline							
HVAC FANS & PUMPS							
SUPPLY FANS				Ventilation and Exhaus	st Fan Operation & C	Control	
Sustan Design Air Flour	E 2 1/2 m2	1.0E CEN//#2	Control	Ventilation Fan	Exhaust Fan	_	
System Design Air Flow	5.3 L/S.M ²	1.05 CFM/ft ²	Control	Fixed Variable	Fixed Variable)	
System Static Pressure VAV	750 Pa	3.0 wg	Incidence of Lise	100%	100%	-	
Fan Efficiency	60%	0.0 Hg	Operation	Continuous Scheduled	Continuous Schedule	ed be	
Fan Motor Efficiency	88%						
Sizing Factor	1.00		Incidence of Use	75% 25%	50% 50%	%	
Fan Design Load CAV	7.5 W/m ²	0.70 W/ft ²					
Fan Design Load VAV	7.5 W/m ²	0.70 W/ft ²	Comments:				
EXHALIST FANS							
EXHAUST FANS							
Washroom Exhaust	50 L/s.wash	nroom 106 CFM/was	shroom				
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.01 CFM/ft ²					
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²					
Total Building Exhaust	0.2 L/s.m ²	0.03 CFM/ft ²					
Exhaust System Static Pressure	250 Pa	1.0 wg					
Fan Efficiency	25%						
Fan Motor Efficiency	/5%						
Exhaust Ean Connected Load	0.2 W/m ²	0.02 W/ft ²					
	0.2 11/11	0.02					
AUXILIARY COOLING EQUIPMENT	(Condenser Pump	and Cooling Tower/Condenser Fans)				
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton				
(Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	1.68 W/m ²	0.16 W/ft ²				
Condenser Pump							
Pump Design Flow		L/s.KW	U.S. gpm/Ton				
Pump Design Flow per unit floor area		L/s.m ²	U.S. gpm/ft ²				
Pump Head Pressure		45 kPa	15 ft				
Pump Efficiency		50%					
Pump Motor Efficiency		80%					
Sizing Factor		1.0	10//642				
Pump Connected Load		VV/m²	VV/ft²				
CIRCULATING PUMP (Heating & Co	oling)					-	
Pump Design Flow @ 5 °C (10 °F) de	elta T	0.004 L/s.m ²	0.0053 U.S. gpm/ft ² 2.4	U.S. gpm/Ton			
Pump Head Pressure		kPa	ft				
Pump Efficiency		50%					
Pump Motor Efficiency		80%					
Sizing Factor Pump Connected Load		0.8 W/m ²	W/ft ²				
i anp connected Load			, white				
Supply Fan Occ. Period		5500 hrs./year					
Supply Fan Unocc. Period		3260 hrs./year					
Supply Fan Energy Consumption		59.9 kWh/m².yr					
Extravel Fee One Design		EE00 hrs kusst					
Exhaust Fan Occ. Period		2260 brs /voor					
Exhaust Fan Energy Consumption		1.5 kW/b/m² vr					
Exhaust ran Energy consumption		1.5					
Condenser Pump Energy Consumptio	n	kWh/m².yr					
Cooling Tower /Condenser Fans Ener	gy Consumption	0.5 kWh/m².yr					
Circulating Pump Yearly Operation		7000 hrs./year					
Circulating Pump Energy Consumption	n	kWh/m².yr					
Fans and Pumps Maintenance		Aaintenance Tasks	Incidence Frequency				
and and rumps wall tend toe	Annual N	numerianee raana	(%) (vears)				
	Inspect/S	Service Fans & Motors	····/ (/-···/				
	Inspect/A	djust Belt Tension on Fan Belts					
	Inspect/S	Service Pump & Motors				EUI kWh/ft².yr	5.8
						M I/m ² vr	222.8

			COMMERCIAL SECT	OR BUILDI	NG PROFILE				
NEW BUILDINGS: Large Non-Food Retail Baseline		SIZE: > 100 kW	VINTAGE: New	RI			REGION: Island Interconnected	I	
EUISUMMARY									
TOTAL ALL END-USES:	Electricity:		24.0 kWh/ft².yr 929.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil / Propa	ane		
GENERAL LIGHTING	6.9	266.6		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr		
ARCHITECTURAL LIGHTING	0.5	18.6	SPACE HEATING	4.6	178.8				
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.9	34.1				
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0		
HVAC FANS & PUMPS	5.8	222.8	FOOD SERVICE EQUIPMENT	1.0	38.7				
REFRIGERATION	1.5	58.1							
MISCELLANEOUS	0.3	10.0							
BLOCK HEATERS									
COMPUTER EQUIPMENT	0.5	19.1							
COMPUTER SERVERS	0.1	4.4							
ELEVATORS/ESCALATORS									
OUTDOOR LIGHTING	0.9	33.9							
Fuel Specific EUIs for Heating Coo	ling & DHW								

			COMMER	CIAL SECTOR BUIL	DING PROFILE	E
NEW BUILDINGS: Small Non-Food Retail	SIZE:	,		VINTAGE:		REGION:
Baseline	< 100 KW			New		
CONSTRUCTION						
Wall U value (W/m ² .°C) 0.28	W/m ² .°C	0.05	Btu/hr.ft ² .	°F	Typical Buildi	ing Size 929 m ² 10,000 ft ²
Roof U value (W/m².ºC) 0.19	W/m².°C	0.03	Btu/hr.ft ² .	°F	I ypical Footp	print (m²) 929 m² 10,000 ft²
Glazing U value (W/m².°C) 2.80	vv/m².°C	0.49	Btu/nr.tt ² .	-F	Percent Conc	ditioned Space 100%
	_				Percent Cond	ditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.10					Defined as E	xterior Zone
Shading Coefficient (SC) 0.78					Floor to Floor	ones 1 or Height (m) 6.0 m 19.7 ft
VENTILATION SYSTEM DUILDING CONTRO						
VENTILATION STSTEM, BUILDING CONTRO	LS & INL	JOOR CONDITIONS				
Ventilation System Type			CAV	CAVR DDN	Z DDMZVV	VAV VAVR IU 100% O.A TOTAL
		System Present (%)	100%			100%
		(Minimum Throttled Air V	olume as P	ercent of Full Flow)		50%
Occupancy or People Density		25 m²/perso	n	269 ft²/persor	I	%OA 17.20%
Occupancy Schedule Unocc. Period		5078				
Fresh Air Requirements or Outside Air		20 L/s.perso	on	42 CFM/per	son	
Fresh Air Control Type */ontor	a 1 2 or 2)	1 If Eroch /	ir Control T	VDP - "2" enter % EA	to the right:	34%
(1 = mixed air control, 2 = Fixed fresh air, 3 100°	% fresh air)	If Fresh A	Air Control T	ype = "3" enter Make-	up Air Ventilatio	on and operation 0.5 L/s.m ² 0.10 CFM/ft ²
					·	50% operation (%)
Sizing Factor		1.4		0.02 CEM/#2		
Total Air Circulation of Design Air Flow		4.05 L/S.III-		0.92 CFM/IE	Se	eparate Make-up air unit (100% OA)
Infiltration Rate		0.42 L/s.m ²		0.08 CFM/ft ²		Operation occupied period 50%
(air infiltration is assumed to occur during unoccur bours only if the ventilation system abuts down)	upied					Operation unoccupied period 50%
nours only if the ventilation system shuts downy						
Economizer		Enthal	py Based	Dry-Bulb Based	Total	
	Incidence	of Use	12.14	100%	100%	Summary of Design Parameters
	Switchov	er Point	KJ/kg. Btu/lbm	64.4 °F	-	Peak Zone Sensible Load 140.593
	L				11	Room air enthalpy 28.2 Btu/lbm
Controls Type	System F	Present (%)	HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
	All Pneum	natic	Equipmen	ii Controis		Design CFM 6.540
	DDC/Pne	eumatic				Total air circulation or Design air 4.65 I/s.m ²
	All DDC	auld add up to 100%)				
	TOTAL (SH					
		Prop	ortional	PI / PID Tota	1	
Control mode	Control N	lode Eived (Discharge	Pecet	_	
	Control S	trategy	Jischarge	Reser		
	,					
Indoor Design Conditions	Summer	Temperature	21	Room	8 °F	Supply Air
	Summer	Humidity (%)	50%			100%
	Enthalpy		65.5	5 KJ/kg. 28.	2 Btu/lbm	54.5 KJ/kg. 23.4 Btu/lbm
	Winter Oo	cc. Temperature	21	1°C 69	.8 °F	15 °C 59 °F
	Enthalpy		53	3 KJ/kg. 22.	3 Btu/lbm	45.5 KJ/kg. 19.6 Btu/lbm
	Winter Ur	nocc. Temperature	21	I °C 69	8 °F	
	Winter Ur	nocc. Humidity	30%) K //ka 21	5 Btu/lbm	
	Linuapy		50	21.	Blanbin	
	·		la di	I		
Damper Maintenance			Incidence	(vears)		
	Control A	rm Adjustment	(70)	(yourd)		
	Lubricatio	on				
	Blade Se	ai keplacement	1			
				-		
Air Filter Cleaning	Changes/	Year				
				Incidence	of Annual Roor	m Controls Maintenance
Incidence of Annual HVAC Controls Maintenance	e					
	A nn:	eintenenee To-li-	Incide-	-	-	nuel Maintenance Table
	Annual M	aintenance I asks	Incidence	2	Ar	nnuai iviaintenance I asks Incidence
	Calibratio	n of Transmitters	(/0)	1	Ins	spection/Calibration of Room Thermostat
	Calibratio	n of Panel Gauges		4	Ins	spection of PE Switches
	Inspection	n or Auxiliary Devices	-	-	Ins	spection of Auxiliary Devices
	Lupecuol		1		(D	Jampers, VAV Boxes)
					<u></u>	<u> </u>

NEW BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	COMMERCIAL SECTO VINTAGE: New	R BUILDING PROFILE	REGION: Island Interconnec	ted	
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46 0.95 18.8 W/m ² 1	.5 ft-candles .8 W/ft²	_			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 95% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 7 100%			al 00% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	10% 5% 0.7 0.7 0 0.65 0.65 0. 15 50	112 113 113 55% 30% 0 0.6 0.6 0.7 0. 75 0.80 0.80 0.8 72 88 65 9	0 10 % 0% 10 6 0.6 0 0 0.80 5	0.0%
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr 6.
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46 0.05 16.6 W/m ² 1	.5 ft-candles .5 W/ft ²				
Ucc. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 95% 50%	Very Classifier Classi				al 00% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL I 5% 10% 0.7 0.7 0 0.65 0.65 0 15 50	20% 20% 40 0.6 0.6 0.6 0.75 75 0.80 0.80 0.83 72 88 65 9	C C <thc< th=""> <thc< th=""> <thc< th=""> <thc< th=""></thc<></thc<></thc<></thc<>	0.0%
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Load X Hrs	s. X SF X GLFF	EUI	kWh/ft².yr 0. MJ/m².yr 1
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m²	ft-candles W/ft²	Floor fr	raction check: should = 1.00	1.00	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500 7	700 1000		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (I /W)	0.7 0.7 0 0.65 0.65 0.	112 18 10 0.6 0.6 0.6 0. 75 0.80 0.80 0.5 72 84 88 6	6 0.6 5 0.55 5 90	
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 18.	72 W/m ² EUI TO	DTAL kWh/ft².yr MJ/m².yr 28
OFFICE EQUIPMENT & PLUG LOA	DS					
Equipment Type Measured Power (W/device)	Computers	Monitors Printe	rs Copiers	Servers Plu	g Loads	
Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.22 0.5 W/m² 0.0 W/f² 90% 50% 2000 6760	0.22 0.01 0.4 W/m² 0.0 W 0.0 W/tt² 0.00 W 90% 90% 50% 50% 50% 2000 6760 6760 6760	/m ² 0.01 /ft ² 0.1 W/m ² 90% 50% 2000 6760	0.02 0.1 0.01 0.01 0.01 0.00% 000% 2000 411 6760	15 W/m ² 11 W/ft ² % 00 60	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m² 1.2 W/m²	0.2 W/ft ² to see notes	(cells with red indicator in upp	per right corner, type "SHIFT @@m	er Equipment EUI	kWh/ft².yr 0. MJ/m².yr 4.
Usage during occupied period Usage during unoccupied period	100% 59%			Compa	Plug Loads EUI	MJ/m ² .yr 19. kWh/ft ² .yr 0.0 MJ/m ² .yr 24.
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5 Electricity Fu	el Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft2.yr MJ/m2.yr	EUI	All Electric EUI kWh/ft2.yr MJ/m2.yr
REFRIGERATION Provide description below:					EUI	kWh/ft².yr MJ/m².yr
BLOCK HEATERS & MISCELLANE	ous			E	Block Heaters EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr 0 MJ/m².yr 1

NEW BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	COMMER	RCIAL SECTOR BUILD VINTAGE: New	ING PROFILE	REGION: Island Interconnec	ted
SPACE HEATING						
Heating Plant Type	Sy Eff Pe (k)	ystem Present (%) f./COP erformance (1 / Eff.) W/kW)	Fuel Oil / Prop. Boilers Stan. High 75% 80% 1.33 1.25	Ane Packaged A/A Rooftop 75% 1.33	Electric HP W. S. HP H/R Chiller Resistar 3.20 3.50 4.50 1.0 0.31 0.29 0.22 1.0	Cf Total % 100% 0
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	49.8 W/m ² 279 MJ/m ² .yr	15.8 Btw/hr.ft ² 7.2 kWh/ft ² .yr	,			All Electric EUI
Electric Fuel Share	100.0% Fuel Oil / I	Propane Fuel Share	Oil Fuel Sha	re		kWh/ft².yr 7.2 MJ/m².vr 279
Boiler Maintenance	Annual Mainte Fire Side Insp Water Side In Inspection of Inspection of Flue Gas Ana	enance Tasks pection nspection for Scale Buildup Controls & Safeties Burner alysis & Burner Set-up	Incidence (%) 75% 100% 100% 90%			Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr Market Composite EUI kWh/ft².yr 7.2 MJ/m².yr 279
SPACE COOLING						
A/C Plant Type	Sy CC Pe (<u>ki</u> Ad Re	Centrifug Standard OP 4.1 erformance (1 / COP) 0.2 W/kW) dditional Refrigerant elated Information	Al Chillers Screw HE Chillers 8 5.4 4.4 1 0.19 0.23	Recprocting Ch Open D 10 3.7 0.27	Absorption Chillers Tot. X W. H. CW 0.0% 100.0 2.7 0.9 1 0.37 1.11 1.00	M 16
Control Mode	Inc Ch Cc	cidence of Use Fixed Setpoint hilled Water ondenser Water	Reset			
Setpoint	Ch Cc Su	hilled Water 7 ondenser Water 30 upply Air 14.0	°C 44.6 °C 86 0 °C 57.2	°F °F °F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	93 W/m² 131.3 MJ/m².yr	29 Btu/hr.ft ² 407 3.4 kWh/ft ² .yr]ft²/Ton			
Sizing Factor	1.00					
A/C Saturation (Incidence of A/C)	90.0%					
Electric Fuel Share	100.0% Fuel Oil / I	Propane Fuel Share				
Chiller Maintenance	Annual Mainte Inspect Contin Inspect Coupl Megger Moto Condenser T. Vibration Ana Eddy Current Spectrochemi	enance Tasks rol, Safeties & Purge Unit ling, Shaft Sealing and Bearings ors ube Cleaning alysis T Testing nical Oil Analysis	Incidence Frequency (%) (years)			All Electric EUI kWb/it².yr 1.1
Cooling Tower/Air Cooled Condense	er Maintenan Annual Mainte Inspection/Cle Inspect/Servic Megger Noto Inspect/Verify	enance Tasks lean Spray Nozzles ice Fan/Fan Motors ors y Operation of Controls	Incidence Frequency (%) (years)			MJ/m².yr 43 Fuel Oil / Propane EUI kWh/ti².yr MJ/m².yr Market Composite EUI kWh/ti².yr 1.1 MJ/m².yr 43
DOMESTIC HOT WATER						
Service Hot Water Plant Type	Fossil Fuel S System Prese Eff./COP	SHW Std. Tank PV Tank ent (%) 0.00% 0.550 0.600	Cond. Tnk Std. Boiler	Cnd. Boil. 0.900	Fossil Fuel Share 0 Blended Efficiency 0.5	Elec. Res. <u>%</u> 100% 5 0.91
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	17.3				5 10 15	
Wetting Use Percentage	90%		All Electric El kWh/ft².yr MJ/m².yr	0.5 19	KWh/ft².yr 0. MJ/m².yr 3	Market Composite EUI 8 kWh/ft².yr 0.5 1 MJ/m².yr 19.0



				COMMER	CIAL SECT	OR BUILDING PROFILE								
NEW BUILDINGS:	SIZE	:			VINTAGE			RE	EGION:					
Small Non-Food Retail	< 10	00 kW			New			Isla	and Inte	rconnecte	d			
Baseline														
HVAC FANS & PUMPS														
SUPPLY FANS							Ventilat	ion an	d Exhau	st Fan Ope	eration & Co	ontrol		
System Design Air Flow	4.6 I/s	m²	0.92	CFM/ft ²	Control		Fixed	Va	ariable	Fixed	Variable			
System Static Pressure CAV	750 Pa		3.0	wa	Control		i ixeu	va	Flow	TIXEU	Flow			
System Static Pressure VAV	750 Pa		3.0	wa	Incidence	of Use	100)%	1101	100%	1101			
Fan Efficiency	60%	I	0.0		Operation		Continu	oussc	heduled	Continuous	Scheduled			
Fan Motor Efficiency	88%													
Sizing Factor	1.00				Incidence	of Use	75	5%	25%	50%	50%			
Fan Design Load CAV	6.6 W/r	m²	0.61	W/ft ²	<u> </u>									
Fan Design Load VAV	6.6 W/r	n²	0.61	W/ft ²		Comments:								
EXHAUST FANS														
			r.											
Washroom Exhaust	50 L/s.	washroom	L	106 CFM/was	hroom									
Washroom Exhaust per gross unit area	0.1 L/s.	.m ²	L	0.02 CFM/ft ²										
Other Exhaust (Smoking/Conference)	0.1 L/s.	.m ²	L	0.02 CFM/ft ²										
Total Building Exhaust	0.2 L/s.	.m²	L	0.04 CFM/ft ²										
Exhaust System Static Pressure	250 Pa		L	1.0 wg										
Fan Efficiency	25%													
Fan Motor Efficiency	75%													
Sizing Factor	1.0	-												
Exhaust Fan Connected Load	0.3 W/r	n²	0.03	W/ft ²										
AUXILIABLY COOLING FOURMENT (C	andoncor Du	ump and Cooling	Tow	or/Condonsor Fana										
AUXILIART COULING EQUIPMENT (CO	bridenser Pu	imp and cooling	TOW	er/Condenser Fans)									
Average Condenser Fan Rower Draw			Г	0.020 WW/WW		0.07 kW/Top								
Cooling Tower/Even Condensor/ Air Co	alad Candon	nor)	-	1.96 \M/m2		0.07 KW/1011								
(Cooling Tower/Evap. Condensel/ All Co	olea Conden	iser)		1.00 \\//11-		0.17								
Condenser Pump														
Condenser Fump														
Pump Design Flow			Г	I /s KW		U.S. gpm/Top								
Rump Design Flow per unit floor area			-	L/3.RW		U.S. gpm/101								
Pump Head Pressure			-	45 kPa		15 ft								
Pump Efficiency			-	50%		10 11								
Pump Motor Efficiency			-	80%										
Sizing Factor			-	1.0										
Pump Connected Load			-	1.0 W/m ²		W/ft ²								
CIRCULATING PUMP (Heating & Coolin	ng)													
Pump Design Flow @ 5 °C (10 °F) delta	Т	0	.004	L/s.m ²	0.0059	U.S. gpm/ft ²	2.4 U.S. gp	m/Tor	n					
Pump Head Pressure				kPa		ft								
Pump Efficiency			50%											
Pump Motor Efficiency			80%											
Sizing Factor			0.8											
Pump Connected Load				W/m²		W/ft ²								
Quarte For One Desired		_	500	h										
Supply Fan Occ. Period		5	500	hrs./year										
Supply Fan Unocc. Period			3260	hrs./year										
Supply Fan Energy Consumption			52.5	kwh/m².yr										
Exhaust Ean Oce, Bariad		5	500	bra lucor										
Exhaust Fan Ucce. Period		0	000	his./year										
Exhaust Fan Unocc. Period			3260	nrs./year										
Exhaust Fan Energy Consumption			2.0	KVVIVIII - .yi										
Condenser Pump Energy Consumption				k\M/b/m² vr										
Cooling Tower (Condenser Fans Energy (Concumption		0.5	kWh/m².yr										
Cooling Tower/Condenser Paris Energy (Consumption		0.5	KVVIVIIIyi										
Circulating Pump Yearly Operation		7	000	hrs /vear										
Circulating Pump Energy Consumption			000	kW/h/m² vr										
chousing rump Energy consumption		L												
Fans and Pumps Maintenance	Annı	ual Maintenance	Tasks		Incidence	Frequency								
					(%)	(years)								
	Insp	ect/Service Fans	& Mo	tors										
	Insp	ect/Adjust Belt Te	ension	on Fan Belts										
	Insp	ect/Service Pum	5 & Mo	otors	1							EUI	kWh/ft2.yr	5.1
	<u>19</u>					·							MJ/m².vr	198.0

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
NEW BUILDINGS: Small Non-Food Retail Baseline		SIZE: < 100 kW	VINTAGE: New	:			REGION: Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		23.5 kWh/ft².yr 910.3 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Fuel Oil	Propane	
GENERAL LIGHTING	6.8	265.0		kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING SPECIAL PURPOSE LIGHTING	0.5	17.8	SPACE HEATING SPACE COOLING	7.2 1.0	279.3 38.8			
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS REFRIGERATION	5.1	198.0	FOOD SERVICE EQUIPMENT					
MISCELLANEOUS BLOCK HEATERS	0.3	10.0						
COMPUTER EQUIPMENT	0.5	19.1						
COMPUTER SERVERS ELEVATORS/ESCALATORS	0.1	4.4						
OUTDOOR LIGHTING Fuel Specific EUIs for Heating Coo	0.9 Ding & DHW	33.9						

			(COMMER	CIAL SEC	FOR BUILD	ING PROF	ILE						
NEW BUILDINGS:	SIZE:	,			VINTAGE	:				REGION:	erconnecte	d		
Baseline	> 100 KW				New					isianu ini	erconnecte	u		
CONSTRUCTION												-		
		Г	0.05	D . <i>H</i> (10)	-						0.717	1.	10.000	٦
Wall U value (W/m².°C)	0.28 W/m ² .°C	_	0.05	Btu/hr.ft ² .	Έ Γ		Typical Bu	ulding Size	``````````````````````````````````````		3,717	m² ?	40,000	1t ²
Roof U value (W/m².°C)	0.19 W/m².*C	-	0.03	Btu/nr.tt ² .			Typical Fo	otprint (m²)		1,500	m²	16,140	112
Glazing U value (W/m ² .°C) 2	2.80 w/m².°C	L	0.49	Btu/hr.ft ² .	'F		Percent C	Aspect Rat	io (L:W) Space		4	1		
							Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%) 0	0.30						Defined a	s Exterior Z	one					
Shading Coefficient (SC) 0	0.65						Typical #	Stories	(m)		3		12.0	f4
								ioor neigni	(11)		3.7	'm l	12.0	II
VENTILATION SYSTEM, BUILDING CONT	ROLS & IND	OOR CONDITION	IS											
Ventilation System Type				CAV	CAVR	DDMZ	DDMZVV	VAV	FCoils	П	J 100% O.A	TOTAL	[
		System Present ((%)	90%				10%				100%	İ	
		Min. Air Flow (%))					60%				1		
		(Minimum Through	ed All VOI	ume as Pe	ercent of Fi	lii FiOW)								
Occupancy or People Density		50 n	n²/person		538	ft²/person				%OA	9.65%			
Occupancy Schedule Occ. Period		50%												
Occupancy Schedule Unocc. Period		80%	/s nerson		32	CEM/perso	n							
		15	23.pei3011		52	CI W/perso								
Fresh Air Control Type *(en	ter a 1, 2 or 3)	1 If	Fresh Air	Control T	ype = "2" e	nter % FA. t	o the right:			15%	<u>.</u>			-
(1 = mixed air control, 2 = Fixed fresh air, 3 1	100% fresh air)	lf	Fresh Air	Control T	ype = "3" e	nter Make-u	o Air Ventila	ation and o	peration	0.5	5 L/s.m ²	0.10	CFM/ft ²	
Sizing Factor		1.4								50%		(10)		
Total Air Circulation or Design Air Flow		3.11 L	./s.m²		0.61	CFM/ft ²							T	
la filhantina Doto		0.70	12		0.44	0514/62		Separate	Make-up air	unit (100%	% OA)	500/	L/s.m ²	CFM/ft
air infiltration is assumed to occur during und	occupied	0.70 L	_/s.m²		0.14	CFM/II ²			Operation	unoccupiea	d period	50%	ł	
hours only if the ventilation system shuts dow	vn)													
F			Eatherbar	Desert	DeviD	lle Deserved	T . (.)	т						
Economizer	Incidence	ofUse	Enthalpy	Based	100%	ID Based	1 otai 100%	-	Summary	of Design	Parameters			T
	Switchove	er Point	1	KJ/kg.	18	°C	10070	1	Peak Desi	gn Cooling	J Load	652,273		
				Btu/lbm	64.4	°F		1	Peak Zone	Sensible	Load	376,026		
Controls Type	System P	resent (%)	1	HVAC	Room	1			Room air e	enthalpy air enthalr	W	28.2	Btu/lbm Btu/lbm	
Controls Type	System	resent (70)	8	Equipment	Controls				Specific volu	me of air at:	'y 55F & 100% R	13.2	ft ³ /lbm	
	All Pneum	natic				1			Design CF	M	_	17,493		
	DDC/Pne	umatic				-			Total air ci	rculation o	r Design air	3.11	l/s.m ²	
	Total (sho	ould add-up to 100%	%)			-								
							1							
Control mode	Control M	lode	Propor	tional	PI/PID	Total								
Condition	Control IV	ode	Fixed Dis	scharge	Reset		1							
	Control S	trategy				1								
Indoor Design Conditions					Room				Supply Air				ſ	
	Summer	Temperature	ŀ	22	°C	71.6	°F	13	°C	55.4	1 °F		Ì	
	Summer I	Humidity (%)	ļ	50%			- т	100%			-		l I	
	Enthalpy Winter Oc	c Temperature		65.5	KJ/kg.	28.2	Btu/lbm °F	54.5	KJ/kg.	23.4	Btu/lbm ∘F		Ì	
	Winter Oc	c. Humidity	ŀ	30%	Ŭ	09.0	1.	45%	Ŭ	5	2 '		Ì	
	Enthalpy	-		53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/lbm	J	l I	
	Winter Un	locc. Temperature	-	21	°C	69.8	°F						ĺ	
	Enthalpv	iocc. munifully	ŀ	50%	KJ/kg.	21.5	Btu/lbm						Ì	
Dompor Maintonanaa				Inoidana -	Froguese	1								
				(%)	(years)									
	Control A	rm Adjustment		/		1								
	Lubricatio	n al Replacement				-								
	Diade Sea	arreplacement			I	J								
	<u>.</u>		-		1									
Air Filter Cleaning	Changes/	Year	L											
						Incidence o	f Annual R	oom Contr	ols Mainten	ance		I		
Incidence of Annual HVAC Controls Maintena	ance]												
	Approx	nintononos Test		Incident ⁻	1			Applied	intonener 7	Tooke		Incidence	ſ	
	A INUAI IVIA	annendrice Tasks		(%)				AT IT LUCKET IVE	an iteridi iCe	0242		(%)	l I	
	Calibratio	n of Transmitters		(/				Inspection	/Calibratior	of Room	Thermostat		Í	
	Calibratio	n of Panel Gauges	;					Inspection	of PE Swit	ches			ł	
	Inspection	not Auxiliary Devic	Ces					Inspection	of Auxiliary	/ Devices	Jalves	├───┤	ł	
	mapecilor				1			(Dampers	, VAV Boxe	is)	vaivea,		l I	
1													•	

NEW BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	COMMERCIAL SEC VINTAG New	CTOR BUILDING PROFILE E:	E REGION: Island Inter	rconnected		
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 11.6 0.75 8.9 W/m ² 0.6	5 ft-candles 3 W/ft ²					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) % Distribution Weighted Average	50 100 75%	200 300 25%	T5H0 LED	otal 100% 125	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	30% 50% 0.7 0.7 0.65 0.65 15 50	10% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0% 10% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr M.l/m² yr	1.7
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27.5 0.25) ft-candles					01
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 75%	Light Level (Lux) % Distribution Weighted Average	300 500 100% INC CFL	700 1000 		otal 100% 300	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	15% 15% 0.7 0.7 0.65 0.65 15 50	55% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0% 15% 1 0.6 0.6 0.6 0.80 0.80 0.80 95 90 90 90 90 90 1 <td>100.0%</td> <td></td>	100.0%	
of Practice			EUI = Load 2	X Hrs. X SF X GLFF	EUI	kWh/ft².yr MJ/m².yr	2.2 86
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²	Fk	bor fraction check: should = 1.	00 1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		T12 T8		TOTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0% 0.7 0.7 0.65 0.65 15 50	0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	100% 0% ' 0.6 0.6	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING				Overall LP	10.11 W/m ² EUI	TOTAL kWh/ft².yr MJ/m².yr	4 153
OFFICE EQUIPMENT & PLUG LOA	DS						
Equipment Type	Computers	Monitors F	Printers Copier	s Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.3 0.3 W/m ² 0.0 W/tt ²	51 10 0.3 0.0 0.3 W/m² 0 0.0 W/t² 0 0.00 W/t² 0	0 15 1 W/m ² 1 W/m ² 1 W/ft ² 0.01 W. 0.01 W. 0.01 W. 0.00 W.	217 0.02 /m ² 0.1 W/m ² /ft ² 0.01 W/ft ²	1.5 W/m ² 0.14 W/ft ²		
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 50% 2000 6760	30% 90 50% 50° 2000 200 6760 676	% 90% % 50% 00 2000 60 6760	100% 2500 6260	25% 3000 5760		
Total end-use load (occupied period) Total end-use load (unocc. period)	1.9 W/m ²	0.2 W/ft ² to see no 0.1 W/ft ²	otes (cells with red indicator i	n upper right corner, type "SHII	FT @@mputer Servers EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr	0.10 3.68 0.42
Usage during occupied period Usage during unoccupied period	100% 48%				Plug Loads EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	16.11 0.49 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricit	y Fuel Share: 98.0%	EUI kWh/tł².yr MJ/m².yr	EUI <u>1.3</u> 50.0	All Electric EUI kWh/ft².yr MJ/m².yr	0.6 25.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	es			EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	ous				Block Heaters EUI Miscellaneous EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.3

NEW BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	COMMERCIAL SI VINTA New	ECTOR BUILDING PRO GE:	FILE REGION: Island Inte	rconnected	
SPACE HEATING						,
				Electric		
neating Flant Type			Boilers Package	d A/A HP W. S. HP H/R Chiller	ResistanceTotal	
	System Present (%) Stan	High Unit		100% 100%	
	Eff./COP Performance (1 / E	7 (ff.) 1	5% 80% 759 .33 1.25 1.3	% 3.20 3.00 4.50 3 0.31 0.33 0.22	1.00	
	(kW/kW)					
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	50.2 W/m² 273 MJ/m².yr 1.00	15.9 Btu/hr.ft ² 7.0 kWh/ft ² .yr				
Electric Fuel Share	100.0% Fuel Oil / Propane Fuel Sha	are	Oil Fuel Share			kWh/ft².yr 7.0
Boiler Maintenance	Annual Maintenance Tasks	Incider	ice			MJ/m².yr 273
	Fire Side Inspection	(%)			Fuel Oil / Propane EUI kWh/ft² vr
	Water Side Inspection for Sca	le Buildup 10	0%			MJ/m².yr
	Inspection of Controls & Safet Inspection of Burner	10 10 10	0%			Market Composite EUI
	Flue Gas Analysis & Burner S	et-up 9	0%			kWh/ft².yr 7.0 MJ/m².yr 273
SPACE COOLING					· ·	
A/C Fiant Type		Centrifugal Chiller	Screw Reciproc	ating Chillers Absorption Chillers	Total	
	System Present (%) Standard HE) 20.	Chillers Open	DX W. H. CW 80.0%	100.0%	
	COP Performance (1 / C	4.7 (OP) 0.21 0	5.4 4.4 3. 19 0.23 0.2	5 2.9 0.9 1 9 0.34 1.11 1.00		
	(kW/kW)	0.21	.13 0.23 0.2	.5 0.54 1.11 1.00		
	Additional Refrigera Related Information	int i				
Control Mode	Incidence of Use	Fixed Reset				
	Chilled Water	Setpoint				
	Condenser Water					
Cotraint	Chilled Water	7.00	44.6%			
Setpoint	Condenser Water	30 °C	44.6 °F			
	Supply Air	13.0 °C	55.4 °F			
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	44 W/m² 14 Btw 74.1 MJ/m².yr 1.9 kWł	hr.ft² <u>866</u> ft²/Ton √ft².yr				
Sizing Factor	0.85	Operation (occ. p	erio 4000 hrs/year	Note value cannot be less than 2	,900 hrs/year)	
A/C Saturation	80.0%					
(Incidence of A/C)						
Electric Fuel Share	100.0% Fuel Oil / Propane Fuel Sha	are				
Chiller Maintenance	Annual Maintenance Tasks	Incider	ce Frequency			
	Inspect Control, Safeties & Pu	(%	(years)			
	Inspect Coupling, Shaft Sealing	g and Bearings				
	Condenser Tube Cleaning					
	Vibration Analysis Eddy Current Testing					
	Spectrochemical Oil Analysis					All Electric EUI
						кvvn/tt².yr 0.7 MJ/m².yr 28
Cooling Tower/Air Cooled Condense	er Maintenan Annual Maintenance Tasks	Incider	(vears)			Fuel Oil / Propane EUI
	Inspection/Clean Spray Nozzle	es (70				kWh/ft².yr
	Megger Motors					ivio/iiryl
	Inspect/Verify Operation of Co	ntrols				Market Composite EUI kWh/ft².yr 0.7
						MJ/m².yr 28
DOMESTIC HOT WATER						
Service Hot Water Plant Type	Fossil Fuel SHW Std	Tank PV Tank Cond.	Tnk Std. Boiler Cnd. Boi	il.	Fossil Elec	. Res.
	System Present (%) Eff./COP	0.00% 0.550 0.600 0.1	000 0.750 0.90	Fuel Share Blended Efficiency	0% 0.55	<u>100%</u> 0.91
Service Hot Water load (MJ/m ² .yr)	236.6				I	
			All Electric EUI	Fuel Oil / Propar	e EUI	Market Composite EUI
Wetting Use Percentage	90%		kWh/ft².yr 6.7 MJ/m².yr 260	7 kWh/ft².yr 0 MJ/m².yr	11.1 430	kWh/ft².yr 6.7 MJ/m².yr 260.0



NEW BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW		COMMER	CIAL SECTOR BU VINTAGE: New	LDING PROFILE		REGION: Island Inte	erconnecte	d			
HVAC FANS & PUMPS												
SUPPLY FANS						Ventilation	and Exhau	ist Fan Ope	ration & Co	ontrol		
System Design Air Flow 3.	1 L/s.m ²	0.61	CFM/ft ²	Control		Ventilat Fixed	ion Fan Variable	Exhau Fixed	st Fan Variable			
System Static Pressure CAV 30	00 Pa	1.2	wg	Insidence of Lice		100%	Flow	100%	Flow			
Fan Efficiency 45	%	1.2	wg	Operation		Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 70 Sizing Factor 1.0	% 0			Incidence of Lise		60%	40%	100%				
Fan Design Load CAV 3 Fan Design Load VAV 3.	0 W/m ²	0.28	W/ft ² W/ft ²		Comments:	0070	1070	10070				
EXHAUST FANS												
Washroom Exhaust 10	0 I /s washroon	m [212 CFM/was	broom								
Washroom Exhaust per gross unit area 0.	1 L/s.m ²		0.03 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0. Total Building Exhaust 0.	1 L/s.m ² 2 L/s.m ²		0.02 CFM/ft ² 0.05 CFM/ft ²									
Exhaust System Static Pressure	50 Pa	l	1.0 wg									
Fan Efficiency 25 Fan Motor Efficiency 75	%											
Sizing Factor 1.	0	0.00	14//6/2									
Exhaust Fan Connected Load	.3 W/m²	0.03	VV/ft²									
AUXILIARY COOLING EQUIPMENT (Conden	ser Pump and 0	Cooling Tow	er/Condenser Fans									
Average Condenser Fan Power Draw		1	0.022 kW/kW	0	08 kW/Top							
(Cooling Tower/Evap. Condenser/ Air Cooled C	Condenser)		0.95 W/m ²	0.	09 W/ft ²							
Condenser Pump												
Pump Design Flow		[0.053 L/s.KW		0.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area Pump Head Pressure			0.002 L/s.m ² kPa	0.0	03 U.S. gpm/tt ² ft							
Pump Efficiency			50%	<u>.</u>								
Pump Motor Efficiency Sizing Factor			80%									
Pump Connected Load		Į	W/m ²		W/ft ²							
CIRCULLATING PLIMP (Heating & Cooling)												
Dump Design Flow @ 5 °C (10 °F) date T	-	0.000	1 /a wa?	0.0020 11.0 m	~/#2		Tan					
Pump Design Flow @ 5 °C (10 °F) delta 1 Pump Head Pressure		100	L/s.m² kPa	0.0028 0.5. gp 33 ft	n/ft² 2.4	4]U.S. gpm/	ION					
Pump Efficiency		50%										
Sizing Factor		80%										
Pump Connected Load		0.4	W/m ²	0.03 W/ft ²								
Supply Fan Occ. Period		3500	hrs./year									
Supply Fan Unocc. Period		5260	hrs./year									
Supply Fan Energy Consumption		19.7	kvvh/m².yr									
Exhaust Fan Occ. Period		3500	hrs./year									
Exhaust Fan Energy Consumption		2.7	kWh/m².yr									
Condenser Pump Energy Consumption			k\W/b/m² vr									
Cooling Tower /Condenser Fans Energy Consul	umption	0.5	kWh/m².yr									
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000	hrs./year kWh/m².yr									
Fans and Pumps Maintenance	Annual Mainte	enance Task	S	Incidence Frequer	cy							
	Inspect/Servic	ce Fans & Mo	otors	(%) (years	<u> </u>							
	Inspect/Adjust	t Belt Tension	n on Fan Belts						i	E1 II	k/M/b/ft2 vr	24
	mapect/Servic	unip & M	0.015]					201	MJ/m².yr	2.1 82.5

COMMERCIAL SECTOR BUILDING PROFILE									
NEW BUILDINGS:		SIZE:	VINTAGE:				REGION:		
Large Accommodation Baseline	:	> 100 kW	New				Island Interconnected		
EUI SUMMARY									
TOTAL ALL END-USES:	Electricity:	E	23.2 kWh/ft².yr 900.0 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	1.0 MJ/m ² .yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane		
GENERAL LIGHTING (SUITES)	1.7	67.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m ² .yr		
SECONDARY LIGHTING	2.2	85.8	SPACE HEATING	7.0	272.6				
TERTIARY LIGHTING			SPACE COOLING	0.6	22.7				
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0		
HVAC FANS & PUMPS	2.1	82.5	FOOD SERVICE EQUIPMENT	0.6	24.5	0.0	1.0		
REFRIGERATION	0.4	15.0							
MISCELLANEOUS	0.3	10.0							
BLOCK HEATERS									
COMPUTER EQUIPMENT	0.4	16.1							
COMPUTER SERVERS	0.1	3.7							
ELEVATORS	0.1	3.9							
OUTDOOR LIGHTING	0.4	17.0							

		COMMERCIAL SECTOR BUILD	ING PROFILE
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Small Accommodation	< 100 kW	New	Island Interconnected
CONSTRUCTION			
Wall U value (W/m ² °C) 0.2	8 W/m ² °C	0.05 Btu/br ft ² °F	Typical Building Size 1 859 m ² 20 000 ft ²
Roof U value (W/m ² .°C) 0.1	9 W/m².°C	0.03 Btu/hr.ft².°F	Typical Ecotorint (m ²) 1.500 m ² 16.140 ft ²
Glazing II value (W/m ² °C) 2.8) W/m² °C	0.49 Btu/br ft ² °F	Footprint Aspect Ratio (I :W)
		0.40 Blankit . 1	Percent Conditioned Space 100%
			Percent Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.3	0		Defined as Exterior Zone
Shading Coefficient (SC) 0.6	5		I ypical # Stories 2 Eloor to Eloor Height (m) 37 m 120 ft
VENTILATION SYSTEM, BUILDING CONTROL	OLS & INDOOR CONDITIONS		
Ventilation System Type			
venuation system rype	System Present (%) 100%	
	Min. Air Flow (%)	,,	60%
	(Minimum Throttled	Air Volume as Percent of Full Flow)	
Occupancy or Reaple Density	E0 m2	E28 ft2/porcon	9/ OA 7 629/
Occupancy Schedule Occ. Period	50%	person 538 ht-person	%OA 7.03%
Occupancy Schedule Unocc. Period	80%		
Fresh Air Requirements or Outside Air	15 L/s	.person 32 CFM/perso	n
French Ala Osiatara Tura a transfer	- 4 0 0) 4 14 5		- the sinks
Fresh Air Control Type (enter (1 - mixed air control 2 - Fixed fresh air 3 100	a 1, 2 or 3) 1 If Fi	resh Air Control Type = "2" enter % FA. t	o the right: 15%
(1 = mixed all conditi, 2 = Fixed fiestrall, 3 100	in riesitali)	lesh Ali Control Type = 5 enter Make-u	50% operation (%)
Sizing Factor	1.4		
Total Air Circulation or Design Air Flow	3.93 L/s	.m ² 0.77 CFM/ft ²	
la filtra ti a a Data	0.70 1/-		Separate Make-up air unit (100% OA) L/s.m ² CFM/ft ²
air infiltration is assumed to occur during upoc	upied U.70 L/S	.m ² 0.14 CFM/ft ²	Operation occupied period 50%
hours only if the ventilation system shuts down)	apied		
Economizer	E	Enthalpy Based Dry-Bulb Based	Total
	Incidence of Use Switchover Point	100%	100% Summary of Design Parameters Reak Design Cooling Load 422 031
	Switchover Form	Btu/lbm 64.4 °F	Peak Zone Sensible Load 237.866
	L		Room air enthalpy 28.2 Btu/lbm
Controls Type	System Present (%)	HVAC Room	Discharge air enthalpy 23.4 Btu/lbm
		Equipment Controls	Specific volume of air at 55F & 100% R 13.2 ft³/lbm
	All Pneumatic		Design CFM 11,066 Total air circulation or Design air 3,93 I/s m ²
	All DDC		
	Total (should add-up to 100%)		
	rr		
Control mode	Control Mode	Proportional PI/PID Total	
Condormode	F	ixed Discharge Reset	
	Control Strategy		
Indoor Design Conditions	Summer Temperature	Room	
	Summer Humidity (%)	50%	100%
	Enthalpy	65.5 KJ/kg. 28.2	Btu/lbm 54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ. Temperature	21 °C 69.8	°F <u>15</u> °C <u>59</u> °F
	Winter Occ. Humidity	30%	45% Ptu/lbm 45.5 K ///a 10.6 Ptu/lbm
	Winter Unocc, Temperature	22.8 21 °C 69.8	рацијала 49.5 №/КУ. 19.0 рацијала °F
	Winter Unocc. Humidity	30%	
	Enthalpy	50 KJ/kg. 21.5	Btu/lbm
Damper Maintenance		Incidence Frequency	
		(%) (vears)	
	Control Arm Adjustment		
	Lubrication		
	Blade Seal Replacement		
Air Filter Cleaning	Changes/Year		
Incidence of Annual UN(AC Constants Mail in		Incidence of	f Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenand	Ce		
	Annual Maintenance Tasks	Incidence	Annual Maintenance Tasks
		(%)	(%)
	Calibration of Transmitters		Inspection/Calibration of Room Thermostat
	Calibration of Panel Gauges		Inspection of PE Switches
	Inspection of Auxiliary Devices	<u>s</u>	Inspection of Auxiliary Devices
		I	(Dampers, VAV Boxes)

NEW BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW	COMMERCIAL SECTOR VINTAGE: New	BUILDING PROFILE	REGION: Island Interconnected	
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 11.6 0.85 6.9 W/m ² 0.6	3] ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) % Distribution Weighted Average	50 100 200 75% 25%	20 300 %	Total 100% 125
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	20% 30% 0.7 0.7 0.6 0.65 0.65 0.75 15 50 72	50% 0% 0 6 0.6 0.6 0.6 5 0.80 0.80 0.80 0.8 2 88 65 95 95	6 100.0%
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 1.5
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27.5 0.15] ft-candles			NIJ/IIyi 60
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 75%	Light Level (Lux) % Distribution Weighted Average	300 500 70 100%	20 1000	Total 100% 300 ED TOTAL
Fixture Cleaning: Incidence of Practice Interval Relamning Strategy & Incidence	years	System Present (%) CU LLF Efficacy (L/W)	20% 15% 0.7 0.7 0.6 0.65 0.65 0.75 15 50 72	55% 0% 10 6 0.6 0.6 0.6 0 5 0.80 0.80 0.80 0.82 2 88 65 95 95	% 100.0% 6 0 100 0
of Practice			EUI = Load X Hrs. 2	X SF X GLFF	EUI kWh/ft².yr 1.5 MJ/m².yr 58
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles	Floor frac	ction check: should = 1.00 1.0	0
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		12 T8 Mag MH HE	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0% 0.7 0.7 0.6 0.65 0.65 0.75 15 50 72	T8 100% 0 6 0.6 0.6 0 5 0.80 0.80 0.55 0.5 2 84 88 65 5	6 6 0
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 8.25 W/m ²	EUI TOTAL kWh/ft².yr 3 MJ/m².yr 118
OFFICE EQUIPMENT & PLUG LOA	DS				
Measured Power (W/device)	55 0.3	51 100 0.3 0.05	200 0.033	217 0.02	
Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.3 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	0.3 W/m² 0.1 W/m² 0.0 W/ft² 0.01 W/ft 90% 90% 50% 50% 5000 5000 2000 2000 6760 6760 6760 6760	12 0.1 W/m ² 2 0.01 W/ft ² 90% 50% 2000 6760	0.1 W/m² 1.5 W/m² 0.01 W/t² 0.14 W/t² 100% 70% 100% 250 2500 3000 6260 5760	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.9 W/m ² 0.9 W/m ²	0.2 W/ft ² to see notes (c 0.1 W/ft ²	ells with red indicator in uppe	er right corner, type "SHIFT Ga mputer Serve Computer Equipme	rrs EUI kWh/ft².yr 0.10 MJ/m².yr 3.68 ent EUI kWh/ft².yr 0.42
Usage during occupied period Usage during unoccupied period	100% 48%			Plug Loa	MJ/m ² .yr 16.11 ds EUI kWh/ft ² .yr 0.49 MJ/m ² .yr 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricity Fuel	Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr 1.3 MJ/m².yr 50.0	All Electric EUI EUI kVVh/ft2.yr 0.6 MJ/m2.yr 25.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet cas	es			EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
BLOCK HEATERS & MISCELLANE	DUS			Block Heate Miscellaneo	us EUI kWh/ft².yr MJ/m².yr EUI kWh/ft².yr 0.3 MJ/m².yr 10

NEW BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW	СОММ	ERCIAL SECT VINTAGE: New	or Buildi	NG PROFI	LE		REGION: Island Inte	rconnected			
SPACE HEATING												
Heating Plant Type			Fue	el Oil / Propa	ne		Ele	ctric				
0 ,1			B0 Stan	ilers I High	Packaged	A/A HP	W. S. HP	H/R Chiller	ResistanceT	otal		
		System Present (%)		r light	Offic			4.50	100%	100%		
		Eff./COP Performance (1 / Eff.)	75%	80% 1.25	75%	3.20	3.00	4.50	1.00			
		(kW/kW)										
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	52.3 W/m ² 295 MJ/m ² .yr	16.6 Btu/hr.1 7.6 kWh/ft ²	it² ?.yr							Г		
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		Oil Fuel Shar	e []			_	kWh/ft².yr	7.6
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence							L	MJ/m².yr	295
	Fire Side	Inspection	(%)								Fuel Oil / Propane EUI kWb/ft² vr	I
	Water Sid	le Inspection for Scale Buildup	100%								MJ/m².yr	
	Inspection Inspection Flue Gas	n of Controls & Safeties n of Burner Analysis & Burner Set-up	100% 100% 90%								Market Composite EU kWh/ft².yr MJ/m².yr	1 7.6 295
SPACE COOLING												
A/C Plant Type												
		Centrif	ugal Chillers	Screw F	Reciprocati	ing Chillers	Absorption	CW	Total			
		System Present (%)		Crimers	Open	100.0%	vv. 11.	011	100.0%			
		Performance (1 / COP) 0	4.7 5.4 0.21 0.19	4.4	3.5 0.29	2.9	0.9	1.00				
		(kW/kW) Additional Refrigerant										
		Related Information										
Control Mode		Incidence of Use Fixed	Reset									
		Chilled Water	nt									
		Condenser Water										
Setpoint		Chilled Water Condenser Water Supply Air 1	7 °C 30 °C 3.0 °C	44.6 86 55.4	°F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	57 W/m² 67.0 MJ/m².yr	18 Btu/hr.ft ² 6 1.7 kWh/ft ² .yr	69 ft²/Ton									
Sizing Factor	0.85	Operat	ion (occ. perio	4000	nrs/year	Note value	e cannot be	less than 2	,900 hrs/yea	r)		
A/C Saturation (Incidence of A/C)	80.0%											
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share										
Chiller Maintenance	Annual Ma	aintenance Tasks	Incidence	Frequency								
	Inenect C	ontrol Safeties & Purge Unit	(%)	(years)								
	Inspect Co	pupling, Shaft Sealing and Bearings	6									
	Megger N Condense	lotors er Tube Cleaning										
	Vibration	Analysis										
	Spectroch	emical Oil Analysis									All Electric EUI	
											kWh/ft².yr MJ/m².yr	0.7 28
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency						F	Fuel Oil / Propage EL	
	Inspection	/Clean Spray Nozzles	(/0)	(years)						-	kWh/ft².yr	-
	Inspect/Se Megger N	ervice Fan/Fan Motors lotors									MJ/m².yr	_
	Inspect/Ve	erify Operation of Controls									Market Composite EU kWh/ft ² .yr MJ/m ² .yr	0.7 28
DOMESTIC HOT WATER											,	-
Service Hot Water Plant Type	Fossil Fue	Std. Tank PV Ta	ank Cond. Tnk	Std. Boiler	Cnd. Boil.				Fossil		Elec. Res.	
	System P Eff./COP	resent (%) 0.00% 0.550 0.6	600 0.900	0.750	0.900		Fuel Share Blended E	fficiency	0% 0.55	-	100% 0.91	
Service Hot Water load (MJ/m ² .yr)	236.6	,						.,				
			A	Il Electric EU			Fuel 0	Dil / Propan	e EUI		Market Composite EU	1
Wetting Use Percentage	90%			kWh/ft².yr MJ/m².yr	6.7 260			kWh/ft².yr MJ/m².yr	11.1 430		kWh/ft².yr MJ/m².yr	6.7 260.0



			COMMER	CIAL SECT	OR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:			VINTAGE			REGION					
Small Accommodation	< 100 kW	V		New			Island In	erconnecte	ed			
Baseline												
HVAC FANS & PUMPS												
HVAC FANS & FUMFS												
SUPPLY FANS						Ventilatio	n and Exha	ust Fan Ope	eration & Co	ontrol		
						Ventil	ation Fan	Exhai	ust Fan			
System Design Air Flow	3.9 L/s.m ²	0.77	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
System Static Pressure CAV	300 Pa	1.2	wg				Flow		Flow			
System Static Pressure VAV	300 Pa	1.2	wg	Incidence	of Use	1009	6	100%				
Fan Efficiency	45%			Operation		Continuo	usSchedule	dContinuou	Scheduled			
Fan Motor Efficiency	70%			Incidence	of Lloo	600	(400	4000/		-		
Sizing Factor	1.9 W/m2	0.17	\///f+2	Incluence	JI USE	605	⁶ 407	o 100%				
Fan Design Load VAV	1.9 W/m ²	0.17	W/ft ²		Comments:							
			1									
EXHAUST FANS												
Washroom Exhaust	100 L/s.wash	nroom	212 CFM/was	shroom								
Other Exhaust (Smeking/Conference)	0.1 L/s.m ²		0.03 CFM/ft ²									
Total Building Exhaust	0.1 L/S.M ²		0.02 CFIVI/IL-									
Exhaust System Static Pressure	250 Pa		1.0 wg									
Fan Efficiency	25%		1.0 Wg									
Fan Motor Efficiency	75%											
Sizing Factor	0.5											
Exhaust Fan Connected Load	0.2 W/m ²	0.01	W/ft ²									
AUXILIARY COOLING EQUIPMENT (Condenser Pump a	and Cooling Tow	er/Condenser Fans)								
			0.000		0.00							
Average Condenser Fan Power Draw			0.022 kW/kW		0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air C	Cooled Condenser)		1.23 VV/m ²		0.11 VV/tt ²							
Condenser Pump												
Condenser Fump												
Pump Design Flow			0.053 L/s KW		30 U.S. gpm/Ton							
Pump Design Flow per unit floor area			0.003 L/s.m ²		0.004 U.S. gpm/ft ²							
Pump Head Pressure			kPa		ft							
Pump Efficiency			50%									
Pump Motor Efficiency			80%									
Sizing Factor			0.5									
Pump Connected Load			W/m ²		W/ft ²							
CIRCULATING PUMP (Heating & Coo	bling)											
Rump Design Flow @ 5 °C (10 °F) det	ta T	0.002	1 /c m2	0.0036	LLS apm/ft2	24115 000	/Ton					
Pump Head Pressure		100	kPa	0.0000	ft	2.4 0.5. gph	01011					
Pump Efficiency		50%	N G	00	it.							
Pump Motor Efficiency		80%										
Sizing Factor		0.5										
Pump Connected Load		0.3	W/m ²	0.03	W/ft ²							
				u.								
			ı									
Supply Fan Occ. Period		3500	hrs./year									
Supply Fan Unocc. Period		5260	hrs./year									
Supply Fan Energy Consumption		12.5	kWh/m².yr									
Exhaust Ean Osa, Bariad		2500	bro (voor									
Exhaust Fan Uppen Boried		5300	his./year									
Exhaust Fan Energy Consumption		5200	hlls./year									
Exhaust ran Energy Consumption		1.4	Kvviviii .yi									
Condenser Pump Energy Consumption			kWh/m².vr									
Cooling Tower /Condenser Fans Energy	v Consumption	0.4	kWh/m².vr									
gg.	,											
Circulating Pump Yearly Operation		7000	hrs./year									
Circulating Pump Energy Consumption			kWh/m².yr									
		-	-									
Fans and Pumps Maintenance	Annual M	laintenance Task	s	Incidence	Frequency							
1	L			(%)	(years)							
	Inspect/S	ervice Fans & M	otors									
1	Inspect/A	djust Belt Tensio	n on Fan Belts	1	<u> </u>					E.u.	134/1-16-2	
	Inspect/S	ervice Pump & N	IOTOIS	1						EUI	KWh/ft².yr	1.3
											IVIJ/III~.yi	51.5

			COMMERCIAL SECT	OR BUILD	NG PROFILE			
NEW BUILDINGS: Small Accommodation		SIZE: < 100 kW	VINTAGE	:			REGION: Island Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:	Γ	22.0 kWh/ft².yr 852.7 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING (SUITES)	1.5	59.7		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
SECONDARY LIGHTING	1.5	58.3	SPACE HEATING	7.6	295.1			
TERTIARY LIGHTING			SPACE COOLING	0.6	22.4			
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0	
HVAC FANS & PUMPS	1.3	51.3	FOOD SERVICE EQUIPMENT	0.6	25.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.4	16.1						
COMPUTER SERVERS ELEVATORS	0.1	3.7						
OUTDOOR LIGHTING	0.4	17.0						

		COMMERCIAL SECTOR BUILT	DING PROFILE
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Health Care Baseline	All	New	Island Interconnected
CONSTRUCTION			
	_		
Wall U value (W/m ² .°C) 0.28	3 W/m².°C	0.05 Btu/hr.ft ² .°F	Typical Building Size 8,829 m² 95,000 ft²
Roof U value (W/m ² .°C) 0.15	9 W/m².°C	0.03 Btu/hr.ft ² .°F	Typical Footprint (m²) 1,400 m² 15,064 ft²
Glazing U value (W/m ² .°C) 2.80) W/m².°C	0.49 Btu/hr.ft ² .°F	Footprint Aspect Ratio (L:W) 2
			Percent Conditioned Space 100%
Window/Wall Ratio (WIWAR) (%) 0.20)		Defined as Exterior Zone
Shading Coefficient (SC) 0.65	5		Typical # Stories 3
VENTILATION SYSTEM, BUILDING CONTROL	DLS & INDOOF	CONDITIONS	
Ventilation System Type		CAV CAVR DDM2	DDMZVV VAV FCoils IU 100% O.A TOTAL
	Sys	stem Present (%) 50%	50% 100%
	(Min	n. Air Flow (%)	60%
	(
Occupancy or People Density		30 m²/person 323 ft²/person	%OA 26.49%
Occupancy Schedule Unocc. Period		90% 75%	
Fresh Air Requirements or Outside Air		45 L/s.person 95 CFM/persor	1
Freeh Air Control Turne	a 1. 0 ar 0)	4 If Freeh Als Control Times - 101	the right
(1 = mixed air control, 2 = Fixed fresh air 3 100	a ı,∠or3) % freshair)	If Fresh Air Control Type = "2" enter % FA. to	Air Ventilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
	,		50% operation (%)
Sizing Factor		6	
I otal Air Circulation or Design Air Flow		5.66 L/s.m ² 1.12 CFM/ft ²	Separate Make-up air unit (100% OA)
Infiltration Rate		0.70 L/s.m ² 0.14 CFM/ft ²	Operation occupied period 50%
(air infiltration is assumed to occur during unocc	upied		Operation unoccupied period 50%
hours only if the ventilation system shuts down)			
Economizer		Enthalpy Based Dry-Bulb Based	Total
	Incidence of U	se 100%	100% Summary of Design Parameters
	Switchover Po	int KJ/kg. 18 °C	Peak Design Cooling Load #######
		Bluibili 04.4 F	Room air enthalov 28.2 Btu/lbm
Controls Type	System Prese	nt (%) HVAC Room	Discharge air enthalpy 23.4 Btu/lbm
		Equipment Controls	Specific volume of air at 55F & 100% R.H 13.2 ft ³ /lbm
	DDC/Pneumat	ic	Total air circulation or Design air fk 5.66 //s.m ²
	All DDC		
	Total (should a	add-up to 100%)	
		Proportional PI / PID Total	
Control mode	Control Mode		
	Control Strate	Fixed Discharge Reset	
	Control Strateg	9y	
Indoor Design Conditions		Room	Supply Air
	Summer Temp	dity (%) 50%	P F 14 °C 57.2 °F
	Enthalpy	65.5 KJ/kg. 28.2	Btu/lbm 54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ. Te	emperature 24 °C 75.2	°F 16.5 °C 61.7 °F
	Winter Occ. H	umidity 30%	8tu/lbm 455 K l/kg 19.6 Btu/lbm
	Winter Unocc.	Temperature 24 °C 75.2	°F
	Winter Unocc.	Humidity 30%	
	Enthalpy	50 KJ/kg. 21.5	Btu/lbm
Damper Maintenance		Incidence Frequency	
	Control Arm A	(%) (years)	
	Lubrication	ojustment	
	Blade Seal Re	placement	
Air Filter Cleaning	Changes/Year		
	3		
Incidence of Appuel H)/AC Centrels Maintener	~	Incidence of	Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenand	ю		
	Annual Mainter	nance Tasks Incidence	Annual Maintenance Tasks Incidence
	0.11.11.11.11	(%)	(%)
	Calibration of	I ransmitters	Inspection/Calibration of Room Thermostat
	Inspection of A	Auxiliary Devices	Inspection of Auxiliary Devices
	Inspection of C	Control Devices	Inspection of Control Devices (Valves,
			(Dampers, VAV Boxes)

	e17E -	COMME		DING PROFILE	RECION				
Health Care Baseline	All		New		Island Interco	onnected			
LIGHTING GENERAL LIGHTING (PATIENT RC	OMS)								
Light Level Floor Fraction (GLFF)	300 Lux 0.40	27.9 ft-candles							
Occ. Period(Hrs./vr.)	10.1 W/m²	U.9 W/tt ²	5	0 100 2	00 300		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period	40%	% Distribution Weighted Average			100%		100% 300		
Usage During Unoccupied Period		Durations David (9(4)	IN	C CFL T	12 T8 HID	T5HO LED	TOTAL		
Incidence of Practice Interval	years	CU LLF	0.6	7 0.7 0. 5 0.65 0.7	83% .6 0.6 0.6 75 0.80 0.80 72 88 65	0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Enicacy (DW)		5 50 7	00 00	33 30	EUI kV	Vh/ft².yr	1.3
SECONDARY LIGHTING (NURSING	STATIONS, EXAMIN	ATION ROOMS, LABORATORIES	, ICU, RECOVERY)				IVI.	<u>////yi</u>	51
Floor Fraction (ALFF) Connected Load	0.60 13.3 W/m ²	1.2 W/ft ²							
Occ. Period(Hrs./yr.)	8760	Light Level (Lux)	30	0 500 7	00 1000		Total		
Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	65%	% Distribution Weighted Average		100%			100% 500		
Fixture Cleaning:		System Present (%)	IN	C CFL T 5%	12 T8 HID 90%	T5HO LED 0% 5%	TOTAL 100.0%		
Incidence of Practice Interval	years	CU LLF	0.1	7 0.7 0. 5 0.65 0.7	.6 0.6 0.6 75 0.80 0.80	0.6 0.6 0.80 0.80	-		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)	1	5 50 7	72 88 65	95 90	EUI kV	Vh/ft².yr	4.2
	S, OTHER)	ft condice		EUI = Load X Hrs.	. X SF X GLFF	1.00	ן M. ר	<u>J/m².yr</u> 1	164
Floor Fraction (HBLFF) Connected Load	Lux	W/ft ²		FIOOTITE	action check. should = 1.00	1.00			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.)	4000 4760	Light Level (Lux) % Distribution					Total		
Usage During Occupied Period Usage During Unoccupied Period	100% 100%	Weighted Average							
Fixture Cleaning: Incidence of Practice	vears	System Present (%) CU	IN 59 0.1	C CFL T 6 5% 7 0.7 0. 5 0.65 0.7	12 T8 90% .6 0.6 0.6 75 0.80 0.80	MH HPS 0% 0.6 0.6 0.55 0.55	5 TOTAL 0 100.0%		
Relamping Strategy & Incidence	Group Spot	Efficacy (L/W)	1	5 50 7	72 88 88	65 90		NIL (12	
		I					EUI KV M	J/m².yr	
TOTAL LIGHTING					Overall LPD	12.02 W/m ²	EUI TOTAL kV M	/h/ft².yr J/m².yr 2	6 215
OFFICE EQUIPMENT & PLUG LOA	DS						_		
Equipment Type	Compute	ers Monitors	Printers	Copiers	Servers	Plug Loads	-		
Measured Power (W/device) Density (device/occupant) Connected Load	54.55 0.48 0.9	51 0.48 W/m ² 0.8 W/m ²	100 0.02 0.1 W/m ²	200 0.02 0.1 W/m ²	217 0.04 0.3 W/m ²	3.85 W/m ²			
Diversity Occupied Period	0.1 90%	W/ft ² 0.1 W/ft ² 90%	0.01 W/ft ² 90%	0.01 W/ft ² 90%	0.02 W/ft ² 100%	0.36 W/ft ² 90%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760	50% 2000 6760	100% 2600 6160	25% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	5.4	W/m ² 0.5 W/ft ² W/m ² 0.2 W/ft ²	to see notes (cells with	red indicator in uppe	er right corner, type "SHIFT I	2"Computer Servers	EUI kV	Vh/ft².yr (J/m².yr	0.21 8.10
Usage during occupied period	100%	· · · · · · · · · · · · · · · · · · ·				Computer Equipmen	EUI kV M	/h/ft².yr (J/m².yr 3	0.90 5.00
Usage during unoccupied period	40%					Plug Loads	EUI kV M	/h/ft².yr J/m².yr 6	1.74 7.29
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fu	uel Share:	Electricity Fuel Share:	100.0%	Fuel Oil / Propane	EUI	All El	ectric EUI	0.4
Commercial rood services					MJ/m².yr	120.0	LUI KV	J/m².yr 8	2.1
REFRIGERATION Provide description below:			7						
Walk-in coolers/freezers, reach-in coo	olers/freezers, refrigera	ted buffet cases					EUI kV M	/h/ft².yr J/m².yr 1	0.4
BLOCK HEATERS & MISCELLANE	ous								_
						Block Heaters Miscellaneous	EUI KV M. EUI KV M.	/h/ft².yr J/m².yr Vh/ft².yr J/m².yr	0.3

NEW BUILDINGS: Health Care Baseline	SIZE: All		COMMERCIAL SE VINTAGE New	CTOR BUILD	NG PROF	ILE		REGION: Island Interc	connected			
SPACE HEATING												
Heating Plant Type			F B Stan.	uel Oil / Propar oilers High	ne Packaged Unit	A/A HP	EI W. S. HP	ectric H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP Performance (1 / Eff.) (kW/kW)	75%	88% 1.14	95% 1.05	1.70 0.59	3.00 0.33	4.50 0.22	100% 1.00 1.00	100%		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	39.0 W/m ² 439 MJ/m ² .yr	12.4 B 11.3 ki	tu/hr.ft² Wh/ft².yr							-		
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share		Oil Fuel Share]			-	All Electric EUI kWh/ft².yr	11.3
Boiler Maintenance	Annual M	aintenance Tasks	Incidence	1						Ĺ	MJ/m².yr	439
	Fire Side Water Sid Inspection Flue Gas	Inspection le Inspection for Scale Buildup n of Controls & Safeties n of Burner Analysis & Burner Set-up	(%) 75% 0 100% 100% 100% 90%								Fuel Oil / Propane EU KWh/ft2.yr MJ/m².yr Market Composite EL KWh/ft2.yr MJ/m².yr	II JI 11.3 439
SPACE COOLING												
A/C Plant Type												
		COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	entrifugal Chillers tandard HE 50.0% 4.7 6.1 0.21 0.16	Screw Chillers 4.4 0.23	Reciprocat Open 3.6 0.28	ing Chillers DX 50.0% 2.7 0.37	Absorption W. H. O.9 1.11	n Chillers CW 1 1.00	Total 100.0%	-		
Control Mode		Incidence of Use Fi S Chilled Water Condenser Water	ixed Reset etpoint					<u> </u>]		
Setpoint		Chilled Water Condenser Water Supply Air	7 ℃ 30 ℃ 14.0 ℃	44.6 86 57.2	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	36 W/m² 121.3 MJ/m².yr	11 Btu/hr.ft ² 3.1 kWh/ft ² .yr	1065 ft²/Ton									
Sizing Factor	0.65	0	peration (occ. perio	3000	hrs/year	Note value	e cannot be	less than 2,9	100 hrs/year	r)		
A/C Saturation (Incidence of A/C)	80.0%											
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share										
Chiller Maintenance	Annual Mi Inspect C Inspect C Megger M Condense	aintenance Tasks ontrol, Safeties & Purge Unit oupling, Shaft Sealing and Be fotors or Tube Cleaning	arings	Frequency (years)								
	Vibration Eddy Cur Spectroch	Analysis rent Testing hemical Oil Analysis								[All Electric EUI kWh/ft².yr MJ/m².yr	0.9 34
Cooling Tower/All Cooled Condense	r Maintenan Annual Mi Inspection Inspect/S Megger M Inspect/V	antenance Tasks n/Clean Spray Nozzles ervice Fan/Fan Motors fotors erify Operation of Controls		(years)						[Fuel Oil / Propane EU kWh/ft².yr MJ/m².yr Market Composite EL kWh/ft².yr MJ/m².yr	II JI 0.9 34
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Std. Tank F Present (%) 0.550	2V Tank Cond. The 0.600 0.900	Std. Boiler 88.000	Cnd. Boil. 0.00% 0.900		Fuel Share Blended E	e fficiency	Fossil 0% 0.90	-	Elec. Res. 100% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	118.3											
Wetting Use Percentage	90%			All Electric EU kWh/ft ² .yr MJ/m ² .yr	3.4 130		Fuel	Oil / Propane kWh/ft².yr MJ/m².yr	EUI 3.4 131		Market Composite EL kWh/ft².yr MJ/m².yr	JI 3.4 130.0

NEW BUILDINGS: Health Care Baseline	SIZE: All	СОММЕ	ERCIAL SECTOR BUILDING PROFILE VINTAGE: New	REGION: Island Interconnected
HVAC FANS & PUMPS				
SUPPLY FANS				Ventilation and Exhaust Fan Operation & Control
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency Fan Motor Efficiency Sizing Factor Fan Design Load CAV Fan Design Load VAV	5.7 L/s.m² 875 Pa 55% 89% 1.00 W/m² 10.1 W/m²	1.12 CFM/ft² 3.5 wg 3.5 wg 0.94 W/ft² 0.94 W/ft²	Control Incidence of Use Operation Incidence of Use Comments:	Variable Fixed Variable Flow Fixed Variable Flow Stread Flow Continuous Scheduled Continuous 75% 25% 75%
EXHAUST FANS				
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wasi 0.1 L/s.m² 0.5 L/s.m² 0.6 L/s.m² 25% 75% 1.0 0.9 0.9 W/m²	212 CFM/wa 0.03 CFM/tr2 0.10 CFM/tr2 0.13 CFM/tr2 0.08 W/ft²	shroom	
AUXILIARY COOLING EQUIPMENT (Condenser Pump	and Cooling Tower/Condenser Fans	5)	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air C	Cooled Condenser)	0.017 kW/kW 0.59 W/m ²	0.06 kW/Ton 0.05 W/ft²	
Condenser Pump				
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 U/s.KW 0.002 U/s.m ² 100 kPa 60% 88% 1.0 0.36 W/m ²	3.0 U.S. gpm/Ton 0.003 U.S. gpm/ft² 33 ft 0.03 W/ft²	
CIRCULATING PUMP (Heating & Cod	oling)			
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	lta T	0.002 L/s.m ² 100 kPa 60% 88% 0.8 0.8 W/m ²	0.0023 U.S. gpm/ft ² 2.4 33 ft 0.02 W/ft ²	U.S. gpm/Ton
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		4000 4760 hrs./year 71.1 kWh/m².yr		
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		4000 hrs./year 4760 hrs./year 6.5 kWh/m².yr		
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energ	y Consumption	0.4 kWh/m².yr 0.5 kWh/m².yr		
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000 hrs./year kWh/m².yr		
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/S Inspect/S	Vaintenance Tasks Service Fans & Motors Adjust Belt Tension on Fan Belts Service Pump & Motors	Incidence Frequency (%) (years)	EUI kWh/ff2.yr 7.3 M /m2.yr 282.7

COMMERCIAL SECTOR BUILDING PROFILE										
NEW BUILDINGS:	:	SIZE:	VINTAGE:			F	REGION:			
Health Care		All	New			k	sland Interconnec	ted		
Baseline										
EUISUMMARY										
TOTAL ALL END-USES:	Electricity:	Ľ	34.9 kWh/ft².yr 1,350.6 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft ² .yr	0.0 MJ/m ²	[!] .yr		
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electri	city	Fuel Oil /	Propane			
GENERAL LIGHTING (PATIENT RO	1.3	51.0		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr			
SECONDARY LIGHTING (NURSING	4.2	163.6	SPACE HEATING	11.3	438.5					
TERTIARY LIGHTING (CORRIDORS			SPACE COOLING	0.7	26.8					
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0			
HVAC FANS & PUMPS	7.3	282.7	FOOD SERVICE EQUIPMENT	2.1	80.0					
REFRIGERATION	0.4	15.0								
MISCELLANEOUS	0.3	10.0								
BLOCK HEATERS										
COMPUTER EQUIPMENT	0.9	35.0								
COMPUTER SERVERS	0.2	8.1								
ELEVATORS	0.2	7.7								
OUTDOOR LIGHTING	0.9	34.9								

			COMMERCIA	AL SECTOR BUIL	DING PROP	DFILE
NEW BUILDINGS:	SIZE:		VI	NTAGE:		REGION:
Baseline	All		Ne	ew		Island Interconnected
CONSTRUCTION						
]			
Wall U value (W/m ² .°C) 0.28	3 W/m ² .°C	0.05	Btu/hr.ft ² .°F		Typical Bi	Building Size 3,717 m ² 40,000 tt ²
Roof U value (W/m².°C) 0.19	9 W/m².°C	0.03	Btu/hr.ft2 .°F		Typical Fo	Footprint (m²) 2,300 m² 24,748 tt²
	J w/m C	0.49	Blu/nr.11F		Percent C	Conditioned Space 100%
	_				Percent C	Conditioned Space 50%
Window/Wall Ratio (WIWAR) (%) 0.15	5				Defined a	as Exterior Zone
	,				Floor to F	Floor Height (m) 3.7 m 12.2 ft
VENTILATION SYSTEM, BUILDING CONTRO	ols & Indoo					
· _ · · · · · · · · · · · · · · · · · ·				T		
Ventilation System Type	5	vetom Procent (%)	CAV	CAVR DDN	Z DDMZVV	/V VAV VAVR IU 100% O.A TOTAL
	Mi	in. Air Flow (%)	5078			50%
	(M	Inimum Throttled Air V	olume as Perc	ent of Full Flow)		
Occupancy or People Density		10 m²/perso	n	108 ft²/persor		%OA 8.81%
Occupancy Schedule Occ. Period		90%	L			
Occupancy Schedule Unocc. Period	\vdash	3 1/2 0000		6 CEM/por	son	
Tean Air Requirements of Outside Air	L	3 L/s.perso	••• L	o Crivi/per	5011	
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fresh A	ir Control Type	e = "2" enter % FA.	to the right:	t. <u>34%</u>
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	It Fresh A	ir Control Type	e = "3" enter Make-	up Aır Ventil	tilation and operation U.5 L/s.m ² 0.10 CFM/tt ²
Sizing Factor		2.5				i
Total Air Circulation or Design Air Flow		3.41 L/s.m ²		0.67 CFM/ft ²		Concrete Males un aix unit (4000/
Infiltration Rate		0.42 L/s.m ²		0.08 CFM/ft ²		Operation occupied period 50%
(air infiltration is assumed to occur during unocc	upied					Operation unoccupied period 50%
hours only if the ventilation system shuts down)						
Economizer		Enthal	by Based	Dry-Bulb Based	Total	al
	Incidence of U	Use		100%	100%	% Summary of Design Parameters
	Switchover P	oint	KJ/kg. Btu/lbm	18 °C	_	Peak Design Cooling Load 418,815 Peak Zone Sensible Load 230,702
			Branbin	01		Room air enthalpy 28.2 Btu/lbm
Controls Type	System Prese	ent (%)	HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
	All Pneumatic	0	Equipment	JUNITORS		Design CFM 10,732
	DDC/Pneuma	atic				Total air circulation or Design air 3.41 l/s.m ²
	All DDC Total (should	add-up to 100%)				
	(
Control mode	Control Mode	Prop	ortional PI	/ PID Tota	al	
Control mode	CONTROLINIOUE	Fixed D	Discharge Re	eset	_	
	Control Strate	egy				
Indoor Design Conditions			R	om		Supply Air
	Summer Tem	nperature	21 °C	69	.8 °F	13 °C 55.4 °F
	Summer Hum	nidity (%)	50%	1/4/2 00	D	100%
	Entnalpy Winter Occ. T	Temperature	65.5 K. 21 °C	лку. 28. С 69	2 Btu/Ibm .8 °F	04.0 NJ/Kg. 23.4 BtWIDT 15 °C 59 °F
	Winter Occ. H	Humidity	30%			45%
	Enthalpy Winter Lincor	Temperature	53 K.	J/kg. 22.	B Btu/lbm	45.5 KJ/kg. 19.6 Btu/lbm
	Winter Unocc	c. Humidity	30%		<u> </u>	
	Enthalpy		50 K.	J/kg. 21.	5 Btu/lbm	
Damper Maintenance			Incidence Fr	equency		
	Control Arm /	Adjustment	(%) (years)		
	Lubrication					
	Blade Seal R	eplacement				
Air Filter Cleaning	Changes/Yea	ar				
				Incidence		Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenand	e			nicidence	or Armudi K	
		····· T -··	In state			
	Annual Mainte	enance rasks	(%)			Annuar maintenance rasks Incidence
	Calibration of	f Transmitters	()			Inspection/Calibration of Room Thermostat
	Calibration of	f Panel Gauges	<u> </u>			Inspection of PE Switches
	Inspection of	Control Devices	+			Inspection of Auxiliary Devices
			·1			(Dampers, VAV Boxes)

NEW BUILDINGS: School Baseline	SIZE: All	COMMERCIAL VINT New	SECTOR BUILDING PROF	ILE REGION: Island Inte	rconnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.85 12.9 W/m ² 1.2	ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 85% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	700 1000		Total 100% 500	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0.65 0.65 15 50	112 18 HID 100%	15HO LED 0% 0% 0.6 0.6 0.80 0.80 95 90	101AL 100.0%	
Relamping Strategy & Incidence of Practice	Group Spot					EUI kWh/ft².yr M.I/m² yr	2.8
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	400 Lux 37.2 0.15 14.1 W/m ² 1.3	? ft-candles 3 W/ft²			I		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 15%	Light Level (Lux) % Distribution Weighted Average	400 500 100%	700 1000	T5HOL LED	Total 100% 400	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	5% 20% 0.7 0.7 0.65 0.65 15 50	10% 20% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	30% 15% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Loa	ad X Hrs. X SF X GLFF		EUI kWh/ft².yr MJ/m².yr	0.6 21
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor fraction check: should = 1.	00 1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 100%	Light Level (Lux) % Distribution Weighted Average		T12 T9		Total	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC OT 0% 0.7 0.7 0.65 0.65 15	0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	100% 0% 100% 0% 0.6 0.6 0.55 0.55 65 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot					EUI kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING				Overall LP	13.09 W/m ²	EUI TOTAL kWh/ft².yr MJ/m².yr	3 129
OFFICE EQUIPMENT & PLUG LOA	DS						
Equipment Type	Computers	Monitors	Printers Cop	biers Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.05 0.3 W/m ² 0.0 W/ft ²	51 0.05 0.3 W/m² 0.0 W/ft²	100 200 0.02 0.02 0.2 0.4 0.02 0.4 0.02 0.02	217 0.01 W/m ² 0.1 W/ft ² 0.01 W/ft ²	0.2 W/m² 0.02 W/ft²		
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 50% 2000 6760	50% 50% 2000 6760	30% 30% 50% 50% 2000 2000 6760 6760	100% 100% 2000 6760	50% 3000 5760		
Total end-use load (occupied period) Total end-use load (unocc. period)	1.3 W/m ²	0.1 W/ft ² to se 0.1 W/ft ²	e notes (cells with red indicate	or in upper right corner, type "SHI	FT @@inputer Servers	EUI kWh/ft².yr MJ/m².yr EUI kWh/ft².yr	0.10 3.68 0.54
Usage during occupied period Usage during unoccupied period	100% 59%				Plug Loads	MJ/m².yr EUI kWh/ft².yr MJ/m².yr	21.01 0.11 4.23
FOOD SERVICE EQUIPMENT Provide description below: Cafeteria	Fuel Oil / Propane Fuel Share:	Elec	tricity Fuel Share: 100.0%	Fuel Oil / Propan EUI kWh/ft2.yr MJ/m².yr	e EUI 0.2 8.0	All Electric EUI EUI KWh/ft².yr MJ/m².yr	0.1 4.0
REFRIGERATION Provide description below: Unknown						EUI kWh/ft².yr MJ/m².yr	0.1
BLOCK HEATERS & MISCELLANE	ous				Block Heaters Miscellaneous	EUI KWh/ft².yr MJ/m².yr EUI KWh/ft².yr MJ/m².yr	0.1

NEW BUILDINGS: School Baseline	SIZE: All		COMMER	CIAL SEC VINTAGE New	tor Build	NG PROF	ILE	1	REGION: Island Inte	erconnecte	d		
SPACE HEATING													
Heating Plant Type				Fu	uel Oil / Propa	ine		Elec	tric				
				Bo Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		73%	83%	75%	2.60	3.10	4.50	100%	100%		
		Performance (1 / Eff.)		1.37	1.20	1.33	0.38	0.32	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	46.7 W/m ² 240 MJ/m ² .yr	14.8 6.2	Btu/hr.ft ² kWh/ft ² .yr				I	II		I	I		
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share			Oil Fuel Sha	re]			_	kWh/ft².yr	6.2
Boiler Maintenance	Annual M	aintenance Tasks		Incidence]						L	MJ/m².yr	240
	Fire Side Water Sid Inspection	Inspection de Inspection for Scale Buil n of Controls & Safeties	dup	(%) 75% 100% 100%	<u>)</u>							Fuel Oil / Propane EU kWh/ft².yr MJ/m².yr	<u> </u>
	Flue Gas	Analysis & Burner Set-up		90%	<u>,</u>						_	kWh/ft².yr	6.2
												MJ/m².yr	240
SPACE COOLING													
A/C Plant Type		System Present (%) COP Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	Centrifuga Standard 2.5 0.40	Al Chillers HE 5 5.4 0 0.19	Screw Chillers 4 4.4 9 0.23	Reciprocat Open 3.6 0.28	ting Chillers DX 100.0% 3 0.33	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%			
Control Mode		Incidence of Use Chilled Water Condenser Water	Fixed Setpoint	Reset									
Setpoint		Chilled Water Condenser Water Supply Air	7 30 13.0	с С С	44.6 86 55.4	°F °F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	33 W/m² 97.7 MJ/m².yr	10 Btu/hr.ft² 2.5 kWh/ft².yr	1146	ft²/Ton									
Sizing Factor	1.00		Operation	n (occ. perio	4000	hrs/year	Note value	e cannot be l	ess than 2	2,900 hrs/ye	ear)		
A/C Saturation (Incidence of A/C)	10.0%												
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share											
Chiller Maintenance	Annual M	aintenance Tasks		Incidence (%)	Frequency (years)								
	Inspect C Inspect C	control, Safeties & Purge U coupling, Shaft Sealing and	nit Bearings										
	Megger N Condense	Notors er Tube Cleaning											
	Vibration	Analysis											
	Spectroc	hemical Oil Analysis										All Electric EUI	
												kWh/ft².yr MJ/m².yr	1.1 41
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency (vears)						Г	Fuel Oil / Propage FI	11
	Inspection	n/Clean Spray Nozzles		(13)	, , caroj						F	kWh/ft².yr	
	Megger N	Aotors									L	iviJ/IIfyi	
	Inspect/V	erify Operation of Controls									_	Market Composite EL kWh/ft².yr MJ/m².yr	JI 1.1 41
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	el SHW Std. Tank	V Tank	Cond. Th	Std. Boiler	Cnd. Boil.	T			Fossil		Elec. Res.	
	System F	Present (%)	0.60	0.000	0.750	0.00%	Ť	Fuel Share	ficiency	0%		100%	
Service Hot Water load (MJ/m ² .yr)	17.3	0.550	0.000	1 0.900	0.730	0.900	J		noientey	0.90	ı <u> </u>	0.31	
(Tertiary Load) Wetting Use Percentage	90%			,	All Electric EL kWh/ft².yr	JI 0.5]	Fuel O	il / Propar kWh/ft².yr	ne EUI 0.5		Market Composite EL kWh/ft².yr	JI 0.5
					MJ/m².yr	19			MJ/m².yr	19		MJ/m².yr	19.0
		COMMER	CIAL SECTOR BUILDING PROFILE										
--	------------------------	-----------------------------------	---------------------------------------	---	----------------------------								
NEW BUILDINGS:	SIZE:		VINTAGE:	REGION:									
School	All		New	Island Interconnected									
Baseline													
HVAC FANS & PUMPS													
SUPPLY FANS				Ventilation and Exhaust Fan Operation &	Control								
				Ventilation Fan Exhaust Fan									
System Design Air Flow	3.4 L/s.m ²	0.67 CFM/ft ²	Control	Fixed Variable Fixed Variable	e								
System Static Pressure CAV	300 Pa	12 wg		Flow Flow	-								
System Static Pressure VAV	300 Pa	1.2 Wg	Incidence of Lise	100% 100%	-								
	500 T a	1.2 Wg	Operation	Cantinuous Cahadulad Cantinuous Cahadul									
Fan Enrolency	60%		Operation	Continuous Scheduled Continuous Schedul	au								
Fan Motor Efficiency	88%			250/ 750/ 250/ 75									
Sizing Factor	1.00		Incidence of Use	25% 75% 25% 75	%								
Fan Design Load CAV	1.9 W/m ²	0.18 W/tt ²											
Fan Design Load VAV	1.9 W/m ²	0.18 W/ft ²	Comments:										
EXHAUST FANS													
Washroom Exhaust	100 L/s.wash	room 212 CFM/was	hroom										
Washroom Exhaust per gross unit area	0.1 L/s.m ²	0.02 CFM/ft ²											
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²											
Total Building Exhaust	0.2 L/s.m ²	0.04 CFM/ft ²											
Exhaust System Static Pressure	250 Pa	1.0 wa											
Fan Efficiency	25%												
Fan Motor Efficiency	75%												
Sizing Easter	10												
Sizing Factor	1.0	0.00 \\\///0											
Exhaust Fan Connected Load	0.2 W/m ²	0.02 W/ft ²											
AUXILIARY COOLING EQUIPMENT (Condenser Pump a	and Cooling Tower/Condenser Fans)											
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton										
(Cooling Tower/Evap. Condenser/ Air 0	Cooled Condenser)	0.66 W/m ²	0.06 W/ft ²										
			<u>_</u>										
Condenser Pump													
Pump Design Flow		0.053 L/c KW	3.0 U.S. gpm/Top										
Fump Design Flow per unit floor area		0.003 L/s.RW	0.002 U.S. gpm/H2										
Pump Design Flow per unit floor area		0.002 L/s.m ²	0.003 0.5. gpm/ft²										
Pump Head Pressure		45 kPa	15 ft										
Pump Efficiency		50%											
Pump Motor Efficiency		80%											
Sizing Factor		1.0											
Pump Connected Load		0.20 W/m ²	0.02 W/ft ²										
			<u>_</u>										
CIRCULATING PUMP (Heating & Cod	olina)												
······································													
Pump Design Flow @ 5 °C (10 °F) de	lta T	0.001 L/s m ²	0.0021 U.S. gpm/ft ² 2.4	U.S. gpm/Top									
Pump Head Pressure	ild i	100 kPa	33 ft	o.o. gpin fon									
Pump Efficiency		100 KF d	35 II										
Pump Enciency		50%											
Pump Motor Efficiency		80%											
Sizing Factor		0.8	0.00 \\\///0										
Pump Connected Load		0.3 W/m ²	0.03 W/ft ²										
Supply Fan Occ. Period		2000 hrs./year											
Supply Fan Unocc. Period		6760 hrs./year											
Supply Fan Energy Consumption		7.1 kWh/m².yr											
Exhaust Fan Occ. Period		2000 hrs./year											
Exhaust Fan Unocc. Period		6760 hrs./vear											
Exhaust Fan Energy Consumption		0.9 kWh/m ² vr											
Constraint an Energy Constrainplion		0.0											
Condenser Pump Energy Consumption		k\M/b/m2 vr											
Cooling Tower (Condenser Fore Fore	I Concumption												
Cooling Tower/Condenser Fans Energ	ly consumption	U.6 KWN/m².yr											
		0000 h (
Circulating Pump Yearly Operation		3000 hrs./year											
Circulating Pump Energy Consumption		kWh/m².yr											
			· · · · · · · · · · · · · · · · · · ·										
Fans and Pumps Maintenance	Annual M	laintenance Tasks	Incidence Frequency										
			(%) (years)										
	Inspect/S	ervice Fans & Motors											
	Inspect/A	diust Belt Tension on Fan Belts											
	Inspect/S	ervice Pump & Motors			FUI kWb/ft² vr 0.8								
	mopooro		II		MJ/m ² .vr 31.3								

			COMMERCIAL SECT	OR BUILD	NG PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE:				REGION:	
School		All	New				Island Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		12.4 kWh/ft².yr 478.8 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	2.8	107.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
SECONDARY LIGHTING	0.6	21.4	SPACE HEATING	6.2	239.8			
TERTIARY LIGHTING			SPACE COOLING	0.1	4.1			
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	0.8	31.3	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.1	3.0						
MISCELLANEOUS	0.1	3.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.5	21.0						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

NY MULLING:::::::::::::::::::::::::::::::::::				COMMER	CIAL SEC	TOR BUILD	ING PROF	ILE							
Answer Data Data Description Construction Construction Construction Construction Viail Unaw (Non-YC) Cols Murker (*** Typical Bating Status (Status	NEW BUILDINGS: University/College	SIZE:			VINTAGE	:				REGION:	erconnecte	d			
Double (Wink C) Red U share, (Wink C) Red U	Baseline	7.0								ioland in					
Note 1 wate (Norm *C) 220 Norm *C 000 mb/db 7 mb Type Holds Size 1000 mb/db 7 mb Starting U wate (Norm *C) 200 mb/db 7 mb Type Holds Size 1000 mb 1000 mb Nicksev Wate (Norm *C) 200 mb/db 7 mb Type Holds Size 1000 mb 1000 mb Nicksev Wate (Norm *C) 200 mb 200 mb 100 mb 100 mb 100 mb Nicksev Wate (Norm *C) 200 mb 200 mb 100 mb 100 mb 100 mb Nicksev Wate (Norm *C) 200 mb 200 mb 100 mb 100 mb 100 mb Wate Norm *Coll (Norm *C) 200 mb 200 mb 100 mb 100 mb 100 mb Wate Norm *Coll (Norm *C) 200 mb 100 mb	CONSTRUCTION														
Since United Control United Control United Product Discussion of Display Provide Conditioned Speece	Wall II value (W/m² °C)	28 W/m ² °C	0.0	5 Btu/br ft ²	۰F		Typical B	ilding Size			6 506	m²	70.000	ft2	
Datage United United (Wein ¹ C) 2.05 Wein ¹ C 0.06 Buffeld *** Product Weinin Aspect Radio (Winin Technologies) 0.00 Perform Aspect Radio (Winin Technologie	Roof U value (W/m².°C) 0	.19 W/m ² .°C	0.0	3 Btu/hr.ft ²	°F		Typical E	potprint (m ²)		4,500	m²	48,420	ft ²	
Interview Image: Imag	Glazing U value (W/m ² .°C) 2	.80 W/m ² .°C	0.4	9 Btu/hr.ft ²	°F		Footprint	Aspect Rat	, io (L:W)		7		10, 120		
product Visit Rade, VIRVAQ (n) 0.01 Bardie Control Visit Rade, VIRVAQ (n) 0.01 Product Visit Rade, VIRVAQ (n) 0.01 Product Visit Rade, VIRVAQ (n) 0.01 Product Visit Rade, VIRVAQ (n) 0.01 Product Visit Rade, VIRVAQ (n) 0.02 Product Visit Rade, VIRVAQ (n) 0.01 Product Visit Rade, VIRVAQ (n) 0.01 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Percent C</td> <td>onditioned</td> <td>Space</td> <td></td> <td>100%</td> <td>]</td> <td></td> <td></td> <td></td>							Percent C	onditioned	Space		100%]			
Description of Continues (Control Not into a second of the Provide Second Of the Provide Second Of the Provid		20					Percent C	onditioned	Space		50%	J			
Normal Network Normal Network Normal Network Normal Network VENTLATION SYSTEM BULLINKS CONTROLS & A INDOOR CONTROLS Image: Normal Network Norm	Shading Coefficient (SC) 0	.50					Typical #	S Exterior 2	one		2	1			
Vertilation System Type Image: Control to State Automatic Control Automatic Control to State Automatic Control Autom							Floor to F	loor Height	(m)		3.7	m	12.0	ft	
Verification System Type Verification System T												-			
Vertilistion System Type <u>Date: Posser(1): 500; 500; 500; 500; 500; 500; 500; 500</u>	VENTILATION SYSTEM, BUILDING CONT	ROLS & INC	OOR CONDITIONS												
Person Preser (%) Convert (%) Co	Mantilation Oceana Trans			0.01	0.00	DDM					14000/ 0 4	TOTAL	т		
Image: Second	Ventilation System Type		System Present (%)	50%	DAVR	DDIVIZ	DDMZVV	50%	VAVR	IL	J 100% O.A	101AL			
Controls Type Image: Second Provide Density Social Provide Control Provide Density Social Provide Density Concuprory Stretch Dors: Provide Density Image: Density Image: Density Social Provide Density Social Provide Density Team Ant Requerements of Coulds Density Image: Density Benchmark Image: Density Benchmark Social Provide Density Social Provide Density 1 - model and counter Jope Image: Density Benchmark Image: Density Benchmark Social Provide Density Social Provid			Min. Air Flow (%)					50%					L		
Cocceptor of Proceids Density Cocceptor Softwarks Unders. Frend All Imperation 100 100 100 Peak All Concentrations of Duals All All Unders. Frend All Concentration of Duals All All Unders. Frend All Concentration of Duals All All Unders. Frend All Concentration of Duals All All Unders. Frend All Concentration of Duals All All Unders. Frend All Concentration of Duals All All Unders. For All All Concentration of Duals All All Unders. For All All Concentration of Duals All All Unders. For All All Concentration of Duals All All Unders. For All All All All All All All All All Al			(Minimum Throttled Air	Volume as P	ercent of F	ull Flow)									
Biopaper Steletist Cor. Period fresh Ar Derström vor Outside Ar 90%	Occupancy or People Density		14 m²/pers	on	151	ft²/person				%OA	14.20%				
Display Sources Finds	Occupancy Schedule Occ. Period		90%			-									
The Air Correll Type Yelfer A 1, 2 or 3)	Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		10 1/s per	son	21	CFM/nerse	n								
Firsh Af Control Type "(enter 1, 2, 03) 1 If Prech Af Control Type - 2' enter % FA to the right: 34% Usure 0.00 CPArtHe String Factor 500			io		<u> </u>	poiot									
	Fresh Air Control Type *(ent	era 1, 2 or 3)	1 If Fresh	Air Control T	ype = "2" e	nter % FA. t	o the right:	ation and	e sentio -	34%		0.40	0514/62		
Sing Paor 1.6	T = Trixed arr control, 2 = Fixed fresh air, 3.1	uu‰ rresh air)	If Fresh	All Control 1	уре = "3" е	niter Make-u	AI Ventil	auon and o	Jeration	0.5	operation (U.10 (%)	GEM/IT		
Total Ar Classed on Chesign Ar Prov 5.00 [Ls.m ² 0.00 CFM.M ² Separate Male-up al valit (100% OA) Operation occupied period 0.00 [00] Bination Rase 0.00 [Ls.m ² 0.00 CFM.M ² Deparation occupied period 000 [00] Control of the vertilation system shuts down Incidence of Ls.m ² 0.00 [00] Total Ar Classed Total (100 [00] 00 [00] 00] 00]	Sizing Factor		1.6												
United and the correct during uncoccipied 0.40 U.k.m ² 0.00 CPMMP Operation uncoccipied period 0.90 Uperation assumed to occur during uncoccipied 0.40 U.k.m ² 0.00 CPMMP Operation uncoccipied period 0.90 Economizer Existence of Use the versite too system shuts down Existence of Use the versite too system shuts down Existence of Use the versite too system shuts down Existence of Use the versite too system shuts down Cortrols Type System Present (%) HVAC Room and enably 28.2 Burbon Display Cortel Operation Preportional too system shuts down 28.2 Burbon 54.3 Burbon Cortrol Mode Operation Preportional too system shuts down 50.3 is.m ² Cortrol Mode Operation Preportional too system shuts down 50.3 is.m ² Cortrol Mode Operation Preportional too system shuts down 50.3 is.m ² Indoor Design Conditions Summer Temperature 24.7 75.3 1% 11.3 If Note Winter Occ. Humidity 50% Mode 22.2 Burbon 54.3 Mode 10.4 10.	Total Air Circulation or Design Air Flow		5.03 L/s.m ²		0.99	CFM/ft ²		Senarato	Makerun oir	unit (1000	% Ο Δ)		l/s m²	CEN	//ft2
(air Inflation is assumed to occur during unoccupied methods) Operation unoccupied period 60% (bits or by If the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation system shuls down) Image: control is a state of the verditation sy	Infiltration Rate		0.40 L/s.m ²		0.08	CFM/ft ²		Separate	Operation	occupied	period	50%	L/5.III-	CFW	///10-
Barbard Difference of Annual HVAC Controls Maintenance Incidence of Annual HVAC Controls Maintenance Support Standing Stan	(air infiltration is assumed to occur during uno	ccupied				-			Operation	unoccupie	d period	50%	I		
Economizer Economizer Endere or Use Total Total Diversion Buikbrower Point KJAsag 100% 100% Switchover Point KJAsag 100% 100% Peak Design Cooling Load 931.801 Controls Type Bystem Present (%) HVAC Room all efficiency 22.2 Buikbrower DOC/Presenation All Presmatic Controls Presentation 43.328 DOC/Presenation All DOC Total (rhoud add up to 100%) 1 43.328 Control Mode Presontional P1 / PID Total 43.328 Indoor Design Conditors Control Strategy Total (rhoud add up to 100%) 1 100% 20.5 1 43.328 Indoor Design Conditors Control Mode Prepontional P1 / PID Total 100% 20.5 1 55.4 7 Indoor Design Conditors Summer Temperature 22.6 Buitbrower 40.6 100% 20.5 10% 20.5 10% 20.5 1 10% 10% 10% 20.5	hours only if the ventilation system shuts dow	n)													
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Sunterview rout Aug		Incidence	of Use		100%		100%		Summary of	of Design	Parameters				
Controls Type System Present (%) HVAC Room Room are instagy 22.2 But/bm Controls Type System Present (%) Equipment Controls Discharge are installey 23.4 But/bm All Presumatic Image: Controls All Presumatic Image: Controls All Presumatic Image: Controls All Presumatic Image: Control Room 1.3 (19/Bm Control mode Control Mode Preportional Preportional Total Control mode Control Mode Fload Decharge Reset 1.3 (19/Bm Indoor Design Conditions Summer Temperature 240 (° 75.2 (° 1.3 (° Summer Temperature 247 (° 75.2 (° 1.3 (° 0.0 (%) Writer Unco: Temperature 247 (° 75.2 (° 1.3 (° 0.0 (%) Writer Unco: Temperature 247 (° 75.2 (° 1.3 (° 0.0 (%) 0.0 (%) United interance Signer Temperature 247 (° 60.8 (° 1.0 (%) 1.0 (%) 1.0 (%) Damper Maintenance Incidence of Annual Room Controls Maintenance Incidence of Annual Room Controls Maintenance 1.0 (%) 1.0 (%) <		Switchov	er Point	KJ/kg. Btu/lbm	64.4	°F			Peak Desi	gn Cooling Sensible	Load	931.391			
Controls Type System Present (%) HVAC Doch mage in eithalpy 23.4 Bulbm All Presumatic Equipment Controls Specie value of at at SF & 100% R 3.2 HVBm Doch Presumatic Indiana conclusion or Design at at SF & 100% R 3.2 HVBm Specie value of at at SF & 100% R 43.328 Control mode Control Mode Proportional P/1 PID Total Total 5.03 Vis.m ² Indoor Design Conditions Summer Temperature 224 °C T523 °F 130 °C 55.4 °F 130 °C 55.4 °F 130 °C 55.4 °F 130 °C 55.4 °F 130 °C 65.5 Ku/kg 28.2 °C 71.6 °F 130 °C 65.5 Ku/kg 28.2 °F 130 °C 65.5 Ku/kg 100 °C 65.5 Ku/kg 100 °C 65.5 Ku/kg 100 °C 65.5 Ku/kg 100 °C 60.8 °F 100 °C 60.8 °F 100 °C 60.8 °F 100 °C 60.8 °F 100 °C					1		1	1	Room air e	enthalpy		28.2	Btu/lbm		
All Preamatic Exploriting Curricus Seeing CPM 13.28 Hould in the set & 10.9 km 13.28 Control mode Control Mode Prepentional Proportional Prive Discharge 5.03 I/s.m ² Control mode Control Mode Prepentional Prive Discharge Total 5.03 I/s.m ² Indoor Design Conditions Summer Temperature 241°C Total 5.03 I/s.m ² Indoor Design Conditions Summer Temperature 221°C Total 100% K/kg. 23.4 Burlbm Writer Coc. Temperature 221°C Total 100% K/kg. 23.4 Burlbm Damper Maintenance Control Mode Prependure 221°C Total 15 Burlbm 15 Skikg. 23.4 Burlbm Damper Maintenance Incidence of Annual HVAC Controls Maintenance Incidence of Annual Room Controls Maintenance (%) Incidence of Annual Room Controls Maintenance (%) Incidence (%) Incidence Incidence Tasks Incidence (%) Incidence (%) Incidence Incidence (%) Incidence (%)	Controls Type	System F	Present (%)	HVAC	Room				Discharge	air enthalp	y	23.4	Btu/lbm		
DDC/Proundic Inclained in cloculation or Design air 5.03 Vs.m ² Control Mode Proportional P1 / P1D Total Control Mode Proportional P1 / P1D Total Indoor Design Conditions Summer Temperature 260 / 75.2 r fixed Discritange Indoor Design Conditions Summer Temperature 260 / 75.2 r fixed Discritange Writer Ooc. Temperature 251 / Vs.g 28.2 tstub 55.4 / F Summer Hemidigi (%) 505 / Vs.g 28.2 tstub 55.4 / F Writer Ooc. Temperature 221 / C 71.8 f f iso C 60.8 r f iso Discritange Writer Uncoc. Temperature 221 / C 69.8 r f iso Discritange 19.6 Btu/bm Damper Maintenance Incidence of Frequency (%) (years) 20.5 / (years) 21.5 Btu/bm 45.5 K/kg, 19.6 Btu/bm Ar Fiber Cleaning Changes/Year Incidence of Annual Room Centrols Maintenance (%) (%) (%) (%) (%) (%) (%) (%) (%) (%) (%) (%) (%) (%) Incidence of Annual Room Centrols Mai		All Pneum	natic	Equipmen	CONTIONS				Design CF	M	55F & 100% K	43,328	Tt-/IDTT		
AT DDC Total (droudd add-up to 100%) Cortrol mode Proportional PI / PID Total Cortrol Mode Floed Discharge Reset Cortrol Strategy Indoor Design Conditions Summer Temperature 24 (C 75.2 (F 13) (C 56.4 (F) Summer Kumidky (%) 60% C 77.6 (F) 100% 66.5 (Likg, 22.3 (Butlbm 22.4 (Butlbm) Mitter Occ. Humidity 55% (Mig, 22.3 (Butlbm) 66.5 (Likg, 19.6 (Butlbm) 19.6 (Butlbm) 19.6 (Butlbm) Damper Maintenance Cortrol Arm Adjustment 21 (C 69.8 (F) 19.6 (Butlbm) Air Filter Cleaning Control Arm Adjustment 21 (C 69.8 (F) 19.6 (Butlbm) Incidence of Annual HVAC Controls Maintenance Incidence Frequency (%) (years) 10.5 (Likg, 19.6 (Butlbm) Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance (%) (years) Incidence of Annual HVAC Controls Maintenance Incidence (%) (regets) Incidence (%) (regets) Air Filter Cleaning Calabration of Taramitters (%) (regets) Incidence (%) (regets) Incidence (%) (regets) Incidence of Annual HVAC Contr		DDC/Pne	eumatic						Total air ci	rculation o	r Design air	5.03	l/s.m²		
Control mode Control Mode Proportional P// PID Total Control Mode Control Mode Proportional P// PID Total Control Mode Control Strategy Field Discharge Reset Control Strategy Indoor Design Conditions Summer Hundity Reset Control Mode Reset Reset Control Mode Reset Reset Control Mode Reset Reset Control Mode Reset Reset Control Mode Reset Reset Control Mode Reset		All DDC Total (sho	ould add-up to 100%)			-									
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Littralpy 65.5 KJ/kg, 28.2 But/bm 54.3 KJ/kg, 23.4 But/bm Winter Occ. Humidity 30% 45.5 KJ/kg, 60.8 °F Winter Unocc. Humidity 30% 45.5 KJ/kg, 19.6 Bt//bm Winter Unocc. Humidity 30% 21.5 Bt//bm 19.6 Bt//bm Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment (%) (years) 10.6 Bt//bm Lubrication Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Air Filter Cleaning Annual Maintenance Tasks Incidence (%) Incidence of Annual HVAC Controls Maintenance Incidence Inspection of Onor Thermostat Incidence of Annual HVAC Controls Maintenance Incidence (%) Inspection of Room Thermostat Inspection of Onor Denno fauges Inspection of Room Thermostat Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices (Valves, Inspection of Auxiliary Devices		Summer	Humidity (%)	50%		00.0	T. D	100%	16 1/1-2	00.4	D4. //h				
Winter Occ. Humidity 30% 45% Enthalpy 53 KJ/kg. 22.8 Btullom 45.5 KJ/kg. 19.6 Btullom Winter Unocc. Humidity 30% 50 KJ/kg. 21.5 Stullom 45.5 KJ/kg. 19.6 Btullom Damper Maintenance Incidence Frequency (%) (years) 50 KJ/kg. 21.5 Btullom 19.6 Btullom Damper Maintenance Incidence Frequency (%) (years) (years) 19.6 Btullom 19.6 Btullom Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence 19.6 Incidence 19.6 19.6 19.6 19.6 19.6 19.6 19.6 19.6 10.6 <td></td> <td>Enthalpy Winter Oc</td> <td>cc. Temperature</td> <td>65.5</td> <td>2 °C</td> <td>28.2</td> <td>Btu/Ibm</td> <td>54.5</td> <td>кJ/кg. °C</td> <td>23.4</td> <td>BTU/IDM 3 °F</td> <td></td> <td></td> <td></td> <td></td>		Enthalpy Winter Oc	cc. Temperature	65.5	2 °C	28.2	Btu/Ibm	54.5	кJ/кg. °C	23.4	BTU/IDM 3 °F				
Enthalpy 53 Ku/kg. 22.8 Btu/lbm 45.5 Ku/kg. 19.6 Btu/lbm Winter Unocc. Temperature 21 °C 69.8 °F 69.8 °F 69.8 °F Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment (%) (years) Lubrication Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Tasks Incidence (%) Air Filter Cleaning Annual Maintenance Incidence (%) Incidence of Annual HVAC Controls Maintenance (%) Incidence (%) Calibration of Transmitters (%) Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices		Winter Oc	cc. Humidity	30%			- T ~	45%	1	·	-				
Winter Unocc. Humidity 30% 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) Control Arm Adjustment (%) Lubrication Incidence Frequency Control Arm Adjustment Incidence Frequency Lubrication Incidence of Annual Room Controls Maintenance Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters (%) Inspection of Auxiliary Devices Inspection of PE Switches Inspection of Auxiliary Devices Inspection of Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Devices (Valves, Inspection of Control Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Control Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection of Devices (Valves, Inspection Devices (Valves, Inspection Devices (Valves, Inspection		Enthalpy Winter Ur	occ. Temperature	53	°C	22.8	Btu/lbm °F	45.5	KJ/kg.	19.6	Btu/lbm	I			
Enhaloy 50 KJ/kg. 21.5 Btu/lbm Damper Maintenance Incidence Frequency (%) (years) Lubrication (years) Air Filter Cleaning Changes/Year Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence (%) Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence (%) Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence (%) Incidence (%) Incidence of Annual Mointenance Incidence (%) Incidence (%) Inspection of Transmitters Inspection of Auxiliary Devices Inspection of Room Thermostal Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices (Valves, (Bampers, VAV Boxes)		Winter Ur	nocc. Humidity	30%	Š		- 								
Damper Maintenance Incidence Frequency (%) (years) Control Arm Adjustment Incidence Lubrication Incidence Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices		Enthalpy		50) KJ/kg.	21.5	Btu/lbm						l		
Damper Maintenance Incidence Frequency (%) Control Arm Adjustment Incidence Lubrication Incidence Blade Seal Replacement Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices															
Air Filter Cleaning Changes/Year Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices	Damper Maintenance			Incidence	Frequency	7									
Air Filter Cleaning Changes/Year Incidence of Annual Mointenance Tasks Incidence of Annual Mointenance Tasks Incidence (%) Annual Multiple Controls Maintenance Tasks Incidence (%) Calibration of Transmitters Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, Inspection of Control Devices (Valves, Inspection of Control Devices)		Control A	rm Adjustment	(%)	(years)	-									
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices		Lubricatio	n			1									
Air Filter Cleaning Changes/Year Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Incidence Annual Maintenance (%) Calibration of Transmitters Incidence Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices Inspection of Control Devices		Blade Se	al Replacement]									
Air Filter Cleaning Changes/Year Incidence Incidence of Annual HVAC Controls Maintenance Incidence Incidence of Annual Room Controls Maintenance Incidence of Annual HVAC Controls Maintenance Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Inspection of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, (Dampers, VAV Boxes)															
Incidence of Annual HVAC Controls Maintenance Incidence Annual Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, (Dampers, VAV Boxes)	Air Filter Cleaning	Changes/	Year]										
Incidence of Annual HVAC Controls Maintenance Annual Maintenance Annual Maintenance Tasks Incidence (%) Calibration of Transmitters Calibration of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, (Dampers, VAV Boxes)						Incidence o	f Annual R	oom Contr	ols Mainten	ance		1			
Annual Maintenance Tasks Incidence Annual Maintenance Tasks Incidence (%) Inspection/Calibration of Transmitters Calibration of Transmitters Inspection of Panel Gauges Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Origon Devices Inspection of Control Devices Inspection of Control Devices	Incidence of Annual HVAC Controls Maintena	ance						Som Contr			L				
Annual Maintenance Lasks Incidence (%) Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of Pawiliary Devices Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Overlog Devices Inspection of Control Devices Inspection of Overlog Devices		A	-i	la de	7			A		I		1	т		
Calibration of Transmitters Inspection/Calibration of Room Thermostat Calibration of Panel Gauges Inspection of PE Switches Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Orol Devices (Valves, (Dampers, VAV Boxes)		Annual M	aintenance Lasks	Incidence				Annual Ma	antenance T	asks		(%)			
Calibration of Panel Gauges Inspection of PE Switches Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices Inspection of Control Devices (Valves, (Dampers, VAV Boxes)		Calibratio	on of Transmitters	, ,,,,	1			Inspection	/Calibration	of Room	Thermostat	(,0)	İ		
Inspection of Auxiliary Devices Inspection of Auxiliary Devices Inspection of Control Devices (Valves, (Dampers, VAV Boxes)		Calibratio	n of Panel Gauges		4			Inspection	of PE Swit	ches		ļ	ļ		
(Dampers, VAV Boxes)		Inspection	n of Control Devices		1			Inspection	of Control	Devices (/alves.		ł		
				l	-			(Dampers	VAV Boxe	is)			l		

NEW BUILDINGS: University/College Baseline	SIZE: All	COMMER	RCIAL SECTO VINTAGE: New	or Buildin	G PROFILE		RI	EGION: and Interc	onnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46.5 0.90 11.9 W/m ² 1.7	5 ft-candles										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 90% 20%	Light Level (Lux) % Distribution Weighted Average		300 INC	500 100% CFL	700 T12	1000 T8	HID	T5HO LEE	Total 1009 50	6 D	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LAV)		0.7 0.65	0.7	0.6 0.75 72	95% 0.6 0.80 88	5% 0.7 0.80	0% 0% 0.6 0.6 0.80 0.80 95 90	6 100.0%	6	
Relamping Strategy & Incidence of Practice	Group Spot			10						EUI	kWh/ft².yr	4.5
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27.5 0.10 8.5 W/m² 0.8) ft-candles 3 W/ft ²									W3/III .yi	175
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 50%	Light Level (Lux) % Distribution Weighted Average		300 100%	500	700	1000			Total 1009 30	6 D	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (LAW)		0.7 0.65	CFL 15% 0.7 0.65 50	T12 0.6 0.75 72	T8 80% 0.6 0.80 88	HID 0.6 0.80	T5HO LEE 0% 5% 0.6 0.6 0.80 0.80 95 90	D TOTAL 6 100.09	- 6	
Relamping Strategy & Incidence of Practice	Group Spot			F		(Hrs X)	SE X GLEE	00		EUI	kWh/ft².yr	0.5
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²			Fic	oor fractio	on check: sh	ould = 1.00	0 1.00]		20
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average								Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	CFL 0% 0.7 0.65 50	0.6 0.75 72	0.6 0.80 84	0.6 0.80 88	MH HPS 100% 0% 0.6 0.6 0.55 0.55 65 90	5 TOTA 6 100.0%	<u>6</u>	
Relamping Strategy & Incidence of Practice	Group Spot									EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							O	verall LP	11.56 W/m ²	EUI TOTA	L kWh/ft².yr MJ/m².yr	5 195
OFFICE EQUIPMENT & PLUG LOA	DS											
Equipment Type	Computers	Monitors	Prin	ters	Copier	s	Server	s	Plug Loads]		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	54.55 0.31 1.2 W/m ² 0.1 W/ft ² 90%	51 0.31 1.1 W/m ² 0.1 W/ft ² 90%	100 0.02 0.1 0.01	N/m² N/ft²	200 0.02 0.3 W/ 0.03 W/ 90%	/m² /ft²	217 0.01 0.1 W 0.01 W 100%	/m² /ft²	1.3 W/m ² 0.12 W/ft ² 100%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760		50% 2000 6760	-	100% 2600 6160		50% 2000 6760			
Total end-use load (occupied period) Total end-use load (unocc. period)	3.9 W/m² 2.2 W/m²	0.4 W/ft ² 0.2 W/ft ²	to see notes	s (cells with re	d indicator i	n upper ri	ight corner, t	/pe "SHIF	F@mputer Servers	sEUI	kWh/ft².yr MJ/m².yr	0.10
Usage during occupied period Usage during unoccupied period	100% 55%							C	omputer Equipmen Plug Loads	s EUI	kWh/tt².yr MJ/m².yr kWh/ft².yr MJ/m².yr	1.34 51.73 0.65 25.18
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity F	uel Share:	100.0%	E	Fuel Oil EUI kV M	/ Propane Vh/ft².yr J/m².yr	EUI 0.5 20.0	EUI	II Electric EUI kWh/ft².yr MJ/m².yr	0.4
REFRIGERATION Provide description below: Unknown]							EUI	kWh/ft².yr MJ/m².yr	0.5 20.0
BLOCK HEATERS & MISCELLANE	ous								Block Heaters Miscellaneous	s EUI s EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.3

	0.75	c	OMMERCI	AL SECT	or Buildi	NG PROFI	LE						
NEW BUILDINGS: University/College Baseline	SIZE: All		N	INTAGE: ew				I	REGION: Island Inte	rconnecte	d		
SPACE HEATING													
Heating Plant Type				Fue	el Oil / Propa	ne		Elec	tric				
				Bo Stan.	ilers I High	Packaged Unit	A/A HP	W. S. HPF	H/R Chiller	Resistance	Total		
		System Present (%)	_	75%	83%	95%	1 70	3.00	4.50	100%	100%		
		Performance (1 / Eff.)		1.33	1.20	1.05	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load)	37.8 W/m ² 192 MJ/m ² .yr	12.0 E 5.0 k	8tu/hr.ft² Wh/ft².yr										
Sizing Factor	1.00	_				-		_				All Electric EUI	
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share			Oil Fuel Shar	e						kWh/ft².yr MJ/m².yr	5.0 192
Boiler Maintenance	Annual Ma	intenance Tasks	Ir	ncidence (%)							r	Fuel Oil / Propane El	JI
	Fire Side	nspection	n	75%								kWh/ft².yr	
	Inspection	of Controls & Safeties	P	100%								Maded Operative El	
	Flue Gas	Analysis & Burner Set-up		90%							-	kWh/ft².yr	5.0
												MJ/m².yr	192
SPACE COOLING													
A/C Plant Type			Centrifugal C	Chillers	Screw F	Reciprocati	ina Chillers	Absorption	Chillers	Total			
		Sustan Brasset (%)	Standard	HE	Chillers	Open	DX 75.0%	W. H.	CW	100.0%			
		COP	4.7	25.0%	4.4	3.6	75.0%	0.9	1	100.0%			
		Performance (1 / COP) (kW/kW)	0.21	0.19	0.23	0.28	0.37	1.11	1.00				
		Additional Refrigerant Related Information											
Control Mode		Incidence of Use	ixed R	eset									
		Chilled Water	selpoini										
		Condenser Water											
Setpoint		Chilled Water	7 °(c [44.6	۶F							
		Condenser Water	30 °(86 55.4	۶E							
Deels Ore lines Level	405 10/2		050 (4	2077-1-1	00.4								
Seasonal Cooling Load (Tertiary Load)	105 W/m ² 128.2 MJ/m ² .yr	3.3 Btu/nr.tt² 3.3 kWh/ft².yr	359 11	-/ I ON									
Sizing Factor	1.00	C	Operation (o	cc. perio	4000	nrs/year	Note value	e cannot be l	ess than 2	900 hrs/ye	ar)		
A/C Saturation	70.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share											
Chiller Maintenance	Annual Ma	intenance Tasks	Ir	ncidence	Frequency								
	Inspect Co	ontrol, Safeties & Purge Unit		(70)	(years)								
	Inspect Co Megger M	oupling, Shaft Sealing and Be otors	arings										
	Condense Vibration	r Tube Cleaning Analysis											
	Eddy Curr Spectroch	ent Testing emical Oil Analysis									Г	All Electric EUI	
	opositosi										-	kWh/ft².yr	1.5
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	intenance Tasks	Ir	ncidence	Frequency							MJ/m².yr	59
	Inspection	/Clean Spray Nozzles		(%)	(years)						_	Fuel Oil / Propane El kWh/ft².yr	JI
	Inspect/Se Meager M	ervice Fan/Fan Motors otors										MJ/m².yr	
	Inspect/Ve	erify Operation of Controls									F	Market Composite E	UI 1.5
												MJ/m².yr	59
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue	I SHW Std. Tank	PV Tank C	ond. Tnk	Std. Boiler	Cnd. Boil.				Fossil		Elec. Res.	
	System P Eff./COP	resent (%)	0,600	0,900	0.750	0.00%		Fuel Share Blended Ff	ficiency	0%		100% 0.91	
Service Hot Water load (MJ/m ² .yr)	22.8	0.000	0.000	0.000	5.100	0.000		-101.000 ET		5.50		0.01	
	000		F	A	Il Electric EU			Fuel O	il / Propan	e EUI	F	Market Composite E	UI
vvetting Use Percentage	90%				ĸvvn/tt².yr MJ/m².yr	0.6 25			kvvn/tt².yr MJ/m².yr	0.7 25		kvvh/tt².yr MJ/m².yr	0.6 25.0

		COMMER	CIAL SECTOR BUILDING PROFILE		
NEW BUILDINGS:	SIZE:		VINTAGE:	REGION:	
University/College	All		New	Island Interconnected	
Baseline					
HVAC FANS & PUMPS					
SUPPLY FANS				Ventilation and Exhaust Fan Operation &	Control
				Ventilation Fan Exhaust Fan	
System Design Air Flow	5.0 L/s.m ²	0.99 CFM/ft ²	Control	Fixed Variable Fixed Variabl	e
System Static Pressure CAV	750 Pa	3.0 wa		Flow	-
System Static Pressure VAV	750 Pa	3.0 wg	Incidence of Lise	50% 50% 100%	-
System Static Tressure VAV	730 T a	3.0 Wg	Operation	Cantinuau Cahadulad Cantinuau Cahadul	ad
Fan Eniciency	00%		Operation	Continuous Scheduled Continuous Schedul	30
Fan Motor Efficiency	80%			500/ 500/ 500/ 50	
Sizing Factor	1.00		Incidence of Use	50% 50% 50% 50	%
Fan Design Load CAV	7.9 W/m ²	0.73 W/ft ²	- · · ·		
Fan Design Load VAV	7.9 W/m ²	0.73 W/ft ²	Comments:		
EXHAUST FANS					
Washroom Exhaust	100 L/s.wash	room 212 CFM/was	hroom		
Washroom Exhaust per gross unit area	0.0 L/s.m ²	0.01 CFM/ft ²			
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²			
Total Building Exhaust	0.1 L/s.m ²	0.03 CFM/ft ²			
Exhaust System Static Pressure	250 Pa	1.0 wg			
Fan Efficiency	25%				
Fan Motor Efficiency	75%				
Sizing Factor	1.0				
Exhaust Ean Connected Load	0.2 1//m2	0.02 \\//f+2			
Exhaust Fair Connected Load	0.2 00/11-	0.02 \\//1			
	(O D				
AUXILIARY COOLING EQUIPMENT	(Condenser Pump a	and Cooling Tower/Condenser Fans			
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton		
(Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	2.11 W/m ²	0.20 W/ft ²		
Condenser Pump					
Pump Design Flow		0.053 L/s.KW	3.0 U.S. gpm/Ton		
Pump Design Flow per unit floor area		0.006 L/s.m ²	0.008 U.S. apm/ft ²		
Pump Head Pressure		kPa	ft		
Pump Efficiency		50%			
Pump Motor Efficiency		80%			
Sizing Eactor		1.0			
Dump Connected Lood		1.0	10//642		
Pump Connected Load		VV/II1-	VV/II-		
CIRCULATING PUMP (Heating & Co	oling)				
				-	
Pump Design Flow @ 5 °C (10 °F) de	elta T	0.005 L/s.m ²	0.0067 U.S. gpm/ft ² 2.4	U.S. gpm/Ton	
Pump Head Pressure		100 kPa	50 ft		
Pump Efficiency		50%			
Pump Motor Efficiency		80%			
Sizing Factor		0.8			
Pump Connected Load		0.9 W/m ²	0.08 W/ft ²		
		·			
1					
Supply Fan Occ, Period		3500 hrs./vear			
Supply Fan Unocc. Period		5260 hrs /vear			
Supply Fan Energy Consumption		37.3 kWh/m².vr			
Coppy ran Energy Consumption		07.0 (301011.9)			
Exhaust Fan Oce, Pariod		3500 bro hoor			
Exhaust Fall Oct. Pellou		5000 his./year			
Exhaust Fan Unocc. Period					
Exnaust Fan Energy Consumption		1.2 KWh/m².yr			
Condenser Pump Energy Consumption	n	kWh/m².yr			
Cooling Tower /Condenser Fans Energy	gy Consumption	0.8 kWh/m ² .yr			
Circulating Pump Yearly Operation		7000 hrs./year			
Circulating Pump Energy Consumption	n	kWh/m².yr			
		,			
Fans and Pumps Maintenance	Annual N	faintenance Tasks	Incidence Frequency		
			(%) (vears)		
	Inspect/S	ervice Fans & Motors	()		
	Inenact/A	diust Belt Tension on Fan Belts	<u>├───</u> ┤		
	Inspect/A	anvice Pump & Motore	<u>├ </u>		
	inspect/S	יפו אוכפ ד עוווף מ ואוטנטוצ			LOI KVI/II ⁺ .VI 3.0
					IVIJ/11*.VI 141.3

			COMMERCIAL SECT	OR BUILD	ING PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE				REGION:	
University/College Baseline		All	New				Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:	E	19.1 kWh/ft².yr 741.4 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.5	175.5		kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr	
SECONDARY LIGHTING	0.5	19.6	SPACE HEATING	5.0	192.0			
TERTIARY LIGHTING			SPACE COOLING	1.1	41.6			
OTHER PLUG LOADS	0.7	25.2	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0	
HVAC FANS & PUMPS	3.6	141.3	FOOD SERVICE EQUIPMENT	0.4	15.0			
REFRIGERATION	0.5	20.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	1.3	51.7						
COMPUTER SERVERS	0.1	3.7						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.4	17.0						

			COMMER	CIAL SECT	OR BUILDI	NG PROF)FILE
NEW BUILDINGS:	SIZE:			VINTAGE:			REGION:
Warehouse/Wholesale Baseline	All			New			Island Interconnected
CONSTRUCTION							
	-						
Wall U value (W/m ² .°C) 0.28	W/m².°C		0.05 Btu/hr.ft ² .	Ϋ́F		Typical Bu	Building Size 3,253 m ² 35,000 ft ²
Roof U value (W/m ² .°C) 0.19	W/m².°C		0.03 Btu/hr.ft ² .°	'F		Typical Fo	Footprint (m ²) 3,253 m ² 35,000 ft ²
Glazing U value (W/m ² .°C) 2.80	W/m².°C		0.49 Btu/hr.ft ² .°	F		Footprint /	t Aspect Ratio (L:W) 1
						Percent C	Conditioned Space 100%
Window/Wall Ratio (WIWAR) (%) 0.05	5					Defined as	as Exterior Zone
Shading Coefficient (SC) 0.80	1					Typical # \$	# Stories 1
						Floor to Fl	Floor Height (m) 6.1 m 19.9 ft
VENTILATION SYSTEM, BUILDING CONTRO	DLS & IND	DOOR CONDITIONS					
Ventilation System Type		[CAV	CAVR	DDMZ		
ventilation System Type		System Present (%)) 100%	CAVK	DDIVIZ		
		Min. Air Flow (%)	<i>,</i>				50%
		(Minimum Throttled	Air Volume as Pe	ercent of Fu	ll Flow)		
Occupancy or People Density		100 m²/	berson	1076	ft²/person		%OA 14.56%
Occupancy Schedule Occ. Period		90%					
Occupancy Schedule Unocc. Period					0514		
Fresh Air Requirements or Outside Air		20 L/s.	.person	42	CFM/persor	1	
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fr	resh Air Control T	ype = "2" er	nter % FA. to	the right:	t
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	lf Fr	esh Air Control T	ype = "3" er	nter Make-up	Air Ventila	tilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
Sining Factor							50% operation (%)
Total Air Circulation or Design Air Flow		1.37 L/s	m²	0.27	CFM/ft ²		
· · · · · · · · · · · · · · · · · · ·							Separate Make-up air unit (100% OA)
Infiltration Rate	and and	0.40 L/s.	.m²	0.08	CFM/ft ²		Operation occupied period 50%
(air inflitration is assumed to occur during unocc	upiea						Operation unoccupied period 50%
Economizer		E	nthalpy Based	Dry-Bul	b Based	Total	
	Incidence	e of Use	K I/he	100%	°C	100%	% Summary of Design Parameters
	Switchov	er Point	RJ/kg. Btu/lbm	64.4	°F		Peak Zone Sensible Load 203,450
							Room air enthalpy 28.2 Btu/lbm
Controls Type	System F	Present (%)	HVAC	Room			Discharge air enthalpy 23.4 Btu/lbm
		natic	Equipment	Controls			Specific volume of air at 55F & 100% R 13.2 t ^{t3} /lbm
	DDC/Pne	eumatic					Total air circulation or Design air 1.37 l/s.m ²
	All DDC						,
	Total (sho	ould add-up to 100%)					
			Proportional	PI / PID	Total		
Control mode	Control N	lode					
	Control	F	ixed Discharge	Reset			
	Control S	bitalegy					
Indoor Design Conditions				Room			Supply Air
	Summer	Temperature	22	°C	71.6	°F	13 °C 55.4 °F
	Summer	Humidity (%)	50%	1/1/1/10	20.2	D4u/llass	100%
	Winter O	cc. Temperature	21	°C	28.2	°F	16 °C 60.8 °F
	Winter O	cc. Humidity	30%				45%
	Enthalpy		53	KJ/kg.	22.8	Btu/lbm	45.5 KJ/kg. 19.6 Btu/lbm
	Winter U	nocc. Temperature	21	°C	69.8	°F	
	Enthalpy	nocc. Humidity	50	KJ/ka.	21.5	Btu/lbm	
				·· 3			
Domnor Meintenenen			la states	Ere er			
Damper Maintenance			(%)	 requency (vears) 			
	Control A	rm Adjustment	(,0)	()00.0)			
	Lubricatio	on					
	Blade Se	al Replacement					
Air Filter Cleaning	Changes/	Year]			
					Incidence of		Deem Centrale Maintenance
Incidence of Annual HVAC Controls Maintenance	e	7			inclaence of	Annual R	
	- <u>ı </u>						
	Annual M	aintenance Tasks	Incidence]			Annual Maintenance Tasks Incidence
	Calibrat	a of Trans	(%)				(%)
	Calibratio	on of Transmitters					Inspection/Calibration of Room Thermostat
	Inspectio	n of Auxiliary Devices	5				Inspection of Auxiliary Devices
	Inspectio	n of Control Devices]			Inspection of Control Devices (Valves,
							(Dampers, VAV Boxes)
1							

NEW BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDI VINTAGE: New	NG PROFILE	REGION: Island Inter	connected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 37. 0.95 9.7 W/m ² 0.	2 ft-candles 9 W/ft ²						
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 50%	500 7 50%			Total 100% 400	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7	0.7 0 0.65 0.7 50	15% 50% 0.6 0.6 0.7 75 0.80 0.80 72 88 65	35% 0.6 0.6 0.80 0.80 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot		I	U			EUI kWh/ft².yr	3.7
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27. 0.05	9 ft-candles 9 W/ft ²					WiJ/IIF.yi	142
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 100%	500 7 CFL T	700 1000	T5HO LED	Total 100% 300 TOTAL	
Fixture Cleaning: Incidence of Practice Interval Relamning Strategy & Incidence	years	System Present (%) CU LLF Efficacy (L/W)	5% 0.7 0.65 15	10% 0.7 0 0.65 0.7 50	85% 0.6 0.6 0.6 75 0.80 0.80 72 88 65	0% 0% 0.6 0.6 0.80 0.80 95 90	100.0%	
of Practice				EUI = Load X Hrs	3. X SF X GLFF		EUI kWh/ft².yr MJ/m².yr	0.2 7
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles		Floor fr	raction check: should = 1.0	00 1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 7	700 1000	MULLUDE	Total	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	O% 0% 0.7 0 0.65 0.7	12 18 0.6 0.6 0.6 75 0.80 0.80 72 84 88	NI HPS 0% 0% 0.6 0.6 0.55 0.55 65 90	0.0%	
Relamping Strategy & Incidence of Practice	Group Spot						EUI kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING					Overall LP	9.71 W/m²	EUI TOTAL kWh/ft².yr MJ/m².yr	3.9 149
OFFICE EQUIPMENT & PLUG LOA	DS							
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	54.55 0.59 0.3 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	51 0.59 0.3 W/m ² 0.0 W/ft ² 90% 50% 2000 6760	100 0.03 0.00 W/m ² 0.00 W/ft ² 90% 50% 2000 6760	200 0.03 0.1 W/m ² 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.03 0.1 0.01 0.	217 0.06 0.1 W/m ² 100% 100% 2000 6760	2 W/m ² 0.19 W/ft ² 90% 25% 3500 5260		
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m ² 1.0 W/m ²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells with	ed indicator in upp	per right corner, type "SHIF	T @@mputer Servers	EUI kWh/ft².yr MJ/m².yr	0.11 4.42
Usage during occupied period Usage during unoccupied period	100% 39%				C	Computer Equipment Plug Loads	EUI kWh/ft².yr MJ/m².yr EUI kWh/ft².yr MJ/m².yr	0.34 <u>13.30</u> 0.83 32.15
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share: [100.0%	Fuel Oil / Propane EUI kWh/t².yr MJ/m².yr	EUI	All Electric EU EUI kWh/ft².yr MJ/m².yr	!
REFRIGERATION Provide description below: Large refrigeration storage]				EUI kWh/ft².yr MJ/m².yr	1.5
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI kWh/ft².yr MJ/m².yr EUI kWh/ft².yr MJ/m².yr	0.3

NEW BUILDINGS: Warehouse/Wholesale Baseline	SIZE: All	COMME	RCIAL SECT VINTAGE: New	or Buildin	ig profi	LE	R	EGION: land Interce	onnected	
SPACE HEATING										
Heating Plant Type				ŀ	lot Water	System		Ek	ectric	I
			Boiler	F Unit Heater	ackaged Rooftop	A/A HP	W. S. HPH/	R Chiller Re	esistanceTotal	
		System Present (%) Eff./COP Performance (1 / Eff.) (kW/kW)	75% 1.33	75% 1.33	95% 1.05	1.70 0.59	3.00 0.33	4.50 0.22	100% 100% 1.00 1.00	5
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	34.0 W/m ² 196 MJ/m ² .yr	10.8 Btu/hr.ft2 5.0 kWh/ft2.y	r							
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		Oil Fuel Shar	e [kWh/ft².yr 5.0
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence							MJ/m².yr 196
	Fire Side Water Sid Inspection Inspection Flue Gas	Inspection e Inspection for Scale Buildup of Controls & Safeties of Burner Analysis & Burner Set-up	(%) 75% 100% 100% 100% 90%							Huel Oli / Propane EUI KWh/tf2.yr MJ/m².yr Market Composite EUI KWh/tf2.yr 5.0 MJ/m².yr 196
SPACE COOLING										
A/C Plant Type										
		Centrifug Standard COP 4. Performance (1 / COP) (kW/kW) 0.2 Additional Refrigerant Related Information Related Information	gal Chillers 1 HE 7 5.4 21 0.19	Screw F Chillers 4.4 0.23	Open 3.6 0.28	ing Chillers DX 100.0% 2.9 0.34	Absorption C W. H. 0.9 1.11	CW CW 1 1.00	Total 100.0%	
Control Mode		Incidence of Use Fixed Setpoint Chilled Water Condenser Water	Reset							
Setpoint		Chilled Water 30 Condenser Water 30 Supply Air 13	7 °C 0 °C 0 °C	44.6 86 55.4	F F F					
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	30 W/m ² 43.3 MJ/m ² .yr	10 Btu/hr.ft ² 124 1.1 kWh/ft ² .yr	1 ft²/Ton							
Sizing Factor	1.00	Operatio	n (occ. perio	4000 h	rs/year	Note value	cannot be le	ss than 2,90	00 hrs/year)	
A/C Saturation (Incidence of A/C)	10.0%									
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share								
Chiller Maintenance	Annual Ma Inspect Co Inspect Co Megger M Condense Vibration	intenance Tasks ontrol, Safeties & Purge Unit oupling, Shaft Sealing and Bearings otors r Tube Cleaning Analysis	Incidence (%)	Frequency (years)						
	Eddy Curr Spectroch	ent Testing emical Oil Analysis								All Electric EUI
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency						kWh/ft².yr 0.5 MJ/m².yr 18
	Inspection Inspect/Se Megger M Inspect/Ve	/Clean Spray Nozzles rvice Far/Fan Motors otors rify Operation of Controls	(%)	(years)						Fuel Oil / Propane EUI KWh/ft².yr MJ/m².yr Market Composite EUI KWh/ft².yr 0.5 MJ/m².yr 18
DOMESTIC HOT WATER										
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Std. Tank PV Tank resent (%) 0.550 0.60	k Cond. Tnk	Std. Boiler 0	2nd. Boil. 0.00% 0.900		Fuel Share Blended Effic	ciency	Fossil 0% 0.90	Elec. Res. 100% 0.91
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	18.2		-							
Wetting Use Percentage	90%		A	II Electric EU kWh/ft².yr MJ/m².yr	0.5 20		Fuel Oil kV M	/ Propane E Nh/ft².yr J/m².yr	UI 0.5 20	Market Composite EUI kWh/ft².yr 0.5 MJ/m².yr 20.0

		COMMER		OR BUILDING PROFIL	LE							
NEW BUILDINGS:	SIZE:	00111121	VINTAGE:				REGION:					
Warehouse/Wholesale	All		New				Island Inte	rconnecte	d			
Baseline												
HVAC FANS & PUMPS												
SUPPLY FANS					v	entilation	and Exhau	ist Fan One	ration & Co	ontrol		
OUT ET TARO					ľ	Ventilat	ion Fan	Exhau	st Fan			
System Design Air Flow 1.	4 L/s.m ²	0.27 CFM/ft ²	Control		F	ixed	Variable	Fixed	Variable			
System Static Pressure CAV 3	00 Pa	1.2 wg					Flow		Flow			
System Static Pressure VAV 3	00 Pa	1.2 wg	Incidence of	Use		100%		100%	_			
Fan Efficiency 60	%		Operation		С	continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 80	1%		Incidence		_	E09/	E0%	E0%	E0%			
Fan Design Load CAV	19 W/m ²	0.08 W/ft ²	Incluence o	056		50%	50%	50%	30%			
Fan Design Load VAV 0.	9 W/m ²	0.08 W/ft ²		Comments:								
EXHAUST FANS												
Washroom Exhaust 10	U L/s.washroom	212 CFM/wa	shroom									
Other Exhaust (Smoking/Conference)	1 L/S.III-	0.02 CFM/ft2										
Total Building Exhaust 0	2 L/s.m ²	0.02 CFM/ft ²										
Exhaust System Static Pressure 2	50 Pa	1.0 wg										
Fan Efficiency 25	%	3										
Fan Motor Efficiency 75	%											
Sizing Factor 1.	.0											
Exhaust Fan Connected Load	0.2 W/m ²	0.02 W/ft ²										
AUXILIARY COOLING FOUIPMENT (Conder	ser Pump and Coolin	a Tower/Condenser Fans	:)									
		g i en en een acheen i ane	,									
Average Condenser Fan Power Draw		0.020 kW/kW	Г	0.07 kW/Ton								
(Cooling Tower/Evap. Condenser/ Air Cooled	Condenser)	0.61 W/m ²		0.06 W/ft ²								
			_									
Condenser Pump												
Ruma Dasian Flour		0.052 1 /2 1/21	Г	2.0 11.0 mm/T	·							
Pump Design Flow		0.053 L/S.KW	-	3.0 U.S. gpm/10	on 2							
Pump Head Pressure		0.002 L/S.III-	-	0.002 0.3. gpm/n-	-							
Pump Efficiency		50%	L									
Pump Motor Efficiency		80%										
Sizing Factor		1.0										
Pump Connected Load		W/m ²	Г	W/ft ²								
CIRCULATING PUMP (Heating & Cooling)												
Rump Dogign Flow @ 5 °C (10 °F) dolto T		0.001 1/2 m2	0.0010	IS app /ft?	2.411	IS anm/	Fon					
Pump Head Pressure		kPa	0.0019	H	2.4 0	.s. ypm/	1011					
Pump Efficiency		50%	LI									
Pump Motor Efficiency		80%										
Sizing Factor		0.8										
Pump Connected Load		W/m ²		W/ft ²								
Sumply For Oce, Devia 1		2500 hrs hur										
Supply Fan Ucc. Period		5260 brs /veor										
Supply Fan Unocc. Period		5200 HIS./year										
Coppy ran Energy Consumption	L	5.5 KWWWIF.91										
Exhaust Fan Occ. Period		3500 hrs./year										
Exhaust Fan Unocc. Period		5260 hrs./year										
Exhaust Fan Energy Consumption		1.3 kWh/m ² .yr										
Condenser Pump Energy Consumption		kWh/m².yr										
Cooling Tower /Condenser Fans Energy Const	umption	0.3 kWh/m ² .yr										
Circulating Rump Voort - Operation		7000 bro /uco-										
Circulating Pump Teany Operation		kWb/m² vr										
Choulding rump Energy Consumption	L	KYVIVIIT.YI										
Fans and Pumps Maintenance	Annual Maintenance	e Tasks	Incidence	Frequency								
			(%)	(years)								
	Inspect/Service Fan	s & Motors										
	Inspect/Adjust Belt	Fension on Fan Belts										
	Inspect/Service Pur	np & Motors								EUI	kWh/ft².yr	0.6
1											M 1/m ² //r	24.6

NEW BUILDINGS: Warehouse/Wholesale Baseline	s A	SIZE: All	COMMERCIAL SECT VINTAGE: New	or Buildi	NG PROFILE		REGION: Island Interconnected	
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		13.6 kWh/ft².yr 527.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electri	city	Fuel Oil /	Propane	
GENERAL LIGHTING	3.7	142.1	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft2.yr	MJ/m².yr	
SECONDARY LIGHTING	0.2	7.0	SPACE HEATING	5.0	195.5			
TERTIARY LIGHTING			SPACE COOLING	0.0	1.8			
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	20.0	0.0	0.0	
HVAC FANS & PUMPS	0.6	24.6	FOOD SERVICE EQUIPMENT					
REFRIGERATION	1.5	60.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.3	13.3						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

			COMMER	CIAL SECT	OR BUILD	NG PROF	ILE						
EXISTING BUILDINGS:	SIZE:			VINTAGE	:				REGION:				
Restaurant	All			New					Island Inter	connected	I		
Baseline													
CONSTRUCTION													
Wall U value (W/m ² .°C)	0.38 W/m ² .°C	0.07	Btu/hr.ft ² .°F			Typical Bu	uildina Size		Γ	929 n	n²	10.000	ft ²
Roof U value (W/m ² .°C)	0.19 W/m ² .°C	0.03	Btu/hr.ft ² .°F			Typical Fo	otprint (m ²)		Ī	929 n	n²	10,000	ft²
Glazing U value (W/m ² .°C)	3.52 W/m ² .°C	0.62	Btu/hr.ft ² .°F			Footprint	Aspect Rati	o (L:W)		1			
						Percent C	onditioned	Space		100%			
_						Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%)	0.36					Defined as	s Exterior Z	one	г	4			
Shading Obernoleni (SC)	0.56					Floor to F	oor Height	(m)	F	3.7 n	n	12.0	ft
								()	L				
·													
VENTILATION SYSTEM, BUILDING C	ONTROLS & INDOOR C	ONDITIONS											
Ventilation System Type			CAV	CAVR	DDMZ	DDMZVV	VAV	VAVR	R IU	100% O.A	TOTAL		
	System	n Present (%)	60%							40%	100%		
	Min. A	ir Flow (%)					60%						
	(Minim	um Throttled Air Vo	lume as Perce	nt of Full Fl	ow)								
Occupancy or People Density		20 m ² /persor		215	ft²/person				%OA	29.87%			
Occupancy Schedule Occ. Period		90%							···· L				
Occupancy Schedule Unocc. Period				0	1								
Fresh Air Requirements or Outside Air		20 L/s.persor	ו	42	CFM/perso	n							
Fresh Air Control Type	*(enter a 1, 2 or 3)	1 If Fresh Δi	r Control Type	= "2" enter	% FA to the	right [.]			<u>г т</u>			·ı	
(1 = mixed air control, 2 = Fixed fresh ai	r, 3 100% fresh air)	If Fresh Ai	r Control Type	= "3" enter	Make-up Air	Ventilatior	and opera	tion		L/s.m ²		CFM/ft ²	
									[operation (%	6)		
Sizing Factor		1.3			1								
Total Air Circulation or Design Air Flow		3.35 L/s.m ²		0.66	CFM/ft ²		Sonarato	Make-up ai	ir upit (100%	OA) [l/e m²	CEM/ft2
Infiltration Rate		0.70 L/s.m ²		0.14	CFM/ft ²		Separater	Operation	occupied pe	eriod	50%	L/5.III-	CFW/IF
(air infiltration is assumed to occur durin	g unoccupied							Operation	unoccupied	period	50%		
hours only if the ventilation system shuts	down)												
Foopomizor		Entho	Inv Rocod	Dry Pu	lb Basad	Total	1						
Economizer	Incidence of Use	Enula	ipy baseu	100%	in pased	100%		Summarv	of Design P	arameters			
	Switchover Point		KJ/kg.	18	°C	10070		Peak Des	ign Cooling I	_oad	301,959		
			Btu/lbm	64.4	°F]	Peak Zon	e Sensible L	oad	109,020		
	Ourtern Descent	(0/)	10/40	Deere	1			Room air	enthalpy		28.2	Btu/lbm	
Controls Type	System Present	(%)	HVAC Equipment	Controls				Discharge Specific volu	e air enthalpy	E & 100% P	23.4	Btu/Ibm ft ³ /Ibm	
	All Pneumatic		Equipment	CONTRIDIS				Design Cl	FM	a a 1007010	5,072	11/10/11	
	DDC/Pneumatic							Total air c	irculation or	Design air	3.35	l∕s.m²	
	All DDC												
	i otal (snouid add	up to 100%)]								
		Pro	ortional	PI / PID	Total]							
Control mode	Control Mode												
		Fixed	Discharge	Reset									
	Control Strategy												
Indoor Design Conditions				Room				Supply Air	r			[
	Summer Tempera	ature	24	°C	75.2	°F	14	°C	57.2	°F			
	Summer Humidity	(%)	50%	16 10.0	00.0	D1///	98%	16.10.0	00.4	Dis //lb as			
	Enthalpy Winter Occ. Tem	erature	21	°C.	28.2	°F	54.5	°C.	23.4	°F			
	Winter Occ. Humi	dity	30%	Ŭ	0010		45%	Ŭ					
	Enthalpy		53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	Btu/Ibm			
	Winter Unocc. Te	mperature	21	°C	69.8	°F							
	Winter Unocc. Hu	midity	30%	K I/ka	21.5	Btu/lbm							
	Entrapy		50	rto/ttg.	21.0	Dianom						i i	
					-								
Damper Maintenance			Incidence	Frequency	1								
	Control Arm Adius	stment	(%)	(years)	1								
	Lubrication	sunen											
	Blade Seal Repla	cement]								
Air Filter Cleaning	Changes/Year			I									
	enanges/redi		l	1									
					Incidence of	Annual R	oom Contro	ols Mainter	nance				
Incidence of Annual HVAC Controls Ma	ntenance								-				
	Appual Maintenan	co Tasks	Incidence	T				intenence	Tasks		Incidence	1	
	Annuar Marnienan	00 1 0515	(%)				Annual Ma	miterialiiCe	1 0313		(%)	l	
	Calibration of Tra	nsmitters	,,	İ			Inspection	/Calibratio	n of Room T	hermostat		J	
	Calibration of Par	nel Gauges		ļ			Inspection	of PE Swi	itches			ł	
	Inspection of Aux	liary Devices		ł			Inspection	of Auxiliar	y Devices	ahoo		ł	
	inspection of Cor	II OI DEVICES	<u> </u>	1			(Dampers	VAV Box	i Devices (Va es)	aives,		l	
									1				

EXISTING BUILDINGS: Restaurant Baseline	SIZE: All	COMMER	RCIAL SECTOR BUILDI VINTAGE: New	NG PROFILE	REGION: Island Interc	connected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 3 0.50 10.3 W/m ²	37.2 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	450 10%	550 650 80% 10%			Total 100% 550		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7	0.7 0.6 0.65 0.75 50 72	18 HID 100.0%	15HO LED 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot				· · ·		EUI	Wh/ft².yr	2.3
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 2 0.50 21.2 W/m ²	27.9 ft-candles						<u>/////////////////////////////////////</u>	00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	200 10%	300 400 40% 40%	500 10%		Total 100% 350		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 30% 0.7 0.65 15	CFL 112 50%	18 HID 0.6 0.6 0.80 0.80 84 65	TSHO LED 20% 0.6 0.80 0.80 95	101AL		
Relamping Strategy & Incidence of Practice	Group Spot			EUI = Load X Hrs. X	SE X GLEE		EUI I	(Wh/ft².yr	4.7
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor fraction	on check: should = 1.0	0 1.00]		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC 0.7 0.65 15	CFL T12 0.7 0.6 0.65 0.75 50 72	T8 HID 0.6 0.6 0.80 0.80 84 65	T5HO LED 0.6 0.6 0.80 0.80 95 90	TOTAL		
Relamping Strategy & Incidence of Practice	Group Spot						EUI k	Wh/ft².yr	
TOTAL LIGHTING					Overall LP	15.75 W/m²	EUI TOTAL I	(Wh/ft².yr vJJ/m².yr	7 269
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads	-		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.16 0.4 W/m ² 0.0 W/ft ² 80%	51 0.16 0.4 W/m ² 0.0 W/ft ² 80%	100 0.01 0.1 W/m ² 0.00 W/ft ² 80%	200 W/m ² W/ft ² 80%	217 0.03 0.1 W/m ² 0.01 W/ft ² 100%	1.15 W/m ² 0.11 W/ft ² 80%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760	50% 2000 6760	100% 2000 6760	50% 2500 6260			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.8 W/m² 1.2 W/m²	0.2 W/ft ² 0.1 W/ft ²				Computer Servers	sEUI k	:Wh/ft².yr MJ/m².yr	0.11 4.42
Usage during occupied period Usage during unoccupied period	100% 65%					Computer Equipmen	tEUI k N SEUI k I	.Wh/ft².yr <u>/J/m².yr</u> (Wh/ft².yr /J/m².yr	0.41 16.00 0.55 21.24
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:	2.0%	Electricity Fuel Share:	98.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI 0.1 5.0	All I EUI I I	Electric EUI (Wh/ft².yr vJ/m².yr	34.3 1330.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant							EUI F	‹Wh/ft².yr ⁄JJ/m².yr	16.8 650.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters	sEUI F	Wh/ft².yr MJ/m².yr Wh/ft².yr	0.3

			COMMER	CIAL SECT	OR BUILDIN	IG PROFI	LE						
EXISTING BUILDINGS: Restaurant Baseline	SIZE: All			VINTAGE: New					REGION: Island Inte	rconnected			
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propar	1e		Ele	ctric				
				Bo Stan.	ilers F High	ackaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%) Eff./COP		70%	80%	70%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / Eff.)		1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load	59.0 W/m ²	18.7	Btu/hr.ft²						11				
Seasonal Heating Load (Tertiary Load)	742 MJ/m².yr	19.1	kWh/ft².yr										
Sizing Factor	1.00										Г	All Electric EUI	
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		Ι	Oil Fuel Share	Ð]				kWh/ft².yr MJ/m².yr	19.1 742
Boiler Maintenance	Annual M	aintenance Tasks		Incidence							L F	Fuel Oil / Drepens [-111
	Fire Side	Inspection		(%)								kWh/ft².yr	201
	Water Sid Inspection	de Inspection for Scale Bui n of Controls & Safeties	ldup	100%							L	MJ/m².yr	
	Inspection Flue Gas	n of Burner Analvsis & Burner Set-up		100%								Market Composite I kWh/ft².vr	EUI 19.1
				1								MJ/m².yr	742
SPACE COOLING													
A/C Plant Type			0.17						01.11	T			
			Standard	HE	WSHP R	Open	DX	W. H.	n Chillers CW	lotal			
		System Present (%) COP	4.7	7 5.4	3.5	3.5	100.0%	0.9	1	100.0%			
		Performance (1 / COP) (kW/kW)	0.2	1 0.19	0.29	0.29	0.38	1.11	1.00				
		Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset									
		Chilled Water	Setpoint										
		Condenser Water											
Catagint		Chilled Water	7	Tec	44.6	-							
Sepon		Condenser Water	30	°C	44.0 86 °	F							
		Supply Air	14.0	<u></u>	57.2°	F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	95 W/m² 107.4 MJ/m².yr	30 Btu/hr.ft ² 2.8 kWh/ft ² .y	397	ft²/Ton									
Sizing Factor	1.00		Operation (or	c. period)	3000 h	nrs/year	Note value	e cannot be	less than 2,	900 hrs/yea	r)		
A/C Saturation	90.0%												
(Incidence of A/C)													
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		I									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge U	nit	(%)	(years)								
	Inspect C Megger N	oupling, Shaft Sealing and Notors	Bearings										
	Condense Vibration	er Tube Cleaning Analysis											
	Eddy Cur Spectrool	rent Testing									F	All Electric ELU	
	opeened											kWh/ft².yr	1.2
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency						L –	iviJ/m².yr	47
	Inspection	n/Clean Spray Nozzles		(%)	(years)							Fuel Oil / Propane E kWh/ft².yr	UI
	Inspect/S Megger N	ervice Fan/Fan Motors /lotors									L	MJ/m².yr	
	Inspect/V	erify Operation of Controls	\$								F	Market Composite I kWh/ft².vr	EUI 1.2
												MJ/m².yr	47
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	el SHW Tank				Boiler]			Fossil		Elec. Res.	
	System F Eff./COP	Present (%) 0.6	5			0%		Fuel Share Blended E	e fficiency	0%	F	100% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	700.0	<u> </u>											
Wetting Lise Percentage	00%			A	II Electric EUI	10.0		Fuel	Oil / Propan	e EUI	F	Market Composite I	EUI
weating use Percentage	90%				MJ/m².yr	769			MJ/m².yr	24.1 933		MJ/m².yr	769.2

		COMMER	CIAL SECTOR BUILDING PROFILE							
EXISTING BUILDINGS:	SIZE:		VINTAGE:		REGION:					
Restaurant	All		New		Island Inte	rconnecte	ed			
Baseline										
HVAC FANS & PLIMPS										
HVAC FANS & FUNFS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	eration & Con	trol		
				Ventilati	on Fan	Exha	aust Fan	1		
System Design Air Flow	3.3 L/s.m ²	0.66 CFM/ft ²	Control	Fixed	Variable	Fixed	Variable			
System Static Pressure CAV	750 Pa	3.0 wg			Flow		Flow			
System Static Pressure VAV	750 Pa	3.0 wg	Incidence of Use	60%		100%				
Fan Efficiency	52%		Operation	Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency	85%							Ļ		
Sizing Factor	1.00	0.50 14////2	Incidence of Use	90%	10%	90%	10%	0		
Fan Design Load VAV	5.7 W/m ²	0.53 W/ft²	Commente:							
Tan Design Load VAV	5.7 W/III	0.55 Wite	Commenta.							
EXHAUST FANS										
Washroom Exhaust	100 L/s.was	hroom 212 CFM/washro	om							
Washroom Exhaust per gross unit area	0.2 L/s.m ²	0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²	0.02 CFM/ft ²								
I otal Building Exhaust	0.3 L/s.m ²	0.06 CFM/ft ²								
Exhaust System Static Pressure	250 Pa	1.0 wg								
Fan Efficiency	40%									
Sizing Factor	1.0									
Exhaust Ean Connected Load	0.2 W/m ²	0.02 W/ft ²								
	0.2	0.02								
AUXILIARY COOLING EQUIPMENT (Condenser Pump	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw		0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air C	Cooled Condenser)	1.87 W/m ²	0.17 W/ft ²							
Condonsor Burn										
Condenser Pump										
Pump Design Flow		0.053 L/s KW	30 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.005 L/s.m ²	0.007 U.S. gpm/ft ²							
Pump Head Pressure		90 kPa	30 ft							
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		1.0								
Pump Connected Load		0.92 W/m ²	0.09 W/ft ²							
CIRCUITATING DUMP (Heating & Co.	alina)									
CIRCULATING FUMP (Heating & Coo	oling)									
Pump Design Flow @ 5 °C (10 °F) de	lta T	0.004 L/s.m ²	0.0060 U.S. gpm/ft ² 2.4	U.S. gpm/T	on					
Pump Head Pressure		150 kPa	50 ft	Joror aburn	0.1					
Pump Efficiency		55%								
Pump Motor Efficiency		90%								
Sizing Factor		0.5								
Pump Connected Load		0.6 W/m ²	0.06 W/ft ²							
Supply Fon Oce, Boried		2500 bro (voor								
Supply Fail Occ. Fellou Supply Fail Upocc. Period		5260 brs /vear								
Supply Fan Energy Consumption		28.1 kWb/m².vr								
		20.1 1.1111.91								
Exhaust Fan Occ. Period		3500 hrs./year								
Exhaust Fan Unocc. Period		5260 hrs./year								
Exhaust Fan Energy Consumption		2.0 kWh/m ² .yr								
Condenser Pump Energy Consumption	ו	0.4 kWh/m².yr								
Cooling Tower /Condenser Fans Energ	gy Consumption	0.6 kWh/m².yr								
Circulating Rump Voorly Operation		5000 brs /voor								
Circulating Pump Energy Consumption		kW/h/m² vr								
		Kvitviir.yi								
Fans and Pumps Maintenance	Annual I	Maintenance Tasks	Incidence Frequency							
			(%) (years)							
	Inspect/s	Service Fans & Motors								
	Inspect//	Adjust Belt Tension on Fan Belts								
	Inspect/s	Service Pump & Motors						EUI	kWh/ft².yr	2.9

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
EXISTING BUILDINGS:	:	SIZE:	VINTAGE	:			REGION:	
Restaurant		All	New				Island Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		102.1 kWh/ft².yr 3,955.9 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.1 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electi	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	2.3	88.3		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	4.7	180.8	SPACE HEATING	19.1	741.5			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	1.1	42.2			
OTHER PLUG LOADS	0.5	21.2	DOMESTIC HOT WATER	19.9	769.2	0.0	0.0	
HVAC FANS & PUMPS	2.9	111.9	FOOD SERVICE EQUIPMENT	33.6	1,303.4	0.0	0.1	
REFRIGERATION	16.8	650.0						
MISCELLANEOUS	0.3	10.0						
BLOCK HEATERS								
COMPUTER EQUIPMENT	0.4	16.0						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

				COMMER	CIAL SECT	FOR BUILD	ING PROF	ILE						
NEW BUILDINGS:	SIZE:					:				REGION:	Interconne	cted		
Baseline	> 100 KW				New					Labrador	Interconne	Lieu		
CONSTRUCTION												-		
		1					- · · · -						40.000	
Wall U value (W/m ² .°C) 0.4	2 W/m ² .°C		0.07	Btu/hr.ft ² .°F			Typical Bi	uilding Size			929	m²	10,000	ft ²
Roof U value (W/m ² .°C) 0.1	9 W/m².°C		0.03	Btu/hr.ft ² .°F			Typical Fo	potprint (m ²	·)		465	m²	5,000	ft ²
Glazing U value (W/m ² .°C) 2.8) W/m².°C	l	0.49	Btu/hr.ft ² .°F			Footprint A	Aspect Rat	io (L:W) Space		100%	I		
							Percent C	onditioned	Space		45%	I		
Window/Wall Ratio (WIWAR) (%) 0.6	0						Defined a	s Exterior Z	one					
Shading Coefficient (SC) 0.5	3						Typical #	Stories			2	1		
							Floor to F	loor Height	(m)		3.7	m	12.0	π
VENTILATION SYSTEM, BUILDING CONTR	OLS & IND	OOR CONDITIC	NS											
Ventilation System Type		[CAV	CAVR			VAV	VAVE	ર ા	100% O.A	τοτα	J.	
		System Present	t (%)	50%	5			50%	5			100%	%	
		Min. Air Flow (%	6)					60%				I.		
		(Minimum Throf	tled Air Vo	lume as Perce	ent of Full F	low)								
Occupancy or People Density		26	m²/persor	n	274	ft²/person				%OA	5.35%	I		
Occupancy Schedule Occ. Period		90%												
Occupancy Schedule Unocc. Period		0		_	16	CEM/para								
Fresh All Requirements of Outside All		0	L/S.peiso	1	10	CFIW/pers	JII							
Fresh Air Control Type *(enter	a 1, 2 or 3)	1	lf Fresh Ai	r Control Type	= "2" enter	% FA. to th	e right:]		_	
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)		If Fresh Ai	r Control Type	= "3" enter	Make-up Ai	r Ventilatior	n and opera	ation		L/s.m ²	(0/)	CFM/ft ²	
Sizing Factor		1.5									loberation (70)	l	ļ.
Total Air Circulation or Design Air Flow		5.50	L/s.m ²		1.08	B CFM/ft ²								
lefiles is a Dete		0.40	1 /2 2		0.00	0514/62		Separate	Make-up a	ir unit (100%	% OA)	500	L/s.m ²	CFM/ft ²
(air infiltration is assumed to occur during unoc	upied	0.40	L/S.m²		0.08	CFIM/It ²			Operation	n occupiea j n unoccupie	d period	50%	<u>%</u>	
hours only if the ventilation system shuts down)	apiou								oporation	i ano ocapio	a ponoa			
F	[Eatha	In Deced	David	dh Danad	T 1	٦						
Economizer	Incidence	ofUse	Entha	ipy Based	100%	JID Based	1 otal 100%		Summary	of Design	Parameters			
	Switchove	er Point		KJ/kg.	18	°C	100 /	<u>.</u>	Peak Des	sign Cooling	Load	217,193	3	
				Btu/lbm	64.4	۴F			Peak Zon	e Sensible	Load	155,218	3	
Controls Type	System P	resent (%)		HVAC	Room	1			Room air	enthalpy	w.	28.2	2 Btu/lbm 4 Btu/lbm	
Contracts Type	Gysterin			Equipment	Controls				Specific vol	ume of air at	55F & 100% R	. 13.	.2 ft ³ /lbm	
	All Pneum	atic							Design C	FM		7,221	1	
	All DDC/Pne	umatic				-			I otal air d	circulation o	r Design air	5.50	l/s.m²	l .
	Total (sho	uld add-up to 10	0%)			-								
			_				-							
Control mode	Control M	ode	Pro	portional	PI / PID	lota								
Control mode	Control In	000	Fixed	Discharge	Reset									
	Control S	irategy												
Indoor Design Conditions					Room				Supply Ai	r			Т	
······	Summer	Temperature		24	4°C	75.2	°F	14	1°C	57.2	°F	I		
	Summer I	lumidity (%)		50%			-	98%				I		
	Enthalpy Winter Oc			65.5	KJ/kg.	28.2	Btu/lbm	54.5	S °C	23.4	Btu/lbm	I		
	Winter Oc	c. Humidity		30%	5	10.		45%	5			I		
	Enthalpy			53	3 KJ/kg.	22.8	Btu/lbm	45.5	5 KJ/kg.	19.6	Btu/lbm	I		
	Winter Ur	occ. Temperatur	e	23	3°C	73.4	1 °F							
	Enthalpy	occ. Humidity		30%) KJ/ka	21.5	Btu/lbm							
						-		1						
Domnor Maintenance	-			Incidence	Fraguesa	7								
Damper Mantenance				(%)	(vears)	/								
	Control A	rm Adjustment												
	Lubricatio	n												
	Blade Sea	al Replacement												
					_									
Air Filter Cleaning	Changes/	Year			1									
						Incidence o	f Annual R	oom Contr	ols Mainte	nance		l I		
Incidence of Annual HVAC Controls Maintenan	e	Ι												
	Appuel	intenance Teal		Incidence	т			Appus	aintenana	Taska		Incident	7	
	Annual Ma	annenance rasks		(%)				AnnuarMa	amiteriance	IdSKS		(%)		
	Calibratio	n of Transmitters		(70)	1			Inspection	/Calibratio	n of Room	Thermostat		_	
	Calibratio	n of Panel Gauge	es		4			Inspection	of PE Sw	itches			_	
	Inspection	of Control Devision	ICES		+			Inspection	n of Auxilia	ry Devices	/alves		-	
	Inspection			1	1			(Dampers	, VAV Box	es)	aivea,	I		
										-		-	-	

NEW BUILDINGS: Large Office Baseline	SIZE: > 100 kW	COMMER	RCIAL SECT VINTAGE: New	or Buildin	g profile	1	RI La	EGION: Ibrador Int	erconnected				
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF)	500 Lux 46 0.90	5 ft-candles											
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period	3300 5460 95%	Light Level (Lux) % Distribution Weighted Average		300	500 100%	700	1000				Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF		0.7 0.65	CFL 0.7 0.65	T12 0.6 0.75	T8 100% 0.6 0.80	HID 0.6 0.80	T5HO 0% 0.6 0.80	LED 0% 0.6 0.80	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)		15	50	72	88	65	95	90 EL	JI	kWh/ft².yr	4.6
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 32 0.10 12.9 W/m ² 1	5 ft-candles 2 W/ft ²										MJ/m².yr	177
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3400 5360 95% 40%	Light Level (Lux) % Distribution Weighted Average		200 10%	300 40%	400 40%	500 10%		TRUC		Total 100% 350		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6 0.75 72	18 40% 0.6 0.80 88	HID 5% 0.6 0.80 65	15HO 15% 0.6 0.80 95	LED 5% 0.6 0.80 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot			E	UI = Load	X Hrs. X S	F X GLFF			EU	JI	kWh/ft².yr MJ/m².yr	0.6 25
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles			FI	oor fractio	n check: sh	ould = 1.00)	1.00			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		300	500	700	1000		MU		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)		0.7 0.65 15	0.7 0.65 50	0.6	0.6 0.80 84	0.6 0.80 88	0.6 0.55 65	0.6 0.55 90	TOTAL		
Relamping Strategy & Incidence of Practice	Group Spot	(<u> </u>					• ·			EU	JI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING							O	verall LP	12.92 W/m ²	EU	JI TOTAL	kWh/ft².yr MJ/m².yr	5 202
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Computers	Monitors	Prir	nters	Copie	rs	Server	s	Plug Loads				
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.9 1.9 W/m ² 0.2 W/ft ² 80%	51 0.9 1.8 W/m ² 0.2 W/ft ² 80%	100 0.15 0.6 0.05 80%	W/m² W/ft²	200 0.1 0.8 W 0.07 W 80%	/m² /ft²	50 0.26 0.5 W 0.05 W 100%	/m² /ft²	1.5 W/m ² 0.14 W/ft ² 80%				
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	<u>50%</u> 2000 6760	2000 6760	2000 6760	_	2000 6760		2000 6760		2500 6260				
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m ² 3.8 W/m ²	0.5 W/ft ² 0.4 W/ft ²							Computer S	ervers EL	JI	kWh/ft².yr MJ/m².yr	0.42 16.20
Usage during occupied period Usage during unoccupied period	100% 66%								Plug	Loads EL	JI	KVVN/tt².yr MJ/m².yr KWh/ft².yr MJ/m².yr	2.36 91.24 0.72 27.70
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:		Electricity I	Fuel Share:	100.0%	E	Fuel Oil / UI kV M	/ Propane /h/ft².yr J/m².yr	EUI 0.1 5.0	EL	All	Electric EUI kWh/ft².yr MJ/m².yr	0.10
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant										EU	JI	kWh/ft².yr MJ/m².yr	0.10
BLOCK HEATERS & MISCELLANE	ous								Block H Miscella	eaters EL)	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.13 5.00 0.13 5.00

NEW BUILDINGS: Large Office Baseline	SIZE: > 100 kW		COMMERCIAL VIN Nev	SECTOR BUI TAGE: v	DING PROF	ILE	REGION: Labrador Interconned	cted		
SPACE HEATING										
Heating Plant Type				Fuel Oil / Pro	opane	E	lectric			
			s	Boilers tan. High	Packaged Unit	A/A HP W. S. H	P H/R Chiller Resistance	Total		
	S	ystem Present (%)		70% 80	1% 75%	170 3.0	100%	100%		
	P	erformance (1 / Eff.)		1.43 1.	25 1.33	0.59 0.3	3 0.22 1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	89.6 W/m ² MJ/m ² .yr	28.4 B 20.7 k	tu/hr.ft² //h/ft².yr							
Electric Fuel Share	100.0% Fuel Oil /	Propane Fuel Share		Oil Fuel S	Share				All Electric EUI kWh/ft².yr	20.7
Boiler Maintenance	Annual Maint	tenance Tasks	Inci	dence					MJ/m².yr	801
	Fire Side Ins Water Side I Inspection of Inspection of Flue Gas An	pection nspection for Scale Buildur I Controls & Safeties I Burner alysis & Burner Set-up))	%) 75% 100% 100% 90%					Fuel Oil / Propane El kWh/ft².yr MJ/m².yr Market Composite E kWh/ft².yr MJ/m².yr	UI UI 20.7 801
SPACE COOLING										
A/C Plant Type										
	S C P K A R	ystem Present (%) OP erformance (1 / COP) W/kW) dditional Refrigerant elated Information	Centrifugal Chill Standard 4.7 0.21	ers WSHF HE 20.0% 5.4 : 0.19 0.	Reciproca Open 3.5 3.5 29 0.29	ting Chillers Absorpti DX W. H. 80.0% 2.7 0 0.37 1.4	on Chillers Total CW 100.0% 9 1 1 1.00			
Control Mode		hilled Water ondenser Water	ixed Res etpoint	et						
Setpoint	C C S	hilled Water ondenser Water upply Air	7 ℃ 30 ℃ 14.0 ℃	5	4.6 °F 86 °F 7.2 °F					
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	68 W/m² 92.9 MJ/m².yr	22 Btu/hr.ft ² 2.4 kWh/ft ² .yr	553 ft²/T	on						
Sizing Factor	1.00	o	peration (occ. pe	riod) 300	00 hrs/year	Note value cannot b	e less than 2,900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	90.0%									
Electric Fuel Share	100.0% Fuel Oil /	Propane Fuel Share								
Chiller Maintenance	Annual Maint	tenance Tasks	Inci	dence Frequen	cy					
	Inspect Cont Inspect Coup Megger Mot Condenser T Vibration An Eddy Curren Spectrochen	rol, Safeties & Purge Unit oling, Shaft Sealing and Be ors Tube Cleaning alysis t Testing nical Oil Analysis	arings	%) (years				F	All Electric EUI kWh/ft².yr	0.9
Cooling Tower/Air Cooled Condense	r Maintenan Annual Maint Inspection/C Inspect/Serv Megger Mot Inspect/Verif	tenance Tasks lean Spray Nozzles ice Far/Fan Motors ors y Operation of Controls	(dence Frequen %) (years	CY)				MJ/m².yr Fuel Oil / Propane El kVhVlft².yr MJ/m².yr Market Composite E kVhVlf².yr MJ/m².yr	36 UI UI UI 0.9 36
DOMESTIC HOT WATER										
Service Hot Water Plant Type	Fossil Fuel System Pres Eff./COP	SHW Std. Tank sent (%) 0.550	PV Tank Cor 0.600	nd. Tnk Std. Boi	er Cnd. Boil. 0.00% 50 0.900	Fuel Sha Blended	re 0% Efficiency 0.90	E	ec. Res. 100% 0.94	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	22.8		·							
Wetting Use Percentage	90%			All Electric kWh/ft².y MJ/m².yr	EUI r 0.6 24	Fue	l Oil / Propane EUI kWh/ft².yr 0.7 MJ/m².yr 25		Market Composite E kWh/ft².yr MJ/m².yr	UI 0.6 24.2

NEW BUILDINGS: Large Office	SIZE: > 100 kW	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: New	REGION: Labrador Interconnected	
Baseline					
HVAC FANS & PUMPS					
SUPPLY FANS				Ventilation and Exhaust Fan Operation & Co	ntrol
System Design Air Flow System Static Pressure CAV	5.5 L/s.m ² 500 Pa	1.08 CFM/ft ² 2.0 wg	Control	Fixed Variable Fixed Variable Flow Flow	_
Fan Efficiency Fan Motor Efficiency	500 Pa 52% 85%	2.0] wg	Operation	Continuous Scheduled Continuous Scheduled	_
Sizing Factor	1.00 6.2 W/m ²	0.58 W/ft ²	Incidence of Use	75% 25% 75% 25	%
Fan Design Load VAV	6.2 W/m ²	0.58 W/ft ²	Comments:		
EXHAUST FANS					
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 L/s.wast 0.4 L/s.m² 0.5 L/s.m² 250 Pa 40% 80% 1.0 0.4	212 CFM/washrov 0.08 CFM/tr2 0.02 CFM/tr2 0.10 CFM/tr2 0.10 CFM/tr2 0.00 W/ft2	om		
AUXILIARY COOLING EQUIPMENT	Condenser Pump	and Cooling Tower/Condenser Fans)			
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air	Cooled Condenser)	0.018 kW/kW 1.23 W/m ²	0.06 kW/Ton 0.11 W/ft ²		
Condenser Pump					
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.004 L/s.m ² 100 kPa 55% 90% 1.0 0.73 W/m ²	3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft ² 33.333333 ft 0.07 W/ft ²		
CIRCULATING PUMP (Heating & Co	oling)				
Pump Design Flow @ 5 °C (10 °F) de Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	lta T	0.003 L/s.m ² 150 kPa 55% 90% 0.5 0.4 W/m ²	0.0043 U.S. gpm/ft ² 2.4 50 ft 0.04 W/ft ²	U.S. gpm/Ton	
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 37.7 kWh/m².yr			
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 3.1 kWh/m².yr			
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy	n gy Consumption	0.7 kWh/m².yr 0.5 kWh/m².yr			
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	I	5000 hrs./year kWh/m².yr			
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/A Inspect/S	Aaintenance Tasks Service Fans & Motors Adjust Belt Tension on Fan Belts Service Pump & Motors	Incidence Frequency (%) (years)		EUI kWh/ft².vr 3.9
1		 p. so a set 9 	· · · · · · · · · · · · · · · · · · ·		M.I/m ² vr 151.0

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE	:			REGION:	
Large Office	:	> 100 kW	New				Labrador Interconnected	
Baseline								
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		35.6 kWh/ft².yr 1,379.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.6	176.9		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.6	25.0	SPACE HEATING	20.7	800.5			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.8	32.1			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0	
HVAC FANS & PUMPS	3.9	151.0	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.1	4.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	2.4	91.2						
COMPUTER SERVERS	0.4	16.2						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

				COMMER	CIAL SECT	OR BUILD	ING PROF	ILE						
NEW BUILDINGS: Small Office	SIZE:	,								REGION	: r Interconnec	ted		
Baseline	< 100 km				New					Lubrudo		leu		
CONSTRUCTION														
				1								[
Wall U value (W/m ² .°C) 0.4	2 W/m ² .°C		0.07	Btu/hr.ft ² .°F			Typical Bu	uilding Size			929 r	n²	10,000 ft ²	
Roof U value (W/m ² .°C) 0.1	9 W/m².°C		0.03	Btu/hr.ft ² .°F			Typical Fo	potprint (m ²)		465 r	n²	5,000 ft ²	
Glazing U value (W/m ² .°C) 2.8	0 W/m ² .°C		0.49	Btu/hr.ft ² .°F			Footprint /	Aspect Rat	io (L:W)		1			
							Percent C	onditioned	Space		45%			
Window/Wall Ratio (WIWAR) (%) 0.3	5						Defined as	s Exterior Z	Ione		4378			
Shading Coefficient (SC) 0.5	8						Typical # 3	Stories			1			
							Floor to F	loor Height	(m)		3.7 r	n	12.0 ft	
VENTILATION SYSTEM, BUILDING CONTR	OLS & INC	OOR CONDITIC	NS											
						1	1	1						
Ventilation System Type		System Presen	F (%)	CAV 100%	CAVR	DDM2		VAV	VAVE		U 100% O.A	100%		
		Min. Air Flow (9	(<i>7</i> 0) ()	100%				60%				100%		
		(Minimum Thro	tled Air Vo	lume as Perce	nt of Full Fl	ow)								
						1								
Occupancy or People Density		26	m ² /persor	1	274	ft²/person				%OA	12.79%			
Occupancy Schedule Unocc. Period		90%												
Fresh Air Requirements or Outside Air		8	L/s.perso	n	16	CFM/perso	n							
													,	
Fresh Air Control Type *(enter	r a 1, 2 or 3)	1	If Fresh Ai	r Control Type	= "2" enter	% FA. to the	e right:	and onors	tion		1/e m2	0	M/ft2	
(1 = mixed air control, 2 = Fixed fresh air, 3.100	J% fresh air)		IT Fresh Al	r Control Type	= "3" enter	маке-ир А	rventilatior	1 and opera	tion		L/S.M ²	() ()	·M/II ²	
Sizing Factor		1.5									Topolation ()	0)	·i	
Total Air Circulation or Design Air Flow		2.30	L/s.m ²		0.45	CFM/ft ²					_			
		0.40			0.00	1.0514/0		Separate	Make-up ai	ir unit (100	% OA)	L/s	3.m²	CFM/ft ²
Inflitration Rate	cunied	0.40	L/s.m ²		0.08	CFM/ft ²			Operation	l occupied	period	50%		
hours only if the ventilation system shuts down)	oupicu								operation	ranoccupi		0070		
								-						
Economizer	la chian a c	- ()	Entha	lpy Based	Dry-Bu	lb Based	Total		0		Deservations			
	Switchov	of Use		K I/ka	100%	°C	100%	·	Summary Peak Des	of Design	d Load	95 876		
	Switchow	er i onit		Btu/lbm	64.4	°F			Peak Zon	e Sensible	Load	64,888		
				1		-		_	Room air	enthalpy		28.2 Btu	ı/lbm	
Controls Type	System F	resent (%)		HVAC	Room				Discharge	air enthal	ру	23.4 Btu	ı/lbm	
		atic		Equipment	Controls				Specific vol	ume of air at	55F & 100% R	13.2 ft³/l	.bm	
	DDC/Pne	umatic							Total air o	rculation	or Design air	2.30 Vs.	.m²	
	All DDC										Ū			
	Total (sho	ould add-up to 10	0%)											
			Pro	oortional	PI / PID	Total	1							
Control mode	Control N	lode	110	Sonaona	11/110	10101								
			Fixed	Discharge	Reset									
	Control S	trategy												
Indoor Design Conditions					Room				Supply Ai	r		T		
Indeer Design Conditions	Summer	Temperature		24	°C	75.2	°F	14	°C	57.	2 °F			
	Summer	Humidity (%)		50%		-	-	98%						
	Enthalpy			65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4	1 Btu/lbm			
	Winter Or	cc. Temperature		23	-0	73.4		45%	-0	5	9 7			
	Enthalpy	bo. Humany		53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6	6 Btu/lbm			
	Winter Ur	nocc. Temperatur	е	23	°C	73.4	°F		, v					
	Winter Ur	nocc. Humidity		30%] . . ///							
	Enthalpy			50	KJ/Kg.	21.5	Btu/Ibm							
Damper Maintenance				Incidence	Frequency	ć								
				(%)	(years)									
	Lubricatio	im Adjustment				_								
	Blade Se	al Replacement												
		•		•		-								
	0	N/		[т									
Air Filter Cleaning	Changes/	rear			1									
						Incidence o	f Annual R	oom Contr	ols Mainter	nance				
Incidence of Annual HVAC Controls Maintenan	се	l												
	A			la del	т			A	late a	T 1:		In states		
	Annual M	aintenance Tasks	•	Incidence				Annual Ma	aintenance	I ASKS		(%)		
	Calibratio	n of Transmitters		(/0)	†			Inspection	/Calibratio	n of Room	Thermostat	(/0)		
	Calibratio	n of Panel Gauge	es		1			Inspection	of PE Sw	itches				
	Inspection	n of Auxiliary Dev	ices		4			Inspection	of Auxiliar	y Devices				
	Inspection	n of Control Devi	ces	I	1			(Dampers	VAV Rov	I Devices (es)	valves,			
								Loampers	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					

NEW BUILDINGS: Small Office Baseline	SIZE: < 100 kW	COMMER	RCIAL SECTOR BUILDING PRC VINTAGE: New	DFILE REGIO Labrac	N: lor Interconnected		
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 0.95 12.9 W/m ²	5.5 ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 20%	Light Level (Lux) % Distribution Weighted Average	300 56 100	00 700 1000 %		Total 100% 500	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0. 0.65 0.6 15 5	112 100% 7 0.6 0.6 0 55 0.75 0.80 0 0 72 88 8	1310 1210 0% 0% 0.6 0.6 0.80 0.80 65 95 90	100.0%	
Relamping Strategy & Incidence of Practice	Group Spot				<u></u>	EUI kWh/fi	² .yr 4.1
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	350 Lux 3 0.05 12.9 W/m ²	2.5 ft-candles				MJ/m·	<u>yr 160</u>
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 95% 40%	Light Level (Lux) % Distribution Weighted Average	200 30 10% 40	00 400 500 % 40% 10%		Total 100% 350	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CI 5% 30 0.7 0. 0.65 0.6 15 5	FL T12 T8 H % 40%	HID T5HO LED 5% 15% 5% 0.6 0.6 0.6 80 0.80 0.80 65 95 90	TOTAL 100.0%	
Relamping Strategy & Incidence of Practice	Group Spot		EU 1			EUI kWh/ft	i².yr 0.3
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles	EUIEL	Floor fraction check: should	= 1.00 1.00]	<u>.yı 11</u>
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 50	00 700 1000		Total	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	0.7 0. 0.65 0.6	FL T12 T8 7 0.6 0.6 (5 0.75 0.80 0.	MH HPS 0.6 0.6 0.6 80 0.55 0.55 0.6 0.6		
Relamping Strategy & Incidence of Practice	Group Spot			0 12 04	66 63 90	EUI kWh/fi	l².yr
TOTAL LIGHTING				Overal	LP 12.92 W/m ²	EUI TOTAL kWh/fi MJ/m ²	¹² .yr 4 ² .yr 172
OFFICE EQUIPMENT & PLUG LOA	ADS						
Equipment Type	Computers	Monitors	Printers C	copiers Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load	55 0.9 1.9 W/m ² 0.2 W/ft ²	51 0.9 1.8 W/m ² 0.2 W/ft ²	100 20 0.15 0 0.6 W/m² 0 0.05 W/ft² 0.1	00 50 0.1 0.26 W/m ² 0.5 W/m ² 0.5 W/m ² 0.5 W/t ²	1.5 W/m² 0.14 W/ft²		
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	80% 50% 2000 6760	80% 50% 2000 6760	80% 80 50% 50 2000 200 6760 676	% 100% % 100% 00 2000 60 6760	80% 50% 2500 6260		
Total end-use load (occupied period) Total end-use load (unocc. period)	5.8 W/m² 3.8 W/m²	0.5 W/ft ² 0.4 W/ft ²			Computer Servers	EUI kWh/ft MJ/m ²	² .yr 0.42 ² .yr 16.20
Usage during occupied period Usage during unoccupied period	100% 66%				Computer Equipment Plug Loads	EUI kWh/fi MJ/m² EUI kWh/fi MJ/m²	² .yr 2.36 ² .yr 91.24 ¹² .yr 0.72 ² .yr 27.70
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share: 100.0	% Fuel Oil / Pro EUI KWh/ft/ MJ/m².	pane EUI .yr yr	All Electr EUI kWh/fi MJ/m ²	ic EUI ¹² .yr 2.yr
REFRIGERATION Provide description below:]			EUI kWh/fi M.J/m2	1 ² .yr
BLOCK HEATERS & MISCELLANE	OUS						
					Block Heaters Miscellaneous	EUI kWh/fi MJ/m ² EUI kWh/fi MJ/m ²	² .yr 0.13 ² .yr 5.00 ² .yr 0.13 ² .yr 5.00

NEW BUILDINGS: Small Office Baseline	SIZE: < 100 kW	,	COMMER	CIAL SECT VINTAGE New	OR BUILDII :	NG PROF	ILE		REGION: Labrador	nterconnec	ted		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Ele	ctric				
				Bo	ilers	Packaged	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)		Start.	High	Unit				100%	100%		
		Eff./COP Performance (1 / Eff.)		70%	80% 1.25	75%	1.70	3.00 0.33	4.50 0.22	1.00 1.00			
		(KW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	69.3 W/m ² 615 MJ/m ² .yr	<u>22.0</u> 15.9	Btu/hr.ft² kWh/ft².yr								F		
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		Ι	Oil Fuel Shar	е]				kWh/ft².yr	15.9
Boiler Maintenance	Annual M	aintenance Tasks		Incidence]						L	MJ/m².yr	615
	Fire Side	Inspection		(%) 75%	-							Fuel Oil / Propane E kWh/ft².yr	UI
	Water Sid	de Inspection for Scale Build	lup	100%	-						L	MJ/m².yr	
	Inspection	n of Burner		100%	-						F	Market Composite E	UI
	Flue Gas	Analysis & Burner Set-up		90%								MJ/m².yr	615
SPACE COOLING													
A/C Plant Type													
			Centrifugal Standard	I Chillers	WSHP	Reciproca Open	ting Chiller	s Absorptio W H	n Chillers CW	Total			
		System Present (%)	Standard		0.5	Open	100.0%	vv. 11.	CW	100.0%			
		Performance (1 / COP)	4.7	0.19	0.29	0.29	0.37	7 0.9 7 1.11	1.00				
		(kW/kW) Additional Refrigerant											
		Related Information											
Control Modo		Insidence of Line	Fixed	Recet	1								
Control Mode		Incidence of Ose	Setpoint	Resei	-								
		Chilled Water Condenser Water			-								
				1	1								
Setpoint		Chilled Water	7	°C	44.6	°F							
		Condenser Water Supply Air	30 14.0	0°C	86 57.2	°F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	30 W/m ² 69.8 MJ/m ² .yr	10 Btu/hr.ft² 1.8 kWh/ft².yr	1252	ft²/Ton									
Sizing Factor	1.00		Operation (oc	c. period)	3000	hrs/year	Note valu	e cannot be	e less than 2	,900 hrs/yea	ar)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel 0	Dil / Propane Fuel Share		Ι									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & Purge Un	it	(%)	(years)								
	Inspect C Meager N	oupling, Shaft Sealing and E Aotors	Bearings										
	Condense	er Tube Cleaning											
	Eddy Cur	rent Testing									-		
	Spectroc	hemical Oil Analysis									-	All Electric EUI kWh/ft².yr	0.7
Cooling Tower/Air Cooled Cordense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency						L	MJ/m².yr	26
				(%)	(years)						F	Fuel Oil / Propane E	UI
	Inspection Inspect/S	ervice Fan/Fan Motors										KVVn/tt².yr MJ/m².yr	
	Megger M Inspect/V	Notors erify Operation of Controls									Г	Market Composite E	UI
	<u> </u>]							kWh/ft².yr M.J/m².yr	0.7 26
													20
DOWESTIC TOT WATER		. .					7	·			r		
Service Hot Water Plant Type	Fossil Fu System F	Present (%) Std. Tank	PV Tank	Cond. Tnk	Std. Boiler	Cnd. Boil. 0.00%		Fuel Shar	e	Fossil 0%		Elec. Res. 100%	
Service Hot Water load (M I/m².vr)	Eff./COP	0.550	0.600	0.900	0.750	0.900		Blended E	fficiency	0.90		0.94	
(Tertiary Load)	22.0			· · · ·			1	_ <u>-</u> ·		• []	-	Martini One in T	
Wetting Use Percentage	90%			A	kWh/ft ² .yr	0.6	1	Fuel	Uil / Propan kWh/ft².yr	e EUI 0.7	+	Market Composite E kWh/ft ² .yr	:UI 0.6
-					MJ/m².yr	24			MJ/m².yr	25		MJ/m².yr	24.2



HVAC FANS & PUMPS SUPPLY FANS Ventilation and Exhaust Fan Operation & Control System Design Air Flow 2.3 Us.m² 0.45 CFM/ft² System Design Air Flow 2.3 Us.m² 0.45 CFM/ft² System Static Pressure CAV 500 Pa 2.0 wg System Static Pressure VAV 500 Pa 2.0 wg Incidence of Use 100% 100% Fan Efficiency 52% 55% Fan Design Load CAV 1.3 W/m² 0.12 Fan Design Load CAV 1.3 W/m² 0.12 Fan Design Load VAV 1.3 W/m² 0.12	
Ventilation and Exhaust Fan Operation & Control Ventilation and Exhaust Fan Operation & Control System Design Air Flow 2.3 Us.m² 0.45 CFM/ft² System Static Pressure CAV 5000 Pa 2.0 wg Incidence of Use 100% 100% System Static Pressure VAV 5000 Pa 2.0 wg Incidence of Use 100% 100% Fan Efficiency 85% 52% 52% 52% 52% 52% Fan Design Load CAV 1.3 W/m² 0.12 W/ft² Comments: EXHAUST FANS	
System Design Air Flow 2.3 U.s.m ² 0.45 CFM/ft ² Control Fixed Variable Fixed Variable System Static Pressure CAV 500 Pa 2.0 wg Incidence of Use 100% 100% System Static Pressure VAV 500 Pa 2.0 wg Incidence of Use 100% 100% Fan Efficiency 52% 52% 55% 0peration Continuou Scheduled Continuous Scheduled Fan Motor Efficiency 85% 0.50 Incidence of Use 75% 25% 75% Fan Design Load CAV 1.3 W/m ² 0.12 W/ft ² Comments: Incidence of Use Incidence of Use	
EXHAUST FANS	
washroom Exhaust 100 Us.washroom 212 CFM/washroom Washroom Exhaust gross unit are; 0.4 Us.m ² 0.08 CFM/t ² Other Exhaust (Smoking/Conference) 0.1 Us.m ² 0.02 CFM/t ² Total Building Exhaust 0.5 Us.m ² 0.10 CFM/t ² Exhaust System Static Pressure 250 Pa 1.0 wg Fan Efficiency 40% 1.0 wg Sizing Factor 0.5 Um/t ² 0.02 W/tt ²	
AUXILIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans)	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled Condenser) 0.018 kW/kW 0.06 kW/Ton (Cooling Tower/Evap. Condenser/ 0.54 W/m² 0.05 W/ft²	
Outbother Fullip 0.053 L/s.KW 3.0 U.S. gpm/Ton Pump Design Flow per unit floor area 0.002 U.S. m2 0.002 U.S. gpm/tr2 Pump Head Pressure 100 kPa 33.333333 ft Pump Efficiency 55% 35/2 55% Pump Motor Efficiency 90% 55% Sizing Factor 0.5 0.5 Pump Connected Load 0.16 W/m2 0.02	
CIRCULATING PUMP (Heating & Cooling)	
Pump Design Flow @ 5 °C (10 °F) delta T 0.001 L/s.m² 0.0019 U.S. gpm/ft² 2.4]U.S. gpm/Ton Pump Head Pressure 150 kPa 50 ft Pump Efficiency 55% 50 ft Pump Motor Efficiency 90% 55% Sizing Factor 0.5 0.02 W/m² 0.02 W/tt²	
Supply Fan Occ. Period 3500 hrs./year Supply Fan Unocc. Period 5260 hrs./year Supply Fan Energy Consumption 9.7 kWh/m².yr	
Exhaust Fan Occ. Period 3500 hrs./year Exhaust Fan Unocc. Period 5260 hrs./year Exhaust Fan Energy Consumption 1.5 kWh/m².yr	
Condenser Pump Energy Consumption 0.1 kWh/m².yr Cooling Tower /Condenser Fans Energy Consumption 0.3 kWh/m².yr	
Circulating Pump Yearly Operation 5000 hrs./year Circulating Pump Energy Consumption kWh/m².yr	
Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) Frequency (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors	

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE	:			REGION:	
Small Office		< 100 kW	New		Labr		Labrador Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		26.8 kWh/ft².yr 1,039.0 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	4.1	160.2		kWh/ft ² .yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr	
ARCHITECTURAL LIGHTING	0.3	11.3	SPACE HEATING	15.9	615.3			
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	23.7			
OTHER PLUG LOADS	0.7	27.7	DOMESTIC HOT WATER	0.6	24.2	0.0	0.0	
HVAC FANS & PUMPS	1.1	42.2	FOOD SERVICE EQUIPMENT					
REFRIGERATION								
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	2.4	91.2						
COMPUTER SERVERS	0.4	16.2						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						

NEW BUILDINGS: Food Retail Baseline	SIZE: Ali		COMMERCI	AL SECTOR /INTAGE: New	BUILDING PR	DFILE	REGION: Labrador Interconnected
CONSTRUCTION Wall U value (W/m².°C) 0.28 Roof U value (W/m².°C) 0.11 Glazing U value (W/m².°C) 2.80 Window/Wall Ratio (W/WAR) (%) 0.11 Shading Coefficient (SC) 0.68	W/m².°C W/m².°C W/m².°C	0.05	Btu/hr.ft².°F Btu/hr.ft².°F Btu/hr.ft².°F		Typica Typica Footpr Percer Percer Define Typica Floor t	Building Size Footprint (m ² , nt Aspect Rati t Conditioned t Conditioned d as Exterior Z # Stories b Floor Height) 929 m^2 $10,000 \text{ ft}^2$ io (L-W) 1 100\% Space 40% io (m) 1 6.0 m 19.7 ft
VENTILATION SYSTEM, BUILDING CONTRO	LS & INDOOI	R CONDITIONS					
Ventilation System Type Occupancy or People Density	Sy: Mii (Mi	stem Present (%) n. Air Flow (%) inimum Throttled Air V 45] m²/perso	CAV 100% Dume as Perc	CAVR ent of Full Flow 484 [ft ² /	DDMZ DDMZ	VV VAV 50%	VAVR IU 100% O.A TOTAL 100%
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air		90% 20 L/s.perso	n [42 CF	M/person		
Fresh Air Control Type *(enter (1 = mixed air control, 2 = Fixed fresh air, 3 100	a 1, 2 or 3) % fresh air)	1 If Fresh A If Fresh A	ir Control Typ ir Control Typ	e = "2" enter % e = "3" enter N	6 FA. to the righ //ake-up Air Ven	t: ilation and ope	eration 0.5 L/s.m ² 0.10 CFM/tt ² 50% operation (%)
Sizing Factor Total Air Circulation or Design Air Flow		3 8.00 L/s.m ²	[1.58 CF	M/ft ²	Concepto	
Infiltration Rate (air infiltration is assumed to occur during unocc hours only if the ventilation system shuts down)	upied	0.70 L/s.m ²	[0.14 CF	M/ft²	Separate	Operation occupied period 50%
Economizer	Incidence of L Switchover Po	Enthal Jse oint	KJ/kg. Btu/lbm	Dry-Bulb B 100% 18 °C 64.4 °F	ased To 10	tal 0%	Summary of Design Parameters Peak Design Cooling Load 198,673 Peak Zone Sensible Load 112,922 Room air enthalov 28.2 Btu/lbm
Controls Type	System Prese All Pneumatic DDC/Pneuma All DDC Total (should a	ent (%) titic add-up to 100%)	HVAC Equipment	Room Controls			Discharge air enthalpy 23,4 Bt/l/lbm Specific volume of air at 55F & 100% R 13.2 ft%/lbm Design CFM 5.253 Total air circulation or Design air 8.00 /s.m²
Control mode	Control Mode Control Strate	Prop Fixed I Pgy	Discharge	Reset	lotal		
Indoor Design Conditions	Summer Tem Summer Hum Enthalpy Winter Occ. T Winter Occ. H Enthalpy Winter Unocc. Enthalpy	perature iidity (%) ^T emperature lumidity . Temperature . Humidity	22° 50% 6555 22° 30% 531 21° 30% 50	Room C (J/kg C C (J/kg	71.6 °F 28.2 Btu/lbr 71.6 °F 22.8 Btu/lbr 69.8 °F 21.5 Btu/lbr	13 100% n 54.5 16 45% n 45.5	Supply Air °C 55.4] °F KJ/kg. 23.4 Btu/lbm °C 60.8] °F KJ/kg. KJ/kg. 19.6 Btu/lbm
Damper Maintenance	Control Arm A Lubrication Blade Seal Re	Adjustment	Incidence F (%)	requency (years)			
Air Filter Cleaning	Changes/Year	r					
Incidence of Annual HVAC Controls Maintenanc	e Annual Mainte	enance Tasks	Incidence (%)	Inci	dence of Annua	Room Contro Annual Ma	sintenance Tasks Incidence
	Calibration of Calibration of Inspection of Inspection of	Transmitters Panel Gauges Auxiliary Devices Control Devices				Inspection Inspection Inspection Inspection (Dampers	VCalibration of Room Thermostat of PE Switches of Awilary Devices of Control Devices (Valves, VAV Boxes)

NEW BUILDINGS: Food Retail Baseline	SIZE: All	COMMERC	CIAL SECTOR BUILDI VINTAGE: New	NG PROFILE	REGION: Labrador I	nterconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 4 0.90 12.0 W/m ²	6.5 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 100% 20%	Light Level (Lux) % Distribution Weighted Average	400	500 600 100%		77110	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL 112 3%	2 18 HID 55% 10% 0.6 0.7 0.80 0.80 88 65	15HO LED 30% 2% 0.6 0.6 0.80 0.80 95 90	100.0%		
of Practice	Group Spot						EUI kV M	Vh/ft².yr J/m².yr	5.4 208
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 2 0.10 12.8 W/m²	6.5 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 100% 50%	Light Level (Lux) % Distribution Weighted Average	300	500 700 100%			Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0.6 0.65 0.75 50 72	2 18 HD 80% 5% 0.6 0.6 0.80 0.80 88 65	15HO LED 15% 0% 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot			FUI = Load X Hrs X	(SE X GLEE		EUI kV	Nh/ft².yr	0.8
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		Floor frac	tion check: should = 1.	00 1.00]	<u>o,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65	CFL T12 0.7 0.6 0.65 0.75 50 72	2 T8 0.6 0.6 0.80 0.80 84 88	MH HPS 0% 0.6 0.6 0.55 0.55 65 90	0.0%		
Relamping Strategy & Incidence of Practice	Group Spot	2110009 (2117)			0. 00		EUI kV	Nh/ft².yr	
TOTAL LIGHTING					Overall LP	12.07 W/m ²	EUI TOTAL KV M	Vh/ft².yr J/m².yr	6 238
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	55 0.65 0.8 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	51 0.65 0.7 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	100 0.01 0.00 W/m ² 90% 50% 2000 6760	200 0.01 0.0 W/m² 90% 50% 2000 6760	217 0.03 0.1 W/m ² 100% 100% 2600 6160	1.5 W/m² 0.14 W/ft² 90% 50% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.9 W/m² 1.7 W/m²	0.3 W/ft ² 0.2 W/ft ²	to see notes (cells with	red indicator in upper	right corner, type "SHI	FT @@mputer Servers	EUI kV M	Vh/ft².yr J/m².yr	0.11
Usage during occupied period Usage during unoccupied period	100% 58%					Plug Loads	EUI KV	J/m².yr J/m².yr Nh/ft².yr J/m².yr	29.56 0.84 32.51
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propan EUI kWh/ft².yr MJ/m².yr	e EUI 2.6 100.0	All E EUI kv M	lectric EUI Nh/ft².yr J/m².yr	3.1 120.0
REFRIGERATION Provide description below: Commercial refrigeration display case	S]				EUI kv M	Vh/ft².yr J/m².yr	25.8 1000.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	EUI KV M EUI KV M	Vh/ft².yr J/m².yr Vh/ft².yr IJ/m².yr	0.1 5 0.1 5

NEW BUILDINGS: Food Retail Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDING PROFIL VINTAGE: New	E REGION: Labrador Interconnected	
SPACE HEATING					
Heating Plant Type		System Present (%) Eff./COP	Fuel Oil / Propane Boilers Packaged Stan. High 80% 88% 95%	Electric A/A HP W. S. HP H/R Chiller Resistance Total 100% 100 3.20 3.00 4.50	96
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor Electric Fuel Share Boiler Maintenance	35.3 W/m ² 306 MJ/m ² .yr 1.00 100.0% Fuel C	Performance (1 / Eff.) (kW/kW) 11.2 Btu/hr.ft² 7.9 kWh/ft².yr Dil / Propane Fuel Share	1.25 1.14 1.05 Oil Fuel Share []	0.31 0.33 0.22 1.00	All Electric EUI KWhyft ² .yr 7.9 MJ/m ² .yr 306
	Fire Side Water Side Inspection Inspection Flue Gas	Inspection Je Inspection for Scale Buildup n of Controls & Safeties n of Burner Analysis & Burner Set-up	(%) 75% 100% 100% 90%		Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr Market Composite EUI kWh/ft².yr 7.9 MJ/m².yr 306
SPACE COOLING					
A/C Plant Type		Centrifuga Standard System Present (%) COP 4. Performance (1 / COP) (kW/kW) Additional Refrigerant Related Information	I Chillers Screw Reciprocatir HE Chillers Open 7 5.2 4.4 3.2 1 0.19 0.23 0.31	DX W. H. CW 100.0% 100.0% 100.0% 2.7 0.9 1 0.37 1.11 1.00	
Control Mode		Incidence of Use Fixed Setpoint Chilled Water Condenser Water	Reset		
Setpoint		Chilled Water 7 Condenser Water 30 Supply Air 13.	7 °C 44.6 °F 0 °C 86 °F 0 °C 55.4 °F		
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	63 W/m² 50.2 MJ/m².yr	20 Btu/hr.ft ² 604 1.3 kWh/ft ² .yr	4 ft²/Ton		
Sizing Factor	1.00	Operation	(occ. period 4000 hrs/year	Note value cannot be less than 2,900 hrs/year)	
A/C Saturation (Incidence of A/C)	90.0%		_		
Electric Fuel Share	100.0% Fuel C	Dil / Propane Fuel Share			
Chiller Maintenance	Annual Ma Inspect C Inspect C Megger M Condense Vibration Eddy Cur Spectroct	antenance 1 asks control, Safeties & Purge Unit coupling, Shaft Sealing and Bearings Atotors er Tube Cleaning Analysis rent Testing hemical Oil Analysis	Incidence Frequency (%) (years)		All Electric EUI kWh/ftº.yr 0.6
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma Inspection Inspect/S Megger M Inspect/Vi	aintenance Tasks n/Clean Spray Nozzles ervice Fan/Fan Motors Alotors erify Operation of Controls	Incidence Frequency (%) (years)		MJ/m².yr 22 Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr Market Composite EUI kWh/ft².yr 0.6 MJ/m².yr 22
DOMESTIC HOT WATER					
Service Hot Water Plant Type	Fossil Fue System P Eff./COP	el SHW Std. Tank PV Tank Present (%) 0.550 0.60	Cond. Tnk Std. Boiler Cnd. Boil. 0 0.00% 0.900 0.750 0.900	Fossil Fuel Share 0% Blended Efficiency 0.90	Elec. Res. 100% 0.91
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	45.5			E 101/15	
Wetting Use Percentage	90%		All Electric EUI kWh/ft².yr 1.3 MJ/m².yr 50	Fuel OII / Propane EUI kWh/ft².yr 1.3 MJ/m².yr 51	Market Composite EUI kWh/ft².yr 1.3 MJ/m².yr 50.0



	COMMER	CIAL SECTOR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:	VINTAGE:	R	EGION:					
Food Retail	All	New	Li	abrador	Interconne	cted			
Baseline									
HVAC FANS & PUMPS									
SUPPLY FANS		<u>\</u>	Ventilation a	nd Exhau	st Fan Ope	ration & Co	ontrol		
Ourters Desire Air Flour	1/2	Our text	Ventilatio	n Fan	Exhau	st Fan			
System Design Air Flow 8.0 System Static Pressure CAV 350	L/S.m ² 1.58 CFM/ft ²	Control	Fixed V	Flow	Fixed	Flow			
System Static Pressure VAV 350	D Pa 1.4 wg	Incidence of Use	100%	11011	100%	1101			
Fan Efficiency 60%		Operation 0	ContinuousS	cheduled	Continuous	Scheduled			
Fan Motor Efficiency 80%		Incidence of Line	1009/		1000/				
Fan Design Load CAV 5.8	3 W/m ² 0.54 W/ft ²		100%		100 %				
Fan Design Load VAV 5.8	W/m ² 0.54 W/ft ²	Comments:							
EXHAUST FANS									
Washroom Exhaust 100	L/s.washroom 212 CFM/wash	room							
Washroom Exhaust per gross unit area 0.2	L/s.m ² 0.04 CFM/ft ²								
Other Exhaust (Smoking/Conference) 0.1	L/s.m ² 0.02 CFM/ft ²								
Exhaust System Static Pressure 250	D Pa 1.0 wg								
Fan Efficiency 25%	· · · · · · · · · · · · · · · · · · ·								
Fan Motor Efficiency 75%									
Sizing Factor 1.0	1 W/m2 0.04 W/ft2								
	0.04								
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw	0.020 kW/kW	0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser) 1.25 W/m ²	0.12 W/ft ²							
Condenser Pump									
Pump Design Flow	0.053 L/s.KW	3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area	0.003 L/s.m ²	0.005 U.S. gpm/ft ²							
Pump Head Pressure	kPa	ft							
Pump Efficiency Pump Motor Efficiency	50%								
Sizing Factor	1.0								
Pump Connected Load	W/m ²	W/ft ²							
CIRCULATING PUMP (Heating & Cooling)									
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²	0.0040 U.S. gpm/ft ² 2.4 U	U.S. gpm/To	on					
Pump Head Pressure	50%	50 ft							
Pump Motor Efficiency	80%								
Sizing Factor	0.8								
Pump Connected Load	W/m²	W/ft ²							
Supply Fan Occ. Period	5000 hrs./year								
Supply Fan Unocc. Period	3760 hrs./year								
Supply Fan Energy Consumption	51.1 KW/n/m².yr								
Exhaust Fan Occ. Period	5000 hrs./year								
Exhaust Fan Unocc. Period	3760 hrs./year								
Exhaust Fan Energy Consumption	3.7 kWh/m².yr								
Condenser Pump Energy Consumption	kWh/m².vr								
Cooling Tower /Condenser Fans Energy Consum	nption 0.3 kWh/m².yr								
Circulation Duran Vente Organitan	7000 hrs has a								
Circulating Pump Yearly Operation	/000 hrs./year								
Consumption and Energy Consumption	KVII/III./JI								
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency							
	Inspect/Service Fore & Mater	(%) (years)							
	Inspect/Adjust Belt Tension on Fan Belts	<u> </u>							
	Inspect/Service Pump & Motors						EUI	kWh/ft².yr	5.1
	· · · ·	·						MJ/m².vr	198.3

			COMMERCIAL SECT	OR BUILDI	IG PROFILE				
NEW BUILDINGS:	:	SIZE:	VINTAGE	: 1			REGION:		
Food Retail		All	New			Labrador Interconnected	t		
Baseline									
EUI SUMMARY									
TOTAL ALL END-USES:	Electricity:		53.2 kWh/ft².yr 2,059.5 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane		
GENERAL LIGHTING	5.4	207.9		kWh/ft².yr	MJ/m².yr	kWh/ft ² .yr	MJ/m².yr		
SECONDARY LIGHTING	0.8	30.5	SPACE HEATING	7.9	306.4				
TERTIARY LIGHTING			SPACE COOLING	0.5	19.6				
OTHER PLUG LOADS	0.8	32.5	DOMESTIC HOT WATER	1.3	50.0	0.0	0.0		
HVAC FANS & PUMPS	5.1	198.3	FOOD SERVICE EQUIPMENT	3.1	120.0				
REFRIGERATION	25.8	1,000.0							
MISCELLANEOUS	0.1	5.0							
BLOCK HEATERS	0.1	5.0							
COMPUTER EQUIPMENT	0.8	29.6							
COMPUTER SERVERS	0.1	4.4							
ELEVATORS									
OUTDOOR LIGHTING	1.3	50.4							

		COMMERCIAL SECTOR BUILD	ING PROFILE
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Large Non-Food Retail	> 100 kW	New	Labrador Interconnected
Baseline			
CONSTRUCTION			
Woll Ll volue (W/m2 °C)	29 W/m2 °C	0.05 Btu/br ft2 °E	Turnical Ruilding Size
	0.20 W/IIF. C	0.00 Btu/http://	Typical Building Size 923 IIF 10,000 IIF
Roof U value (VV/m².°C)).19 W/m².°C	0.03 Btu/hr.ft² .°F	l ypical Footprint (m ²) 929 m ² 10,000 ft ²
Glazing U value (W/m ² .°C)	2.80 W/m².°C	0.49 Btu/hr.ft ² .°F	Footprint Aspect Ratio (L:W) 5
			Percent Conditioned Space 100%
Window/Wall Ratio (WIWAR) (%)) 10		Defined as Exterior Zone
Shading Coefficient (SC)).78		Typical # Stories 1
			Floor to Floor Height (m) 6.0 m 19.7 ft
VENTILATION SYSTEM BUILDING CONT		NITIONS	
VENTILATION SYSTEM, BUILDING CONT	ROLS & INDOUR COND	ITIONS	
Ventilation System Type		CAV CAVR DDM	DDMZVV VAV VAVR IU 100% O.A. TOTAL
Volkilation Oyotom Typo	System Pre	esent (%) 100%	
	Min. Air Flo	ow (%)	50%
	(Minimum T	Throttled Air Volume as Percent of Full Flow)	
Occupancy or People Density		∠5 m²/person 269 ft²/person	%UA 7.61%
Occupancy Schedule Upocc Period	9		
Fresh Air Requirements or Outside Air		15 L/s.person 32 CFM/perso	n
	L		
Fresh Air Control Type *(en	ter a 1, 2 or 3)	1 If Fresh Air Control Type = "2" enter % FA. t	o the right:
(1 = mixed air control, 2 = Fixed fresh air, 3 1	100% fresh air)	If Fresh Air Control Type = "3" enter Make-u	p Air Ventilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
	[50% operation (%)
Sizing Factor			
I otal AIr Circulation or Design Air Flow	7	1.55 CFM/tt ²	Separate Make-up air unit (100% QA)
Infiltration Rate		L/s.m ² CFM/ft ²	Operation occupied period 50%
(air infiltration is assumed to occur during un	occupied		Operation unoccupied period 50%
hours only if the ventilation system shuts dow	vn)		
Economizer		Enthalpy Based Dry-Bulb Based	Total
	Incidence of Use	100%	100% Summary of Design Parameters
	Switchover Point	KJ/kg. 18 °C	Peak Design Cooling Load 284,710
		Bturbin 04.4 F	Room air enthalov 28.2 Bti/lbm
Controls Type	System Present (%)	HVAC Room	Discharge air enthalpy 23.4 Btu/lbm
	-,	Equipment Controls	Specific volume of air at 55F & 100% R 13.2 ft³/lbm
	All Pneumatic		Design CFM 7,760
	DDC/Pneumatic		Total air circulation or Design air 7.88 //s.m ²
	All DDC	- 400%)	
	I otal (should add-up to	6 100%)	
		Proportional PI / PID Total	1
Control mode	Control Mode		
		Fixed Discharge Reset	
	Control Strategy		
		-	• • • •
Indoor Design Conditions	o	Room	Supply Air
	Summer Humidity ///	50%	14 C 37.2 F
	Enthalpy	65,5 KJ/ka. 28.2	Btu/lbm 54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ. Temperat	ure 21 °C 69.8	°F 15 °C 59 °F
	Winter Occ. Humidity	30%	45%
	Enthalpy	53 KJ/kg. 22.8	Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm
	Winter Unocc. Temper	rature 21 °C 69.8	<u>I</u> °F
	Forthology	ty 30%] Btu/lbm
	Епшару	50 KJ/kg. 21.5	Bidribili
Damper Maintenance		Incidence Frequency	
		(%) (years)	
	Control Arm Adjustme	nt	
	Lubrication		
	Blade Seal Replaceme	eni	
Air Filter Cleaning	Changes/Year		
-	-		
		Incidence of	f Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Mainten	ance		
	Annual Malinteres -	aska Incidence	Annual Maintenanas Teala
	Annual Maintenance T	asks Incidence	Annual Maintenance Lasks Incidence
	Calibration of Transmi	itters	Inspection/Calibration of Room Thermostat
	Calibration of Panel G	auges	Inspection of PE Switches
	Inspection of Auxiliary	Devices	Inspection of Auxiliary Devices
	Inspection of Control	Devices	Inspection of Control Devices (Valves,
			(Dampers, VAV Boxes)

NEW BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMMER	CIAL SECTOR BU VINTAGE: New	ILDING PROFIL	E	REGION Labrado	: r Interconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46. 0.95 184 W/m² 1	5 ft-candles								
Connected Load Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4500 4260 95%	Light Level (Lux) % Distribution Weighted Average		300 500 100%	700	1000		Total 10(5	0% 6 00	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	1 0	NC CFL 0% 5% 0.7 0.7 65 0.65 15 50	T12 0.6 0.75 72	T8 HII 55% 10% 0.6 0.7 0.80 0.80 88 65	D T5HO % 20% 7 0.6 0 0.80 0 5 95	LED TOT. 0% 100.0 0.6 0.80 90	AL 0%	
Relamping Strategy & Incidence of Practice	Group Spot							EUI	kWh/ft².yr	8.0
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load Occ. Period(Hrs./yr.)	500 Lux 46. 0.05 20.5 W/m ² 1. 4500	5 ft-candles 9 W/ft² Light Level (Lux)		300 500	700	1000		Total	wom y	510
Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4260 95% 50%	% Distribution Weighted Average		100%				100	0% 600	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0	NC CFL 8% 10% 0.7 0.7 65 0.65 15 50	T12 0.6 0.75 72	T8 HII 20% 60% 0.6 0.6 0.80 0.80 88 65	D T5HO % 0% \$ 0.6 0 0.80 0 5 95	LED TOTA 2% 100.0 0.6 0.80 90	AL 0%	
Relamping Strategy & Incidence of Practice	Group Spot			EUI = Load	X Hrs. X SF	X GLFF		EUI	kWh/ft².yr MJ/m².yr	0.6
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²		F	loor fraction	check: should =	1.00 1	1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		300 500	700	1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0	NC CFL 0.7 0.7 65 0.65 15 50	T12 0.6 0.75 72	T8 0.6 0.6 0.80 0.80 84 88	MH 1 6 0.6 0 0.55 (3 65	<u>1PS TOT</u> 0.6).55 90	<u>AL</u>	
Relamping Strategy & Incidence of Practice	Group Spot							EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING						Overall L	P 18.53 W/m ²	EUI TOT	AL kWh/ft².yr	9 333
OFFICE EQUIPMENT & PLUG LOA	DS									
Equipment Type	Computers	Monitors	Printers	Copie	ers	Servers	Plug Loads	—		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.22 0.5 W/m ² 0.0 W/ft ² 90% 50%	51 0.22 0.4 W/m ² 0.0 W/ft ² 90% 50%	100 0.01 0.00 W/m ² 0.00 W/ft ² 90%	200 0.01 0.1 0.01 0.01 90% 50%	V/m² V/ft²	217 0.02 0.1 W/m ² 0.01 W/ft ² 100%	1.15 W/m ² 0.11 W/ft ² 90%			
Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	2000 6760	2000 6760	2000 6760	2000 6760		2000 6760	4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m² 1.2 W/m²	0.2 W/ft ² 0.1 W/ft ²	to see notes (cells	with red indicator	r in upper rigt	ht corner, type "SI	HIFT @@mputer Ser	vers EUI	kWh/ft².yr MJ/m².yr	0.11
Usage during occupied period Usage during unoccupied period	100% 59%						Computer Equipi	pads EUI	MJ/m².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.49 19.14 0.64 24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5	Electricity Fuel Sha	re: 100.0%	EL	Fuel Oil / Propa JI kWh/ft².y MJ/m².yr	ne EUI r	EUI	All Electric EUI kWh/ft².yr MJ/m².yr	1.0 38.7
REFRIGERATION Provide description below:]					EUI	kWh/ft².yr MJ/m².yr	1.5 58.1
BLOCK HEATERS & MISCELLANE	ous						Block Hea	aters EUI eous EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.1 5 0.1 5

NEW BUILDINGS: Large Non-Food Retail Baseline	SIZE: > 100 kW	COMMERCIAL SEC VINTAGE New	TOR BUILDING PROI E:	FILE	REGION: Labrador Interconnected	ı
SPACE HEATING						
Heating Plant Type		F	uel Oil / Propane		Electric	
		B Stan.	oilers Packaged High Rooftop	A/A HP W. S.	HP H/R Chiller Resistance T	otal
	System Present (%) Eff./COP) 75%	6 80% 75%	3.20 3.	100% 50 4.50 1.00	100%
	Performance (1 / E (kW/kW)	ff.) 1.3	3 1.25 1.33	3 0.31 0	.29 0.22 1.00	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	42.5 W/m ² 350 MJ/m ² .yr	13.5 Btu/hr.ft² 9.0 kWh/ft².yr				
Electric Fuel Share	100.0% Fuel Oil / Propane Fuel Sha	are	Oil Fuel Share			All Electric EUI kWh/ft².yr 9.0
Boiler Maintenance	Annual Maintenance Tasks	Incidence	•			MJ/m².yr 350
	Fire Side Inspection	(%)	6			Fuel Oil / Propane EUI kWh/ft².yr
	Water Side Inspection for Scal	le Buildup 100% ies 100%	<u>,</u>			MJ/m².yr
	Inspection of Burner	100%	6 6			Market Composite EUI
		et-up 307				MJ/m².yr 350
SPACE COOLING						
A/C Plant Type						
		Centrifugal Chillers Standard HE	Screw Recproct Chillers Open	DX W. H.	tion Chillers Total	
	System Present (%) COP) 4.8 5.4	4 4.4 3.7	100.0% 7 2.7	0.9 1	
	Performance (1 / C (kW/kW)	OP) 0.21 0.19	9 0.23 0.27	7 0.37 1	.11 1.00	
	Additional Refrigera	ant				
Control Mode	Incidence of Use	Fixed Reset	7			
	Chilled Water	Setpoint	_			
	Condenser Water					
Setpoint	Chilled Water Condenser Water	7 °C 30 °C	44.6 °F 86 °F			
	Supply Air	14.0 °C	57.2 °F			
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	90 W/m² 28 Btu/ 84.4 MJ/m².yr 2.2 kWh	hr.ft² <u>421</u> ft²/Ton √ft².yr				
Sizing Factor	1.00					
A/C Saturation	90.0%					
(Incidence of A/C)						
Electric Fuel Share	100.0% Fuel Oil / Propane Fuel Sha	are				
Chiller Maintenance	Annual Maintenance Tasks		Frequency			
	Inspect Control, Safeties & Put	rge Unit	(years)			
	Megger Motors	g and Bearings				
	Condenser Tube Cleaning Vibration Analysis					
	Eddy Current Testing Spectrochemical Oil Analysis					All Electric EUI
	_ · , , , , , , , , , _ , , _ , _ , , _ , , _ , , _ , , _ , , _ , , _ , , _ , , _ , , _ , , _ ,					kWh/ft².yr 0.7 M.I/m².yr 28
Cooling Tower/Air Cooled Condense	er Maintenan Annual Maintenance Tasks		Frequency			Evel Oil / Propage EUI
	Inspection/Clean Spray Nozzle	es (78)	(years)			kWh/ft².yr
	Megger Motors	rs				MJ/m².yr
	Inspect/Verity Operation of Co	ntrols				Market Composite EUI kWh/ft².yr 0.7 M.I/m² vr 28
DOMESTIC HOT WATER						
Service Hot Water Plant Type	Fossil Fuel SHW Sta	Tank PV Tank Cond To	k Std Boiler Cod Boil	т г <u> </u>	Fossil	Flec Res
	System Present (%)			Fuel St	hare 0%	100%
Service Hot Water load (MJ/m ² .yr)	17.3	0.900 0.000 0.900	0.750 0.900	Biende	a Enrolency 0.90	0.91
(Tertiary Load)			All Electric EUI	Fu	el Oil / Propane EUI	Market Composite EUI
Wetting Use Percentage	90%		kWh/ft².yr 0.5 MJ/m².yr 19		kWh/ft².yr 0.5 MJ/m².yr 19	kWh/ft².yr 0.5 MJ/m².yr 19.0

	COMME	RCIAL SECTOR BUILDING PROFILE									
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:								
Large Non-Food Retail	> 100 kW	New	Labrador Interconnected								
Baseline											
HVAC FANS & PUMPS											
			antilation and Eulopust For Oneration & Control								
SUPPLIFANS		VI	Ventiletion Explause Fan Operation & Control								
System Design Air Flow 7	9 1 /c m ² 1 55 C EM/ft ²	Control	ventulation Fain Exhaust Fain								
System Static Pressure CAV 50	0 Pa 2.0 wg	Control	Flow Flow								
System Static Pressure VAV 50	2.0 wg	Incidence of Lise	100% 100%								
System Static Flessure VAV 50	0/ Fa 2.0 wg	Operation C	ntipuour Scheduled Continuour Scheduled								
Fail Efficiency 00	70 0/	Operation	unitindo di Scheduled Continuo di Scheduled								
Sizing Easter 1.0	<u>///</u>	Insidence of Lice	759/ 259/ 509/ 509/								
Sizing Factor 1.0	E W/m2 0.60 W/#2	Incidence of Ose	75% 25% 50%								
Fan Design Load VAV 7	5 W/m2 0.69 W/ft2	Comments:									
	0.09 W/II	Commenta.									
EXHAUST FANS											
Washroom Exhaust 5	0 L/s washroom 106 CEM/wa	ashroom									
Washroom Exhaust per gross unit area	1 1/s m ² 0.02 CFM/ft ²										
Other Exhaust (Smoking/Conference) 0	1 L/s m ² 0.02 CFM/ft ²										
Total Building Exhaust 0	2 1/s m ² 0.04 CFM/ft ²										
Exhaust System Static Pressure 24	50 Pa 1.0 wg										
Fan Efficiency 25	%										
Ean Motor Efficiency 75	<u>%</u>										
Sizing Factor 1	0										
Expanse Ean Connected Load	3 W/m2 0.03 W/ft2										
	.3 W/IF 0.03 W/IF										
AUXILIARY COOLING FOUIPMENT (Conden	ser Pump and Cooling Tower/Condenser Fan	s)									
		5,									
Average Condenser Fan Power Draw	0.020 kW/kW	0.07 kW/Top									
(Cooling Tower/Evan, Condenser/ Air Cooled (Condenser) 1.80 W/m2	0.17 W//ft2									
(Cooling Tower/Evap. Condensel/ All Cooled C		0.17									
Condensor Rump											
Condenser Fullip											
Rump Design Flow		U.S. apm/Top									
Pump Design Flow per unit floor area	L/S.KW	U.S. gpm/101									
Pump Lead Pressure	L/S.III-	0.5. gpm/n²									
Pump Head Pressure	45 KPa	15 π									
Pump Efficiency	50%										
Pump Motor Enciency	80%										
Sizing Factor	1.0	10//62									
Pump Connected Load	W/m²	VV/ft²									
CIRCULATING FOMP (Heating & Cooling)											
Dump Design Flow @ 5 °C (10 °F) date T	0.004 1/2 m2	0.0057 11 6 mm/#2 0.411	C ann/Tan								
Pump Design Flow @ 5 °C (10 °F) delta 1	0.004 L/S.III-	0.0057 U.S. gpm/n² 2.4 U.	.S. gpm/ron								
Pump Felicionau	KPa	π									
Pump Efficiency	50%										
Pump Motor Efficiency	80%										
Sizing Factor	0.8	14//642									
Pump Connected Load	VV/m²	VV/ft²									
Overally Face Over Basis d	5500 has fores										
Supply Fan Occ. Period	5500 hrs./year										
Supply Fan Unocc. Period	32bU nrs./year										
Supply Fan Energy Consumption	59.3 KWN/m².yr										
Futuret Fon One Devi- 1	EFOO has been										
Exhaust Fan Ucc. Period	5500 hrs./year										
Exhaust Fan Unocc. Period	32bU nrs./year										
Exhaust Fan Energy Consumption	2.0 KWN/m².yr										
Condensor Dump Energy Construction	1380. / 2										
Condenser Pump Energy Consumption	kwh/m².yr										
Cooling Tower /Condenser Fans Energy Const	Imption 0.4 kWh/m².yr										
Circulating Dump Vents Counting	7000 has been										
Circulating Pump Yearly Operation	/000 hrs./year										
Circulating Pump Energy Consumption	kWh/m².yr										
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency									
		(%) (years)									
	Inspect/Service Fans & Motors	+ + + + + + + + + + + + + + + + + + + +									
	Inspect/Adjust Belt Tension on Fan Belts										
	Inspect/Service Pump & Motors		EUI kWh/ft².yr 5.7								
			M.I/m ² vr 221.8								
COMMERCIAL SECTOR BUILDING PROFILE											
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NEW BUILDINGS:		SIZE:	VINTAGE:				REGION:				
Baseline		> 100 KW	New				Labrador Intercon	nected			
EUI SUMMARY											
TOTAL ALL END-USES:	Electricity:		29.4 kWh/ft².yr 1,139.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².y	r			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Fuel Oil /	Propane				
GENERAL LIGHTING	8.0	309.7		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr				
ARCHITECTURAL LIGHTING	0.6	23.6	SPACE HEATING	9.0	350.5						
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	25.2						
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0				
HVAC FANS & PUMPS	5.7	221.8	FOOD SERVICE EQUIPMENT	1.0	38.7						
REFRIGERATION	1.5	58.1									
MISCELLANEOUS	0.1	5.0									
BLOCK HEATERS	0.1	5.0									
COMPUTER EQUIPMENT	0.5	19.1									
COMPUTER SERVERS	0.1	4.4									
ELEVATORS/ESCALATORS											
OUTDOOR LIGHTING	0.9	33.9									
Fuel Specific EUIs for Heating Cod	oling & DHW										

			COMMERCIAL SECT	OR BUILDING PRO	DFILE
NEW BUILDINGS: Small Non-Food Retail	SIZE:		VINTAGE		REGION: Labrador Interconnected
Baseline			New		
CONSTRUCTION					
Wall U value (W/m².°C)	0.28 W/m ² .°C	0.05	Btu/hr.ft ² .°F	I ypical B	Building Size 929 m ² 10,000 ft ²
Roof U value (W/m².*C)	0.19 W/m².°C	0.03	Btu/nr.ft².*F	i ypical F	Footprint (m²) 929 m² 10,000 ft²
Glazing O value (w/m². C)	2.60 00/114.10	0.49		Percent C	Conditioned Space 100%
				Percent C	Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%)	0.10			Defined a	as Exterior Zone
Shading Coefficient (SC)	0.78			Floor to F	Floor Height (m) 6.0 m 19.7 ft
VENTILATION SYSTEM DUILDING CON					
VENTILATION STSTEM, BUILDING CON	ITROLS & INDO	OR CONDITIONS			
Ventilation System Type			CAV CAVR	DDMZ DDMZVV	V VAV VAVR IU 100% O.A TOTAL
		System Present (%)	100%		100%
	<u>[</u>	Minimum Throttled Air Vo	olume as Percent of Fu	II Flow)	50%
	-				
Occupancy or People Density	-	25 m²/persor	n 269	ft²/person	%OA 11.07%
Occupancy Schedule Unocc. Period	-	90 %			
Fresh Air Requirements or Outside Air		15 L/s.perso	n 32	CFM/person	
Fresh Air Control Type	ntera 1.2 or 3\	1 If Freeb A	ir Control Type - "2" o	nter % FA to the right	34%
(1 = mixed air control, 2 = Fixed fresh air, 3	100% fresh air)	If Fresh A	ir Control Type = 2 e	nter Make-up Air Ventil	tilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
					50% operation (%)
Sizing Factor	-	1.4 5.42 L/a m ²	1.07	0514/62	
Total Air Circulation of Design Air Flow	L	5.42 L/S.III-	1.07	CFIM/II-	Separate Make-up air unit (100% OA)
Infiltration Rate		0.42 L/s.m ²	0.08	CFM/ft ²	Operation occupied period 50%
(air infiltration is assumed to occur during un	noccupied				Operation unoccupied period 50%
hours only if the ventilation system shuts do	own)				
Economizer		Enthalp	by Based Dry-Bu	b Based Tota	
	Incidence o	f Use	100%	100%	% Summary of Design Parameters
	Switchover	Point	KJ/kg. 18 Btu/lbm 64.4	°F	Peak Design Cooling Load 281,834 Peak Zone Sensible Load 163,938
					Room air enthalpy 28.2 Btu/lbm
Controls Type	System Pre	sent (%)	HVAC Room		Discharge air enthalpy 23.4 Btu/lbm
	All Pneuma	tic	Equipment Controls		Specific volume of air at 55F & 100% R 13.2 ft%IDm Design CFM 7.626
	DDC/Pneur	natic			Total air circulation or Design air 5.42 /s.m ²
	All DDC	d add up to 100%)			
	Total (shou				
		Propo	ortional PI / PID	Total	
Control mode	Control Mo	de Eined D	Visebarga Deset		
	Control Stra	ategy	ischarge Reset		
		07			
Indoor Design Conditions	Summor To	mooraturo	Room	60.9 °E	Supply Air
	Summer Hu	midity (%)	50%	09.0 F	14 C 37.2 F
	Enthalpy		65.5 KJ/kg.	28.2 Btu/lbm	54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ.	Temperature	21 °C	69.8 °F	15 °C 59 °F
	Enthalpy	. Humility	53 KJ/kg.	22.8 Btu/lbm	45.5 KJ/kg. 19.6 Btu/bm
	Winter Uno	cc. Temperature	21 °C	69.8 °F	
	Winter Uno	cc. Humidity	30%	21.5 Ptu/lbm	
	Entralpy		50 KJ/kg.	21.3 Blu/IDIT	
			I !		
Damper Maintenance			Incidence Frequency		
	Control Arm	Adjustment	(/o) (years)		
	Lubrication				
	Blade Seal	Replacement			
Air Filter Cleaning	Changes/Ye	ear			
				Incidence of Annual	Room Controls Maintenance
Incidence of Annual HVAC Controls Mainte	nance			Incidence of Annual 1	
			<u> </u>		
	Annual Mair	ntenance Tasks	Incidence		Annual Maintenance Tasks Incidence
	Calibration	of Transmitters	(70)		Inspection/Calibration of Room Thermostat
	Calibration	of Panel Gauges			Inspection of PE Switches
	Inspection of	of Auxiliary Devices	╂────┤		Inspection of Auxiliary Devices
	inspection of	Di Controi Devices	<u> </u>		(Dampers, VAV Boxes)

NEW BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	COMMERCIAL SECTOR BUILDING PR VINTAGE: New	OFILE REGION: Labrador Interconnecte	d
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 46 0.95 17.6 W/m ² 1	.5 ft-candles .6 W/ft ²		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 95% 15%	Light Level (Lux) 300 5 % Distribution 100 Weighted Average		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) 8% 8 CU 0.7 0 LLF 0.65 0.1 Efficacy (L/W) 15 5	112 100 5% 55% 30% 0% 1.7 0.6 0.6 0.7 0.6 65 0.75 0.80 0.80 0.80 50 72 88 65 95	2% 100.0% 0.6 0.80 90
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr 7.0 M./m² yr 272
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	500 Lux 46 0.05 17.1 W/m ² 1	.5 ft-candles .6 W/ft ²		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 95% 50%	Light Level (Lux) 300 5 % Distribution 10 Weighted Average INC C	100 700 1000 5% 1000	10tal 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	INC CC System Present (%) 5% 11 CU 0.7 C LLF 0.65 0.0 Efficacy (L/W) 15 5	FL 112 13 HD 13HO 5% 20% 20% 40% 17 0.6 0.6 0.6 0.6 65 0.75 0.80 0.80 0.80 50 72 88 65 95	0% 100.0% 0.6 0.80 90
Relamping Strategy & Incidence of Practice	Group Spot	EUI =	Load X Hrs. X SF X GLFF	EUI kWh/ft².yr 0.5 MJ/m².yr 19
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft²	Floor fraction check: should = 1.00	1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) 300 5 % Distribution Weighted Average		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU CU 0.7 CU LLF 0.65 0.0 Efficacy (LW) 15 0	III IO IIII 0.7 0.6 0.6 0.6 0.6 65 0.75 0.80 0.80 0.55 50 72 84 88 65	0.6 0.55 90
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LP 17.58 W	/m² EUI TOTAL kWh/ft².yr 8 MJ/m².yr 291
OFFICE EQUIPMENT & PLUG LOA	DS			
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	55 0.22 0.5 W/m ²	Monitors Printers O 51 100 2 0.22 0.01 0 0.4W/m² 0.00W/m² 0	Servers Plug Los 200 217 .01 0.02 0.1 0.02 0.1 0.12	/m²
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.0 W/IE 90% 50% 2000 6760	0.0 W/I* 0.00 W/I* 0 90% 90% 90% 91 50% 50% 55 50 2000 2000 20 20 6760 6760 67 67	OT WITE O.01 WITE O.11 WITE 0% 100% 90% 0% 100% 50% 000 2000 4100 760 6760 4660	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.1 W/m ² 1.2 W/m ²	0.2 W/ft ² to see notes (cells with red indi 0.1 W/ft ²	cator in upper right corner, type "SHIFT @@mputer	Servers EUI kWh/ft².yr 0.11 MJ/m².yr 4.42
Usage during occupied period Usage during unoccupied period	100% 59%		Plu	Jupinen Eor Willeyr 0.45 MJ/m².yr 19.14 g Loads EUI kWh/tf².yr 0.64 MJ/m².yr 24.92
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	5 Electricity Fuel Share: 100.0	Fuel Oil / Propane EUI EUI kWh/tl².yr MJ/m².yr	All Electric EUI EUI kWh/ft².yr MJ/m².yr
REFRIGERATION Provide description below:				EUI kWh/ft².yr MJ/m².yr
BLOCK HEATERS & MISCELLANE	ous		Block Miscel	Heaters EUI kWh/ft².yr 0.1 MJ/m².yr 5 Ianeous EUI kWh/ft².yr 0.1 MJ/m².yr 0.1

NEW BUILDINGS: Small Non-Food Retail Baseline	SIZE: < 100 kW	СОММ	ERCIAL SEC VINTAGE New	tor Building	PROFILE	REGI Labra	ON: ador Interconnect	ed		
SPACE HEATING										
Heating Plant Type			Fu	el Oil / Propane		Electric				
			Bo Stan	bilers Pac High Ro	kaged A/A HF	P W. S. HP H/R C	Chiller Resistance	Total		
		System Present (%)	750/	0.00/	750/ 2.2	2.50	100%	100%		
		Performance (1 / Eff.) (kW/kW)	1.33	80% 1.25	1.33 0.3	31 0.29	0.22 1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	49.8 408 W/m² MJ/m².yr	15.8 Btu/hr.1 10.5 kWh/ft	t² .yr							
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share		Oil Fuel Share					kWh/ft².yr	10.5
Boiler Maintenance	Annual Ma	intenance Tasks	Incidence	1					MJ/m².yr	408
	Fire Side I	nspection	(%)					Fu	el Oil / Propane E kWh/ft².yr	UI
	Water Side	e Inspection for Scale Buildup	100%						MJ/m².yr	
	Inspection	of Burner	100%	5				Ma	arket Composite E	UI
	Flue Gas A	Analysis & Burner Set-up	90%						kWh/ft².yr MJ/m².yr	10.5 408
SPACE COOLING										
A/C Tianic Type		Centrif	ugal Chillers	Screw Red	cprocting Chille	rs Absorption Chille	ers Total			
		Standa System Present (%)	rd HE	Chillers O	0pen DX 100.0	W. H. C	N 100.0%			
		COP Performance (1 / COP)	4.8 5.4	4.4	3.7 2	2.7 0.9	1			
		(kW/kW)	.21 0.13	0.23	0.27 0.3	57 1.11	1.00			
		Additional Refrigerant Related Information								
Control Mode		Incidence of Use Fixed	Reset	1						
		Chilled Water	nt							
		Condenser Water								
Setpoint		Chilled Water	7 °C	44.6 °F						
		Supply Air 1	4.0 °C	57.2 °F						
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	89 W/m ² 81.4 MJ/m ² .yr	28 Btu/hr.ft ² 4 2.1 kWh/ft ² .yr	26 ft²/Ton							
Sizing Factor	1.00									
A/C Saturation	90.0%									
(Incidence of A/C)										
Electric Fuel Share	100.0% Fuel O	il / Propane Fuel Share								
Chiller Maintenance	Annual Ma	intenance Tasks	Incidence	Frequency						
	Inspect Co	ntrol. Safeties & Purce Unit	(%)	(years)						
	Inspect Co	upling, Shaft Sealing and Bearings	6							
	Condense	otors r Tube Cleaning								
	Vibration A	Analysis								
	Spectroch	emical Oil Analysis							All Electric EUI	
									kWh/ft².yr MJ/m².yr	0.7 27
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	intenance Tasks	Incidence	Frequency					el Oil / Propone F	
	Inspection	Clean Spray Nozzles	(70)	(years)				FL	kWh/ft².yr	
	Inspect/Se Megger M	rvice Fan/Fan Motors otors		<u> </u>					MJ/m².yr	
	Inspect/Ve	rify Operation of Controls						Ma	arket Composite E	UI
									MJ/m².yr	27
DOMESTIC HOT WATER										
Service Hot Water Plant Type	Fossil Fuo	SHW Std Tank DV Ta	ink Cond Tol	Std Boiler Con	l Boil		Foeeil	Elac D	20	
Convice Flor water Flant Type	System Pr	esent (%)			0.00%	Fuel Share	0%	10	0%	
Service Hot Water load (M.I/m².vr)	Eff./COP	0.550 0.0	600 0.900	0.750	0.900	Blended Efficien	cy 0.90	0.	91	
(Tertiary Load)						Evel Oil (D			rkot Companit- 5	
Wetting Use Percentage	90%		,	kWh/ft².yr MJ/m².yr	0.5 19	kWh/ MJ/m	t².yr 0.5 ².yr 19	Ma	kWh/ft².yr MJ/m².yr	0.5 19.0



			COMMER	CIAL SECT	OR BUILDING PROFILE							
NEW BUILDINGS:	SIZE:			VINTAGE	:		REGION:					
Small Non-Food Retail	< 100 kW			New			Labrador	Interconne	cted			
Baseline												
HVAC FANS & PUMPS												
SUPPLY FANS				r		Ventilation	and Exhau	st Fan Ope	ration & Co	ontrol		
Quality Design Air Flaur	5 4 1 /22	4.07	0514/02	O a set set l		Ventila	tion Fan	Exhau	st Fan			
System Design Air Flow	5.4 L/s.m ²	1.07	CFM/ft ²	Control		Fixed	Variable	Fixed	Variable			
System Static Pressure VAV	500 Pa	2.0	wa	Incidence	of Lise	100%	FIUW	100%	FIOW			
Fan Efficiency	60%	2.0		Operation		Continuou	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency	88%											
Sizing Factor	1.00			Incidence	of Use	75%	25%	50%	50%			
Fan Design Load CAV	5.1 W/m ²	0.48	W/ft ²		Commenter							
Fan Design Load VAV	5.1 W/III+	0.46	VV/IL-		Comments:							
EXHAUST FANS												
Washroom Exhaust	50 L/s.washr	oom	106 CFM/was	hroom								
Washroom Exhaust per gross unit area	0.1 L/s.m ²		0.02 CFM/ft ²									
Other Exhaust (Smoking/Conference)	0.1 L/s.m ²		0.02 CFM/ft ²									
Exhaust System Static Pressure	250 Pa		1.0 wg									
Fan Efficiency	25%											
Fan Motor Efficiency	75%											
Sizing Factor	1.0											
Exhaust Fan Connected Load	0.3 W/m ²	0.03	W/ft ²									
AUXILIARY COOLING EQUIPMENT (Cor	ndenser Pump a	nd Cooling Tow	er/Condenser Fans)								
				, ,								
Average Condenser Fan Power Draw			0.020 kW/kW		0.07 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Coo	led Condenser)		1.78 W/m ²		0.17 W/ft ²							
Condenser Pump												
Pump Design Flow			l /s KW		U.S. gpm/Top							
Pump Design Flow per unit floor area			L/s.m ²		U.S. gpm/ft ²							
Pump Head Pressure			45 kPa		15 ft							
Pump Efficiency			50%		<u>_</u>							
Pump Motor Efficiency			80%									
Sizing Factor			1.0									
Pump Connected Load			W/m ²		W/tt ²							
CIRCULATING PUMP (Heating & Cooling	g)											
Pump Design Flow @ 5 °C (10 °F) delta T	Г	0.004	L/s.m ²	0.0056	U.S. gpm/ft ²	2.4 U.S. gpm/	Ton					
Pump Head Pressure		500/	kPa		ft							
Pump Efficiency		50%										
Sizing Eactor		0.8										
Pump Connected Load		0.0	W/m ²		W/ft ²							
				L								
		r										
Supply Fan Occ. Period		5500	hrs./year									
Supply Fan Unocc. Period		3260	nrs./year									
Supply Fail Energy Consumption		40.0	KVVIVIIIyi									
Exhaust Fan Occ. Period		5500	hrs./vear									
Exhaust Fan Unocc. Period		3260	hrs./year									
Exhaust Fan Energy Consumption		2.0	kWh/m².yr									
		r										
Condenser Pump Energy Consumption			kWh/m².yr									
Cooling Tower/Condenser Fans Energy Co	onsumption	0.3	KVVN/m².yr									
Circulating Pump Yearly Operation		7000	hrs./vear									
Circulating Pump Energy Consumption			kWh/m².yr									
		•	-									
Fans and Pumps Maintenance	Annual M	aintenance Task	s	Incidence	Frequency							
	L	and an Example 1		(%)	(years)							
	Inspect/Se	ervice Fans & Mo	DIOIS									
	Inspect/Ac	ajust beit Tensio ervice Pump & M	lotors						1	EUI 🖌	Wh/ft² vr	4.0
				1						_0. r	/J/m².yr	155.2

COMMERCIAL SECTOR BUILDING PROFILE											
NEW BUILDINGS: Small Non-Food Retail Baseline		SIZE: < 100 kW	VINTAGE: New	:			REGION: Labrador Interconnected				
EUI SUMMARY											
TOTAL ALL END-USES:	Electricity:		25.6 kWh/ft².yr 989.8 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 M.	J/m².yr			
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electric	ity	Fuel Oil /	Propane				
GENERAL LIGHTING	7.0	271.7		kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m ² .yr				
ARCHITECTURAL LIGHTING	0.5	19.1	SPACE HEATING	10.5	408.2						
SPECIAL PURPOSE LIGHTING			SPACE COOLING	0.6	24.2						
OTHER PLUG LOADS	0.6	24.9	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0				
HVAC FANS & PUMPS	4.0	155.2	FOOD SERVICE EQUIPMENT								
REFRIGERATION											
MISCELLANEOUS	0.1	5.0									
BLOCK HEATERS	0.1	5.0									
COMPUTER EQUIPMENT	0.5	19.1									
COMPUTER SERVERS	0.1	4.4									
ELEVATORS/ESCALATORS											
OUTDOOR LIGHTING	0.9	33.9									
Fuel Specific EUIs for Heating Coo	ling & DHW										

		COMMERCIAL SECTOR BUILD	ING PROFILE
NEW BUILDINGS: Large Accommodation	SIZE: > 100 kW	VINTAGE: New	REGION: Labrador Interconnected
Baseline			
CONSTRUCTION			
Wall Livalue (W/m2 °C) 0.28	8 W//m2 °C	0.05 Btu/br ft2 °E	Tunical Building Size 1 304 m2 15 000 ft2
Roof II value (W/m ² °C) 0.10	9 W/m² °C	0.03 Btu/hr.ft ² °F	Typical Equiling 512e 1,054 m 13,000 m Typical Ecotorint (m ²) 1 500 m ² 16 140 ft ²
Glazing II value (W/m ² °C) 2.80	9 W/m2 °C	0.49 Btu/hr ft2 °F	Footprint Aspect Ratio (L-W)
		0.40 Blumint . I	Percent Conditioned Space 100%
	_		Percent Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.30 Shading Coefficient (SC) 0.66	5		Defined as Exterior Zone
			Floor to Floor Height (m) 3.7 m 12.0 ft
VENTILATION SYSTEM. BUILDING CONTRO	OLS & INDOOR CONDITION	S	
· _ · · · _ · · · · · · · · · · · · · ·			
Ventilation System Type	Quarters Descent (CAV CAVR DDM2	DDMZVV VAV FCoils IU 100% O.A TOTAL
	Min. Air Flow (%)	%) 90%	60%
	(Minimum Throttle	ed Air Volume as Percent of Full Flow)	
	50	520 42/2020	0/04
Occupancy or People Density Occupancy Schedule Occ. Period	50 n 50%	Tryperson 538 Tt/person	70UA 0.22%
Occupancy Schedule Unocc. Period	80%		
Fresh Air Requirements or Outside Air	15 L	/s.person 32 CFM/perso	n
Fresh Air Control Type *(enter	a 1, 2 or 3) 1 If	Fresh Air Control Type = "2" enter % FA. t	o the right: 15%
(1 = mixed air control, 2 = Fixed fresh air, 3 100	1% fresh air) If	Fresh Air Control Type = "3" enter Make-u	D Air Ventilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
Sizing Factor			50% operation (%)
Sizing Factor Total Air Circulation or Design Air Flow	5.75 1	/s m ² 1 13 CFM/ft ²	
	0.10		Separate Make-up air unit (100% OA) L/s.m ² CFM/ft ²
Infiltration Rate	0.70 L	/s.m ² 0.14 CFM/ft ²	Operation occupied period 50%
(air infiltration is assumed to occur during unoccur bours only if the ventilation system shuts down)	cupied		Operation unoccupied period 50%
Economizer		Enthalpy Based Dry-Bulb Based	Total
	Incidence of Use Switchover Point	100%	100% Summary of Design Parameters
	Switchover Folini	Btu/lbm 64.4 °F	Peak Zone Sensible Load 260,711
			Room air enthalpy 28.2 Btu/lbm
Controls Type	System Present (%)	HVAC Room	Discharge air enthalpy 23.4 Btu/lbm
	All Pneumatic	Equipment Controls	Design CFM 12,128
	DDC/Pneumatic		Total air circulation or Design air 5.75 l/s.m ²
	All DDC Total (should add-up to 100°	()	
	Total (should add-up to 100)	0)	
		Proportional PI / PID Total	
Control mode	Control Mode	Fixed Discharge Reset	
	Control Strategy	The Discharge Reset	
Indoor Design Conditions	Summer Temperature	Room	Supply Air
	Summer Humidity (%)	50%	100%
	Enthalpy	65.5 KJ/kg. 28.2	Btu/lbm 54.5 KJ/kg. 23.4 Btu/lbm
	Winter Occ. Temperature	21 °C 69.8	°F 15 °C 59 °F
	Enthalpy	53 KJ/kg. 22.8	Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm
	Winter Unocc. Temperature	21 °C 69.8	°F
	Winter Unocc. Humidity	30%	D4.//here
	Епіпаіру	50 KJ/Kg. 21.5	Buibiii
Damper Maintenance			
	Control Arm Adjustment	(70) (years)	
	Lubrication		
	Blade Seal Replacement		
Air Filter Cleaning	Changes/Year		
		Incidence o	f Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenand	ce	incidence d	
	Annual Maintenance Tasks	Incidence	Annual Maintenance Tasks Incidence
	Calibration of Transmitters	(70)	(%)
	Calibration of Panel Gauges		Inspection of PE Switches
	Inspection of Auxiliary Devic	es	Inspection of Auxiliary Devices
	Inspection of Control Device	S	Inspection of Control Devices (Valves, (Dampers, VAV Boxes)

NEW BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	COMMERCIAL SECTOR BUILDING PR VINTAGE: New	OFILE REGION: Labrador Interconnected	
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 125 Lux 125 T.3 W/m ²	1.6] ft-candles		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) 50 7 % Distribution 7 Weighted Average	100 200 300 5% 25%	Total 100% 125
Fixture Cleaning: Incidence of Practice Interval	years	Inc. C System Present (%) 20% 20% CU 0.7 0 LLF 0.65 0. Efficacy (LW) 15	112 16 110 1570 160 0% 10% 0% 20% 17 0.6 0.6 0.6 0.6 65 0.75 0.80 0.80 0.80 50 72 88 65 95 90	5 100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr 1.4
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 2 0.25 11.4 W/m ²	77.9] ft-candles 		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 75%	Light Level (Lux) 300 8 % Distribution 100% Weighted Average		Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	INC C System Present (%) 8% 11 CU 0.7 0 LLF 0.65 0. Efficacy (LW) 15 0	FL 112 16 Hb 15H0 LEt 5% 75% 0% 2% 7 0.6 0.6 0.6 0.6 65 0.75 0.80 0.80 0.80 0.80 50 72 88 65 95 90	\$ 100.0%
Relamping Strategy & Incidence of Practice	Group Spot	EUI =	Load X Hrs. X SF X GLFF	EUI kWh/ft².yr 1.8 MJ/m².yr 71
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft ²	Floor fraction check: should = 1.00 1.00]
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		
Fixture Cleaning: Incidence of Practice Interval	years	INC CC System Present (%) 0.7 CU 0.7 0. LLF 0.65 0. Efficacy (L/W) 15 15	Incl Incl <th< td=""><td>5 TOTAL 6 100.0%</td></th<>	5 TOTAL 6 100.0%
Relamping Strategy & Incidence of Practice	Group Spot			EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING			Overall LP 8.35 W/m ²	EUI TOTAL kWh/ft².yr 3 MJ/m².yr 126
OFFICE EQUIPMENT & PLUG LOA	ADS			_
Equipment Type Measured Power (W/device) Density (device/occupant) Connected Load	55 0.3 0.3 W/m ²	Monitors Printers 0 51 100 2 0.3 0.05 0.0 0.3W/m² 0.1W/m² 0.1	Copiers Servers Plug Loads 200 217	-
Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	0.0 W/tt² 90% 50% 2000 6760	0.0 W/ft² 0.01 W/ft² 0 90% 90% 90% 9 50% 50% 5 5 2000 2000 20 20 6760 6760 67	.01 W/ft² 0.01 W/ft² 0.14 W/ft² 0% 100% 70% 70% 70% 70% 25% 25% 25% 25% 25% 25% 25% 260 3000 760 6260 5760	
Total end-use load (occupied period) Total end-use load (unocc. period)	1.9 W/m² 0.9 W/m²	0.2 W/ft ² to see notes (cells with red indi 0.1 W/ft ²	icator in upper right corner, type "SHIFT @amputer Server	s EUI kWh/ft².yr 0.10 MJ/m².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 48%		Plug Load	MJ/m².yr 16.11 SEUI kWh/t².yr 0.49 MJ/m².yr 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricity Fuel Share: 100.	Fuel Oil / Propane EUI EUI kWh/f2.yr 1.3 MJ/m2.yr 50.0	All Electric EUI EUI kWh/ft².yr 1.3 MJ/m².yr 50.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	olers/freezers, refrigerated buffet o	sases		EUI kWh/ft².yr 0.5 MJ/m².yr 20.0
BLOCK HEATERS & MISCELLANE	ous		Block Heaten Miscellaneou	s EUI kWh/ft².yr 0.1 MJ/m².yr 5 s EUI kWh/ft².yr 0.1 MJ/m².yr 5

NEW BUILDINGS: Large Accommodation Baseline	SIZE: > 100 kW	СОМ	IERCIAL SECT VINTAGE: New	OR BUILDING PRO	DFILE	REGION: Labrador	nterconnected	
SPACE HEATING								
Heating Plant Type			Fu	el Oil / Propane		Electric		
			Bo Stan.	ilers Package High Unit	ed A/A HP	W. S. HP H/R Chiller	ResistanceTotal	
		System Present (%) Eff./COP	75%	80% 75	3.20	3.00 4.50	100% 100% 1.00	
		Performance (1 / Eff.) (kW/kW)	1.33	1.25 1.	33 0.31	0.33 0.22	1.00	
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	52.1 W/m² 421 MJ/m².yr	16.5 Btu/hr 10.9 kWh/fr	.ft² ł².yr					
Electric Fuel Share	100.0% Fuel C	il / Propane Fuel Share		Oil Fuel Share			-	KWh/ft².yr 10.9
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence				L	MJ/m².yr 421
	Fire Side	Inspection	(%) 75%				-	Fuel Oil / Propane EUI kWh/ft².yr
	Water Sid	e Inspection for Scale Buildup	100%				L	MJ/m².yr
	Inspection Elue Gas	of Burner	100%				F	Market Composite EUI
			50%					MJ/m².yr 421
SPACE COOLING								
A/C Plant Type		[
		Centri Stand	fugal Chillers ard HE	Screw Recipro Chillers Open	cating Chillers	Absorption Chillers W. H. CW	Total	
		System Present (%) COP	20.0% 4.7 5.4	4.4 3	80.0% 3.5 2.9	0.9 1	100.0%	
		Performance (1 / COP) (kW/kW)	0.21 0.19	0.23 0.	29 0.34	1.11 1.00		
		Additional Refrigerant						
		Related monthation						
Control Mode		Incidence of Use Fixed	Reset					
		Chilled Water	int					
		Condenser Water						
Setopint		Chilled Water	7.00	44.6 °E				
Sethour		Condenser Water	30 °C	86 °F				
			13.0 °C	55.4 °F				
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	79 W/m ² 49.6 MJ/m ² .yr	25 Btu/hr.ft² 1.3 kWh/ft².yr	476 ft²/Ton					
Sizing Factor	0.85	Opera	ation (occ. perio	4000 hrs/year	Note value	cannot be less than 2	,900 hrs/year)	
A/C Saturation	80.0%							
(Incidence of A/C)								
Electric Fuel Share	100.0% Fuel C	0il / Propane Fuel Share						
Chiller Maintenance	Annual Ma	aintenance Tasks	Incidence	Frequency (vears)				
	Inspect Co	ontrol, Safeties & Purge Unit	19					
	Megger M	lotors r Tubo Clooping	,0					
	Vibration	Analysis						
	Eddy Curr Spectroch	ent Testing nemical Oil Analysis					Ľ	All Electric EUI
								kWh/ft².yr 0.6 MJ/m².yr 21
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency (vears)			-	Fuel Oil / Propane EUI
	Inspection	/Clean Spray Nozzles	() ~ /	()				kWh/ft².yr
	Megger M	lotors					L F	Morket Compacity 511
	Inspective	entry Operation of Controls					_	kWh/ft².yr 0.6
								MJ/m².yr 21
DOMESTIC HOT WATER								
Service Hot Water Plant Type	Fossil Fue	el SHW Std. Tank PV T	ank Cond. Tnk	Std. Boiler Cnd. Bo	oil. 0%	Fuel Share	Fossil	Elec. Res. 100%
Service Hot Water load (M 1/m2	Eff./COP	0.550 0	.600 0.900	0.750 0.9	00	Blended Efficiency	0.90	0.91
(Tertiary Load)	230.0			I Electric Et II		Evel 01 (2	- =	Madat Occ. 11 511
Wetting Use Percentage	90%		A	kWh/ft².yr 6. MJ/m².yr 26	.7	kWh/ft².yr MJ/m².yr	6.8 263	kWh/ft².yr 6.7 MJ/m².yr 260.0

	COMM	ERCIAL SECTOR BUILDING PROFILE		
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:	
Large Accommodation	> 100 kW	New	Labrador Interconnected	
Baseline				
HVAC FANS & PUMPS				
SUPPLY FANS			Ventilation and Exhaust Fan Operation & Cor	ntrol
		-	Ventilation Fan Exhaust Fan	
System Design Air Flow	5.7 L/s.m ² 1.13 CFM/ft ²	Control	Fixed Variable Fixed Variable	
System Static Pressure CAV	300 Pa 1.2 Wg	Insidence of Line	FIOW FIOW	
Fan Efficiency	300 Fa 1.2 Wg	Operation	Continuous Scheduled Continuous Scheduled	
Fan Motor Efficiency 7	70%	operation		
Sizing Factor 1	.00	Incidence of Use	60% 40% 100%	
Fan Design Load CAV	5.5 W/m ² 0.51 W/ft ²	<u> </u>		
Fan Design Load VAV	5.5 W/m ² 0.51 W/ft ²	Comments:		
EXHAUST FANS				
Washroom Exhaust	100 L/s washroom 212 CEM/	vashroom		
Washroom Exhaust per gross unit area	0.1 L/s.m ² 0.03 CFM/	t ²		
Other Exhaust (Smoking/Conference)	0.1 L/s.m ² 0.02 CFM/	t ²		
Total Building Exhaust	0.2 L/s.m ² 0.05 CFM/	t ²		
Exhaust System Static Pressure	250 Pa 1.0 wg			
Fan Efficiency 2	25%			
Fan Motor Efficiency 7	75%			
Sizing Factor	1.0			
Exhaust Pan Connected Load	0.3 W/II ² 0.03 W/I ²			
AUXILIARY COOLING EQUIPMENT (Conde	enser Pump and Cooling Tower/Condenser Fa	ins)		
Average Condenser Fan Power Draw	0.022 kW/kW	0.08 kW/Ton		
(Cooling Tower/Evap. Condenser/ Air Cooled	d Condenser) 1.73 W/m ²	0.16 W/ft ²		
O and an an Direct				
Condenser Pump				
Pump Design Flow	0.053 L/s KW	/ 30 U.S. gpm/Top		
Pump Design Flow per unit floor area	0.004 I /s m ²	0.006 U.S. gpm/ft ²		
Pump Head Pressure	kPa	ft		
Pump Efficiency	50%			
Pump Motor Efficiency	80%			
Sizing Factor	1.0			
Pump Connected Load	W/m ²	W/ft ²		
CIRCUIL ATING PLIMP (Heating & Cooling)				
CIRCULATING FOMF (Heating & Cooling)				
Pump Design Flow @ 5 °C (10 °F) delta T	0.003 L/s.m ²	0.0050 U.S. gpm/ft ² 2	2.4 U.S. gpm/Ton	
Pump Head Pressure	100 kPa	33 ft		
Pump Efficiency	50%			
Pump Motor Efficiency	80%			
Sizing Factor	0.8			
Pump Connected Load	0.7 W/m ²	0.06 W/ft ²		
Supply Fan Occ. Period	3500 brs /vear			
Supply Fan Unocc. Period	5260 hrs./year			
Supply Fan Energy Consumption	36.4 kWh/m².yr			
Exhaust Fan Occ. Period	3500 hrs./year			
Exhaust Fan Unocc. Period	5260 hrs./year			
Exhaust Fan Energy Consumption	2.7 kWh/m².yr			
Condenser Dump From Consumption	LAND / 2 ····			
Cooling Tower (Condensor Fors Forset)	KWh/m².yr			
County Tower /Condenser Fans Energy Con	isumption 0.3 kvvn/m².yr			
Circulating Pump Yearly Operation	7000 hrs./vear			
Circulating Pump Energy Consumption	kWh/m².yr			
Fans and Pumps Maintenance	Annual Maintenance Tasks	Incidence Frequency		
		(%) (years)		
	Inspect/Service Fans & Motors			
	Inspect/Adjust Belt Tension on Fan Belts		le contra c	EIII k\Wb/ft2.vr 2.7
	mapeer/service Fump & Motors		E	

COMMERCIAL SECTOR BUILDING PROFILE											
NEW BUILDINGS: Large Accommodation Baseline	:	SIZE: > 100 kW	VINTAGE: New				REGION: Labrador Interconnected				
EUISUMMARY											
TOTAL ALL END-USES:	Electricity:		28.5 kWh/ft².yr 1,102.9 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr				
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electr	icity	Fuel Oil /	Propane				
GENERAL LIGHTING (SUITES)	1.4	55.6	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m².yr				
SECONDARY LIGHTING	1.8	70.8	SPACE HEATING	10.9	421.4						
TERTIARY LIGHTING			SPACE COOLING	0.4	17.1						
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0				
HVAC FANS & PUMPS	3.7	142.1	FOOD SERVICE EQUIPMENT	1.3	50.0						
REFRIGERATION	0.5	20.0									
MISCELLANEOUS	0.1	5.0									
BLOCK HEATERS	0.1	5.0									
COMPUTER EQUIPMENT	0.4	16.1									
COMPUTER SERVERS ELEVATORS	0.1	3.7									
OUTDOOR LIGHTING	0.4	17.0									

				COMMER	CIAL SEC	TOR BUILD	ING PROP	FILE					
NEW BUILDINGS:	SIZE:				VINTAGE	:				REGION:			
Small Accommodation Baseline	< 100 KW				New					Labrador Intercor	inected		
CONSTRUCTION													
	_			-								r	1
Wall U value (W/m ² .°C) 0.2	B W/m².°C		0.05	Btu/hr.ft ² .	°F		Typical B	uilding Size		6	97 m²	7,500	ft²
Roof U value (W/m ² .°C) 0.1	9 W/m².°C		0.03	Btu/hr.ft ² .	°F		Typical Fo	potprint (m ²))	6	97 m²	7,500	ft²
Glazing U value (W/m ² .°C) 2.8	0 W/m².°C		0.49	Btu/hr.ft ² .	°F		Footprint	Aspect Rati	io (L:W)		4		
							Percent C	onditioned	Space	10	0%		
Window/Wall Patio (WIWAR) (%) 0.3	1						Percent C	onditioned	Space Ione	4	0%		
Shading Coefficient (SC) 0.6	5						Typical #	Stories	one		1		
							Floor to F	loor Height	(m)	3	.7 m	12.0	ft
VENTILATION SYSTEM. BUILDING CONTR	OLS & INC		ONS										
										r		-	
Ventilation System Type			+ (0/)	CAV	CAVR	DDM2	DDMZVV	VAV	FCoils	IU 100% 0	D.A TOTA	L	
		Min Air Flow (it (%) %)	100%				60%			100%	0	
		(Minimum Thro	ttled Air Vo	olume as P	ercent of F	ull Flow)	1	0070	1				
					500	1							
Occupancy or People Density		50	m²/perso	n	538	ft²/person				%UA 8.5	0%		
Occupancy Schedule Unocc. Period		80%											
Fresh Air Requirements or Outside Air		15	L/s.perso	n	32	CFM/perse	on						
Fresh Air Control Type *(ontor	a 1 2 or 2)	4	If Freeb A	ir Control T	VDA - "2" 4	nter% EA	o the right-			15%			
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	L '	If Fresh A	ir Control T	ype = "3" e	inter Make-u	p Air Ventil	ation and or	peration	0.5 L/s.m ²	0.1	0 CFM/ft ²	
	,									50% operati	on (%)		
Sizing Factor		1.4				0.000							
I otal Air Circulation or Design Air Flow		3.51	L/s.m²		0.69	CFM/ft ²		Separate	Make-un ai	r unit (100% OA)		1 /s m ²	CFM/ft ²
Infiltration Rate		0.70	L/s.m ²		0.14	CFM/ft ²		Copulato	Operation	occupied period	50%	6	Of million
(air infiltration is assumed to occur during unocc	upied					_			Operation	unoccupied period	50%	6	
hours only if the ventilation system shuts down)													
Economizer			Enthalp	y Based	Dry-Bi	ulb Based	Total	Т					
	Incidence	of Use			100%		100%	5	Summary	of Design Paramet	ers		
	Switchov	er Point		KJ/kg.	18	°C			Peak Desi	ign Cooling Load	122,326		
				Btu/Ibm	64.4	۳F		1	Peak Zone Room air	e Sensible Load	79,537	Btu/lbm	
Controls Type	System F	Present (%)		HVAC	Room				Discharge	air enthalpy	23.4	Btu/lbm	
				Equipmen	t Controls				Specific volu	ume of air at 55F & 100	% R 13.3	2 ft³/lbm	
	All Pneum	natic							Design CF	-M irculation or Design	3,700 air 3,51	l/s m2	
	All DDC	dificulto							rotar ar o	inculation of Design	un 0.01	03.111	J
	Total (sho	ould add-up to 10	0%)]							
			Prop	ortional		Total	1						
Control mode	Control N	lode	1100			1010							
			Fixed D	Discharge	Reset								
	Control S	trategy											
Indoor Design Conditions				1	Room				Supply Air			Т	
Ŭ	Summer	Temperature		22	°C	71.6	°F	13	°C	55.4 °F			
	Summer	Humidity (%)		50%			T	100%					
	Enthalpy Winter Or			65.5	KJ/kg.	28.2	Btu/lbm	54.5	KJ/kg.	23.4 Btu/lbn	1		
	Winter Od	c. Humidity		30%	Ĭ	00.0	<u>.</u>	45%	Ĩ	00 1			
	Enthalpy			53	KJ/kg.	22.8	Btu/lbm	45.5	KJ/kg.	19.6 Btu/lbn	n		
	Winter Ur	nocc. Temperatu	re	21	°C	69.8	°F						
	Enthalov	IOCC. Humidity		30%	K I/ka	21.5	Btu/lbm						
	Entrapy			00	rto/ng.	21.0	Diarioni	1				1	
Damper Maintenance	I			Indictory	Ese al la c								
Damper Maintenance				(%)	(vears)	1							
	Control A	rm Adjustment		(/0)	(years)								
	Lubricatio	n											
	Blade Se	al Replacement											
Air Filter Cleaning	Changes/	Year]								
						Incidence d		a ana Canta	olo Mointon				
Incidence of Annual HVAC Controls Maintenan	ce	7				mciuence c	i Annual R	Join Contro	us mainter	iance			
	L				-			. <u> </u>				-	
	Annual M	aintenance Tasks	5	Incidence				Annual Ma	aintenance	Tasks	Incidence	9	
	Calibratio	n of Transmittor		(%)	-			Inspection	Calibration		(%)	+	
	Calibratio	n of Panel Gaud	, es	1	1			Inspection	of PE Swi	tches	nat	1	
	Inspection	n of Auxiliary Dev	/ices		1			Inspection	of Auxiliar	y Devices		1	
	Inspection	n of Control Devi	ces	I]			Inspection	of Control	Devices (Valves,			
								Uampers	, VAV BOXE	55/		L	

NEW BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW	COMMERCIAL SEC VINTAG New	TOR BUILDING PROFILE E:	REGION: Labrador Ir	iterconnected		
LIGHTING GENERAL LIGHTING (SUITES) Light Level Floor Fraction (GLFF) Connected Load	125 Lux 11.6 0.85 7.1 W/m ² 0.7] ft-candles					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 50% 25%	Light Level (Lux) % Distribution Weighted Average	50 100 75%	200 300 25%		otal 100% 125	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	15% 70% 0.7 0.7 0.65 0.65 15 50	10% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0% 5% 10 0.6 0.6 0.80 0.80 95 90 90 10	00.0%	
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr MJ/m².vr	1.6 61
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 27.9 0.15] ft-candles 2 W/ft ²					
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 85% 75%	Light Level (Lux) % Distribution Weighted Average	300 500 100%	700 1000 T12 T8 HID		otal 100% 300 DTAL	
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	10% 30% 0.7 0.7 0.65 0.65 15 50	55% 0.6 0.6 0.6 0.75 0.80 0.80 72 88 65	0% 5% 10 0.6 0.6 0.80 0.80 95 90 90 00	00.0%	
of Practice	Group Spot		EUI = Load X	(Hrs. X SF X GLFF	EUI	kWh/ft².yr MJ/m².yr	1.2 48
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft²	Flo	or fraction check: should = 1.0	00 1.00		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average		T42			
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 0% 0% 0.7 0.7 0.65 0.65 15 50	112 18 0.6 0.6 0.6 0.75 0.80 0.80 72 84 88	Min HPS 1 100% 0% 10 0.6 0.6 0.6 0.55 0.55 65	00.0%	
Relamping Strategy & Incidence of Practice	Group Spot				EUI	kWh/ft².yr MJ/m².yr	
TOTAL LIGHTING				Overall LP	7.95 W/m ² EUI T	OTAL kWh/ft².yr MJ/m².yr	3 109
OFFICE EQUIPMENT & PLUG LOA	DS						
Equipment Type	Computers	Monitors P	rinters Copiers	s Servers	Plug Loads		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.3 0.3 W/m ² 0.0 W/ft ² 90%	51 10 0.3 0.0 0.3 W/m² 0.0 W/t² 0.0 90%	0 200 5 0.033 1 W/m ² 0.1 W/ 1 W/ft ² 0.01 W/ 6 90%	217 0.02 m ² 0.1 W/m ² ft ² 0.01 100%	1.5 W/m ² 0.14 W/ft ² 70%		
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 50% 2000 200 6760 676	6 50% 0 2000 0 6760	100% 2500 6260	25% 3000 5760		
Total end-use load (occupied period) Total end-use load (unocc. period)	1.9 W/m² 0.9 W/m²	0.2 W/ft ² to see no 0.1 W/ft ²	tes (cells with red indicator in	n upper right corner, type "SHIF	T @@mputer Servers EUI	kWh/ft².yr MJ/m².yr	0.10 3.68
Usage during occupied period Usage during unoccupied period	100% 48%				Plug Loads EUI	MJ/m².yr kWh/ft².yr MJ/m².yr	16.11 0.49 19.12
FOOD SERVICE EQUIPMENT Provide description below: Kitchen services	Fuel Oil / Propane Fuel Share:	Electricit	/ Fuel Share: 100.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI 1.3 50.0 EUI	All Electric EUI kWh/ft².yr MJ/m².yr	0.6 25.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	lers/freezers, refrigerated buffet case	es			EUI	kWh/ft².yr MJ/m².yr	0.4
BLOCK HEATERS & MISCELLANE	ous				Block Heaters EUI Miscellaneous EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.1 5 0.1 5

NEW BUILDINGS: Small Accommodation Baseline	SIZE: < 100 kW	I	COMMER	CIAL SEC VINTAGE New	for Buildi :	NG PROF	ILE		REGION: Labrador I	Interconne	cted		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elec	tric				
				Bo Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	Total		
		System Present (%)		759/	90%	750/	2 20	3.00	4.50	100%	100%		
		Performance (1 / Eff.)		1.33	1.25	1.33	0.31	0.33	4.50	1.00			
		(kW/kW)											
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	72.1 W/m ² 619 MJ/m ² .yr	22.9 16.0	Btu/hr.ft² kWh/ft².yr								_		
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Share			Oil Fuel Sha	re]				All Electric EUI kWh/ft².yr	16.0
Boiler Maintenance	Annual M	aintenance Tasks		Incidence	1						L	MJ/m².yr	619
	Fire Side	Inspection		(%)	-						F	Fuel Oil / Propane E	UI
	Water Sid	de Inspection for Scale Build	dup	100%	-							MJ/m².yr	
	Inspectio	n of Controls & Safeties		100%								Market Composite E	UI
	Flue Gas	Analysis & Burner Set-up		90%								kWh/ft².yr MJ/m².yr	16.0 619
SPACE COOLING													
SPACE COOLING													
A/C Plant Type			Centrifuga	al Chillers	Screw	Reciprocat	ting Chillers	Absorption	Chillers	Total			
		System Brocont (%)	Standard	HE	Chillers	Open	DX	W. Н.	CW	100.0%			
		COP	4.7	5.4	4.4	3.5	2.9	0.9	1	100.0%			
		Performance (1 / COP) (kW/kW)	0.21	0.19	0.23	0.29	0.34	1.11	1.00				
		Additional Refrigerant											
		Related Information											
Control Mode		Incidence of Use	Fixed	Reset	1								
		Chilled Water	Setpoint		-								
		Condenser Water											
Setpoint		Chilled Water	7	°C	44.6	°F							
		Supply Air	13.0	0°C	55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	44 W/m² 53.7 MJ/m².yr	14 Btu/hr.ft² 1.4 kWh/ft².yr	866	ft²/Ton									
Sizing Factor	0.85		Operation	n (occ. perio	4000	hrs/year	Note value	e cannot be	less than 2	,900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	80.0%												
Electric Fuel Share	100.0% Fuel 0	Oil / Propane Fuel Share											
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	control, Safeties & Purge Ur	nit	(%)	(years)								
	Inspect C	Coupling, Shaft Sealing and I	Bearings										
	Condens	er Tube Cleaning											
	Vibration Eddy Cu	Analysis rrent Testing											
	Spectroc	hemical Oil Analysis									F	All Electric EUI	
					<u> </u>							KVVn/tt².yr MJ/m².yr	0.6
Cooling Tower/Air Cooled Condense	er Maintenan Annual M	aintenance Tasks		Incidence	Frequency (years)						Г	Fuel Oil / Propage F	UI
	Inspectio	n/Clean Spray Nozzles		(//)	(Joard)							kWh/ft².yr	0.
	Megger M	Aotors										MJ/m².yr	
	Inspect/V	erify Operation of Controls									-	Market Composite E kWh/ft².vr	UI 0.6
												MJ/m².yr	22
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fu	el SHW Std. Tank	PV Tank	Cond. Tnk	Std. Boiler	Cnd. Boil.	I			Fossil		Elec. Res.	
	System F	Present (%)	0.000	0.000	0.750	0.00%	ļ	Fuel Share	fieles	0%	_	100%	
Service Hot Water load (MJ/m ² .yr)	236.6	0.550	0.600	0.900	0.750	0.900	J	Biended Ef	nciency	0.90		0.91	
(Tertiary Load)					All Electric EL	11	1	Fuel C)il / Pronan	e EUI	Г	Market Composite F	UI
Wetting Use Percentage	90%				kWh/ft².yr	6.7		1 0010	kWh/ft².yr	6.8	F	kWh/ft².yr	6.7
					MJ/m².yr	260		1	MJ/m².yr	263		MJ/m².yr	260.0



		COMMER	CIAL SECTOR B	UILDING PROFILE							
NEW BUILDINGS:	SIZE:		VINTAGE:			REGION:					
Small Accommodation	< 100 kW		New			Labrador	Interconne	cted			
Baseline											
HVAC FANS & PUMPS											
SUPPLY FANS			ſ		Ventilation	and Exhau	st Fan Ope	ration & Co	ontrol		
System Design Air Flow 35	l/sm ² 0.69	CFM/ft2	Control		Ventia	ion Fan Variable	Exnau	st Fan Variable			
System Design Air Iow 0.0 System Static Pressure CAV 300) Pa 1.2	wq	COLICI		FINCU	Flow	TINEU	Flow			
System Static Pressure VAV 300) Pa 1.2	wg	Incidence of Use		100%		100%				
Fan Efficiency 45%	2		Operation		Continuous	Scheduled	Continuous	Scheduled			
Fan Motor Efficiency 70%	2		Incidence of Line		600/	400/	1009/				
Fan Design Load CAV 1.7	7 W/m ² 0.16	W/ft ²	Incidence of Use		00%	40%	100%				
Fan Design Load VAV 1.7	W/m ² 0.16	W/ft ²		Comments:							
		-									
EXHAUST FANS											
Washroom Exhaust 100	L/s.washroom	212 CFM/was	hroom								
Washroom Exhaust per gross unit area 0.3	L/s.m ²	0.06 CFM/ft ²									
Other Exhaust (Smoking/Conference) 0.1	L/s.m ²	0.02 CFM/ft ²									
Total Building Exhaust 0.4	L/s.m ²	0.08 CFM/ft ²									
Exhaust System Static Pressure 250	ЛРа	1.0 Wg									
Fan Motor Efficiency 75%											
Sizing Factor 0.5		_									
Exhaust Fan Connected Load 0.3	3 W/m ² 0.02	W/ft ²									
AUXILIARY COOLING EQUIPMENT (Condens	er Pump and Cooling Toy	ver/Condenser Fans									
	or i unip and cooming i of		,								
Average Condenser Fan Power Draw		0.022 kW/kW		0.08 kW/Ton							
(Cooling Tower/Evap. Condenser/ Air Cooled Co	ondenser)	0.95 W/m ²		0.09 W/ft ²							
Condenser Rump											
Pump Design Flow		0.053 L/s.KW		3.0 U.S. gpm/Ton							
Pump Design Flow per unit floor area		0.002 L/s.m ²	(0.003 U.S. gpm/ft ²							
Pump Head Pressure		kPa		ft							
Pump Efficiency		50%									
Sizing Eactor		80%									
Pump Connected Load		0.5 W/m ²		W/ft ²							
· · · · · · · · · · · · · · · · · · ·											
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T	0.002	L/s.m ²	0.0028 U.S. d	ppm/ft ² 2.4	4 U.S. apm/	Ton					
Pump Head Pressure	100	kPa	33 ft		i o.o. gpiii						
Pump Efficiency	50%										
Pump Motor Efficiency	80%	-									
Sizing Factor	0.5	W/m2	0.02 \///f+2								
i unp connected Load	0.2	W/////	0.02 W/IT								
		_									
Supply Fan Occ. Period	3500	hrs./year									
Supply Fan Unocc. Period	5260	hrs./year									
Supply Fan Energy Consumption	11.1	KVVIVII+.yi									
Exhaust Fan Occ. Period	3500	hrs./year									
Exhaust Fan Unocc. Period	5260	hrs./year									
Exhaust Fan Energy Consumption	2.3	kWh/m².yr									
Condenses Dump Energy Consumption		LAN/b/m2.ur									
Cooling Tower /Condenser Fans Energy Consumption	notion 0.3	kWh/m².yr									
cooling rower/condenser rans Energy consu	0.0	Kuun .yi									
Circulating Pump Yearly Operation	7000	hrs./year									
Circulating Pump Energy Consumption		kWh/m².yr									
Fans and Pumps Maintenance	Appual Maintonanaa Taal	76	Incidence Fram	ency							
rans and rumps maintenance	Annual Maintenance lask	3	(%) (ve	ars)							
	Inspect/Service Fans & M	otors	(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,								
	Inspect/Adjust Belt Tensio	n on Fan Belts									
	Inspect/Service Pump & N	lotors							EUI	kWh/ft².yr	1.3
1										MJ/m ² .vr	49.4

			COMMERCIAL SECT	OR BUILD	ING PROFILE				
NEW BUILDINGS:	:	SIZE:	VINTAGE:				REGION:		
Small Accommodation Baseline		< 100 kW	New				Labrador Interconnecte	ed	
EUI SUMMARY									-
TOTAL ALL END-USES:	Electricity:		30.0 kWh/ft².yr 1,160.3 MJ/m².yr	Fuel Oil	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr		
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Elect	icity	Fuel Oil /	Propane		
GENERAL LIGHTING (SUITES)	1.6	60.8	-	kWh/ft².yr	MJ/m ² .yr	kWh/ft2.yr	MJ/m².yr		
SECONDARY LIGHTING	1.2	48.1	SPACE HEATING	16.0	618.6				
TERTIARY LIGHTING			SPACE COOLING	0.5	17.5				
OTHER PLUG LOADS	0.5	19.1	DOMESTIC HOT WATER	6.7	260.0	0.0	0.0		
HVAC FANS & PUMPS	1.3	49.4	FOOD SERVICE EQUIPMENT	0.6	25.0				
REFRIGERATION	0.4	15.0							
MISCELLANEOUS	0.1	5.0							
BLOCK HEATERS	0.1	5.0							
COMPUTER EQUIPMENT	0.4	16.1							
COMPUTER SERVERS	0.1	3.7							
ELEVATORS									
OUTDOOR LIGHTING	0.4	17.0							

		COMMERCIAL SECTOR BUILDING PROFILE
NEW BUILDINGS:	SIZE:	VINTAGE: REGION:
Health Care Baseline	All	New Labrador interconnected
CONSTRUCTION		
Wall U value (W/m ² .°C) 0.	28 W/m².°C	0.05 Btu/hr.ft ² .°F Typical Building Size <u>8,829</u> m ² <u>95,000</u> ft ²
Roof U value (W/m ² .°C) 0.	19 W/m².°C	0.03 Btu/hr.ft ² .°F Typical Footprint (m ²) 2,943 m ² 31,667 ft ²
Glazing U value (W/m ² .°C) 2.	80_W/m².°C	0.49 Btu/hr.ff2.°F Footprint Aspect Ratio (L:W) 2 Revent Conditioned Space 100%
		Percent Conditioned Space 45%
Window/Wall Ratio (WIWAR) (%) 0.	20	Defined as Exterior Zone
Shading Coefficient (SC) 0.	65	Typical # Stories 3 Eloc to Eloc Height (m) 43 m 140 ft
VENTILATION SYSTEM DUILDING CONT		
VENTILATION STSTEW, BUILDING CONT		
Ventilation System Type		CAV CAVR DDMZ DDMZVV VAV FCoils IU 100% O.A TOTAL
		System Present (%) 50% 50% 100%
		(Minimum Throttled Air Volume as Percent of Full Flow)
Occupancy or People Density Occupancy Schedule Occ. Period		30 III/person %UA 13.43%
Occupancy Schedule Unocc. Period		75%
Fresh Air Requirements or Outside Air		35 Us.person 74 CFM/person
Fresh Air Control Type *(ent	era 1, 2 or 3)	1 If Fresh Air Control Type = "2" enter % FA, to the right:
(1 = mixed air control, 2 = Fixed fresh air, 3 10	00% fresh air)	If Fresh Air Control Type = "3" enter Make-up Air Ventilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
		50% operation (%)
Sizing Factor Total Air Circulation or Design Air Flow		5 8.69 L/s m ² 1.71 CFM/ft ²
		Separate Make-up air unit (100% OA)
Infiltration Rate		0.40 L/s.m ² 0.08 CFM/ft ² Operation occupied period 50%
(air infiltration is assumed to occur during uno hours only if the ventilation system shuts down	ccupied	Operation unoccupied period 50%
······································	·/	
Economizer		Enthalpy Based Dry-Bulb Based Total
	Switchove	or Use 100% 100% Summary or Design Parameters
	e interior e	Btu/Ibm 64.4 °F Peak Zone Sensible Load 698,518
0		Room air enthalpy 28.2 Btu/l/om
Controls Type	System P	resent (%) HVAC Koom Discharge air enthalpy 23.4 Btu/bm Equipment Controls Specify sufficient at 555.8 100% R H 13.2 ft//bm
	All Pneum	atic Design CFM 32,495
	DDC/Pne	unatic Total air circulation or Design air fik 8.69 l/s.m ²
	Total (sho	uld add-up to 100%)
Control mode	Control M	Proportional PI / PID Total
Control mode	Control IVI	Fixed Discharge Reset
	Control St	rategy
Indeer Design Conditions		Danama Dumply Air
Indoor Design Conditions	Summer T	remperature 24°C 75.2°F 14°C 57.2°F
	Summer H	lumidity (%) 50% 100%
	Enthalpy Winter Oc	65.5[KJ/kg. 28.2] Btu/bm 54.5[KJ/kg. 23.4] Btu/bm c Temperature 24°C 75.2] °F 16.5] °C 61.7] °F
	Winter Oc	c. Humidity 30% 45%
	Enthalpy	53 KJ/kg. 22.8 Btu/lbm 45.5 KJ/kg. 19.6 Btu/lbm
	Winter Un Winter Lin	occ. lemperature 22 °C 71.6] °F
	Enthalpy	50/KJ/kg. 21.5 Btu/lbm
Damper Maintenance		Incidence Erequency
	Control A	m Adjustment
	Lubricatio	n Alenhacement
	Diade dea	
Air Filter Cleaning	Ch	
All Filler Cleaning	Cnanges/	rear
		Incidence of Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintena	nce]
		aintenance Tasks Incidence Incidence
	Calibration	n of Transmitters Inspection/Calibration of Room Thermostat
	Calibration	1 of Panel Gauges Inspection of PE Switches
	Inspection	Inspection of Control Devices Inspection of Control Devices (Valves,
		(Dampers, VAV Boxes)

NEW BUILDINGS: Health Care Baseline	SIZE All	Ξ:	СОММЕ	ERCIAL SEC VINTAGE: New	TOR BUILD	DING PROFIL	E	F	REGION: Labrador Inte	erconnected			
LIGHTING GENERAL LIGHTING (PATIENT RC Light Level	OOMS) 300 Lux	27.9	ft-candles										
Floor Fraction (GLFF) Connected Load	0.40 9.4 W/m	n² 0.9	W/ft ²										
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 40%		Light Level (Lux) % Distribution Weighted Average		50	100	200	300 100%			Total 100 3	0% 00	
Fixture Cleaning: Incidence of Practice Interval	year	rs	System Present (%) CU LLF		INC 3% 0.7 0.65	CFL 10% 0.7 0.65	T12 0.6 0.75 72	T8 85% 0.6 0.80	HID 0.6 0.80	T5HO LE 0% 2 0.6 0 0.80 0.8	ED TOT % 100.0 6 80	AL 0%	
Relamping Strategy & Incidence of Practice	Group S	pot			10		12	00	00		EUI	kWh/ft².yr	1.2
SECONDARY LIGHTING (NURSING Light Level Floor Fraction (ALFF) Connected Load	STATIONS, E 500 0.60 15.2 W/m	XAMINATION ROOM 46.5 n ² 1.4	S, LABORATORIES] ft-candles]W/ft ²	, ICU, RECC	VERY)							MJ/m².yr	47
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	8760 65%		Light Level (Lux) % Distribution Weighted Average		300	500	700	1000			Total 100 5	0% 00	
Fixture Cleaning: Incidence of Practice Interval	year	rs	System Present (%) CU LLF Efficacy (L/W)		INC 3% 0.7 0.65 15	CFL 5% 0.7 0.65 50	0.6 0.75 72	T8 90% 0.6 0.80 88	HID 0.6 0.80 65	T5HO LE 0% 2 0.6 0 0.80 0.8 95 95	ED TOTA % 100.0 6 80 90	AL	
Relamping Strategy & Incidence of Practice	Group S	pot				FUI = Load	X Hrs X S	SE X GI FE			EUI	kWh/ft².yr M.I/m² yr	4.8 186
TERTIARY LIGHTING (CORRIDORS Light Level Floor Fraction (HBLFF) Connected Load	S, OTHER) Lux W/n	n²	ft-candles W/ft²			F	loor fractio	on check: s	should = 1.00) 1.(0		100
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 100%		Light Level (Lux) % Distribution Weighted Average								Total		
Fixture Cleaning: Incidence of Practice Interval	yea	rs	System Present (%) CU LLF Efficacy (L/W)		INC 5% 0.7 0.65 15	CFL 5% 0.7 0.65 50	T12 0.6 0.75 72	T8 90% 0.6 0.80 88	0.6 0.80 88	MH HF 0.6 0 0.55 0.5 65 9	PS TOT 100.0 6 5 00	AL)%	
Relamping Strategy & Incidence of Practice	Group S	pot								i.	EUI	kWh/ft².yr	
TOTAL LIGHTING								0	Overall LPD	12.84 W/m ²	EUI TOT	AL kWh/ft².yr MJ/m².yr	6 234
OFFICE EQUIPMENT & PLUG LOA	DS												
Equipment Type	Co	omputers	Monitors	Pri	nters	Copie	ers	Sen	vers	Plug Loads			
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Unoc. Period (hrs./year) Operation Unoc. Period (hrs./year)		54.55 0.48 0.9 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	51 0.48 0.8 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	100 0.02 0.1 0.01 90% 50% 2000 6760	W/m² W/ft²	200 0.02 0.1 W 90% 50% 2000 6760	V/m² V/ft²	217 0.04 0.3 0.02 100% 100% 2600 6160	N/m² N/ft²	3.85 W/m ² 0.36 W/ft ² 90% 25% 4100 4660			
Total end-use load (occupied period)		5.4 W/m ²	0.5 W/ft ²	to see note	es (cells with	red indicator i	n upper rig	pht corner, t	ype "SHIFT	F2'Computer Serve	ers EUI	kWh/ft².yr	0.21
Usage during occupied period Usage during unoccupied period		100% 40%	0.2							Computer Equipme Plug Loa	ent EUI ds EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.90 35.00 1.74 67.29
FOOD SERVICE EQUIPMENT Provide description below: Commercial food services	Fuel Oil / Prop	pane Fuel Share:		Electricity F	Fuel Share:	100.0%	E	Fuel C EUI k	Dil / Propane kWh/ft².yr MJ/m².yr	EUI 3.1 120.0	EUI	All Electric EUI kWh/ft².yr MJ/m².yr	2.1 80.0
REFRIGERATION Provide description below: Walk-in coolers/freezers, reach-in coo	olers/freezers, re	frigerated buffet cases	S								EUI	kWh/ft².yr MJ/m².yr	0.4 15.0
BLOCK HEATERS & MISCELLANE	ous									Block Heate Miscellaneo	ers EUI us EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.1 5 0.1 5

NEW BUILDINGS: Health Care Baseline	SIZE: All	СОМ	IERCIAL SE VINTAGE New	CTOR BUILD	DING PROF	ILE		REGION: Labrador In	terconnect	ted		
SPACE HEATING												
Heating Plant Type			F	uel Oil / Propa	ine		EI	ectric				
			B Stan.	oilers High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistanc	Total		
		System Present (%) Eff /COP	75%	88%	95%	1 70	3.00	4 50	100%	100%		
		Performance (1 / Eff.)	1.33	1.14	1.05	0.59	0.33	8 0.22	1.00)		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	25.2 W/m ² 198 MJ/m ² .yr	8.0 Btu/hr.ft 5.1 kWh/t².	2 yr	1	1	1		1		11		
Electric Fuel Share	100.0% Fuel C	0il / Propane Fuel Share		Oil Fuel Shar	e		1			-	All Electric EUI kWh/ft².yr	5.1
Boiler Maintenance	Annual Ma	aintenance Tasks	Incidence	1			_				MJ/m².yr	198
	Fire Side	Inspection	(%)	_						F	Fuel Oil / Propane E	UI
	Water Sid	le Inspection for Scale Buildup	100%								MJ/m².yr	
	Inspection	n of Burner	100%							F	Market Composite E	UI
	Flue Gas	Analysis & Burner Set-up	90%								MJ/m².yr	5.1 198
SPACE COOLING												
A/C Plant Type										_		
		Centrifu Standar	igal Chillers d HE	Screw Chillers	Reciprocat Open	ting Chillers DX	Absorptio W. H.	n Chillers CW	Total			
		System Present (%) COP	50.0%	4.4	3.6	50.0%	0.9	9 1	100.0%			
		Performance (1 / COP) 0.	21 0.16	0.23	0.28	0.37	1.11	1.00)			
		Additional Refrigerant								-		
		Related Information										
Control Mode		Incidence of Use Fixed	Reset	1								
		Chilled Water	t									
		Condenser Water										
Setpoint		Chilled Water	7 °C	44 F	۰F							
		Condenser Water	30 °C	86	°F							
Deals Cooling Lood	CO.W/m2		+.0 C	57.2								
Seasonal Cooling Load	64.6 MJ/m ² .yr	1.7 kWh/ft².yr	29 11-/1011									
					ı							
Sizing Factor	0.65	Operation	on (occ. perio	3000	hrs/year	Note valu	e cannot be	e less than 2,9	900 hrs/yea	r)		
A/C Saturation (Incidence of A/C)	80.0%											
Electric Fuel Share	100.0% Fuel C	0il / Propane Fuel Share										
Chiller Maintenance	Appual Ma	aintenance Tasks	Incidence	Frequency	1							
	Inspect C	ontrol Sofeties & Purge Unit	(%)	(years)	-							
	Inspect C	oupling, Shaft Sealing and Bearings			-							
	Condense	otors er Tube Cleaning										
	Vibration Eddy Cur	Analysis rent Testing			_					_		
	Spectroch	nemical Oil Analysis]					-	All Electric EUI kWh/ft².yr	0.6
Cooling Tower/Air Cooled Condense	r Maintenan Annual Ma	aintenance Tasks	Incidence	Frequency	1					L	MJ/m².yr	24
g	Inspection	/Clean Spray Nozzles	(%)	(years)	-					F	Fuel Oil / Propane E	UI
	Inspect/S	ervice Fan/Fan Motors			-						MJ/m².yr	
	Inspect/Ve	erify Operation of Controls								F	Market Composite E	UI
											KVVh/tt².yr MJ/m².yr	0.6 24
DOMESTIC HOT WATER												
Service Hot Water Plant Type	Fossil Fue	SHW Std. Tank PV Ta	nk Cond. Thi	Std. Boiler	Cnd. Boil.]			Fossil		Elec. Res.	
	System P Eff./COP	resent (%) 0.550 0.6	00 0.900	88.000	0.00%	-	Fuel Share Blended F	e Efficiencv	0%		100% 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	118.3					-				·		
Wetting Lise Percentage	90%			All Electric EL	II 34]	Fue	I Oil / Propan	e EUI	7 F	Market Composite E	UI
wealing use reidenlage	30.10			MJ/m².yr	3.4 130			MJ/m ² .yr	3.4 131		MJ/m².yr	3.4 130.0

NEW BUILDINGS: Health Care Baseline	COMME SIZE: Ali	RCIAL SECTOR BUILDING PROFILE VINTAGE: New	REGION: Labrador Interconnected
HVAC FANS & PUMPS			
SUPPLY FANS		Ventil V	ation and Exhaust Fan Operation & Control /entilation Fan Exhaust Fan
System Design Air Flow 8: System Static Pressure CAV 75 System Static Pressure VAV 75 Fan Efficiency 55' Fan Motor Efficiency 89' Sizing Factor 1.00 Fan Design Load CAV 13.	7 L/S.m ² 1.71 CFM/ft ² 50 Pa 3.0 wg % % 0 3 W/m ² 1.24 W/ft ² 3 W/m ² 1.24 W/ft ²	Control Fixed Incidence of Use Operation Contin Incidence of Use Comments:	Variable Flow Fixed Variable Flow 80% 20% 100% nucudScheduled Continuous Scheduled 75% 25% 75%
EXHAUST FANS			
Washroom Exhaust 100 Washroom Exhaust per gross unit area 0.0 Other Exhaust (Smoking/Conference) 0.1 Total Building Exhaust 0.0 Exhaust System Static Pressure 225 Fan Efficiency 25' Fan Motor Efficiency 75' Sizing Factor 1.1 Exhaust Fan Connected Load 0	0 L/s.washroom 212 CFM/wa 1 U.s.m² 0.01 CFM/tl² 5 U.s.m² 0.10 CFM/tl² 6 U.s.m² 0.11 CFM/tl² 0 Pa 1.0 wg % 0	shroom	
AUXILIARY COOLING EQUIPMENT (Conden	ser Pump and Cooling Tower/Condenser Fans)	
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled C	0.017 kW/kW 0.99 W/m ²	0.06 0.09 W/ft ²	
Condenser Pump			
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.053 L/s.KW 0.003 L/s.m ² 100 kPa 60% 88% 1.0 0.60 W/m ²	3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft ² 33 ft 0.06 W/ft ²	
CIRCULATING PUMP (Heating & Cooling)			
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	0.003 L/s.m ² 100 kPa 60% 88% 0.8 0.8 0.4 W/m ²	0.0038 U.S. gpm/ft ² 2.4 U.S. g 33 ft 0.04 W/ft ²	gpm/Ton
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption	4000 hrs./year 4760 hrs./year 93.3 kWh/m².yr		
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption	4000 hrs./year 4760 hrs./year 5.7 kWh/m².yr		
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	0.7 kWh/m².yr 0.3 kWh/m².yr		
Circulating Pump Yearly Operation Circulating Pump Energy Consumption	7000 hrs./year kWh/m².yr		
Fans and Pumps Maintenance	Annual Maintenance Tasks Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors	Incidence Frequency (%) (years)	EUI KWh/tP.yr 9.3

			COMMERCIAL SEC	TOR BUILD	ING PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE:			F	REGION:	
Health Care		All	New			L	abrador Interconnected	
Baseline								
EUISUMMARY								
TOTAL ALL END-USES:	Electricity:		30.9 kWh/ft².yr 1,195.1 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m².yr	END USE:	Electri	city	Fuel Oil /	Propane	
GENERAL LIGHTING (PATIENT RO	1.2	47.2	_	kWh/ft².yr	MJ/m².yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING (NURSING	4.8	186.3	SPACE HEATING	5.1	198.3			
TERTIARY LIGHTING (CORRIDORS	3		SPACE COOLING	0.5	19.0			
OTHER PLUG LOADS	1.7	67.3	DOMESTIC HOT WATER	3.4	130.0	0.0	0.0	
HVAC FANS & PUMPS	9.3	360.1	FOOD SERVICE EQUIPMENT	2.1	80.0			
REFRIGERATION	0.4	15.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.9	35.0						
COMPUTER SERVERS	0.2	8.1						
ELEVATORS	0.1	3.9						
OUTDOOR LIGHTING	0.9	34.9						

			COMMER	CIAL SECTOR E	UILDING PRO	FILE
NEW BUILDINGS:	SIZE:			VINTAGE:		REGION:
School	All			New		Labrador Interconnected
Baseline						
CONSTRUCTION						
Mall Lucha (M/m2.8C)	N//m2 %C	0	05 Du /br 62	or-	Turning D	Duilding Cine 2 747 m2 40 000 42
Vvali 0 value (W/m² 200) 0.2	5 W/III+. C	0	05 Blu/hr.ft2 (F	Турісаны	Sullaing Size 3,717 III 40,000 II
Roof U value (W/m².°C) 0.1	9 W/m².°C	0	03 Btu/hr.ft ² .	۲ ۲	I ypical F	-ootprint (m ²) 3,717 m ² 40,000 ft ²
Glazing U value (W/m ² .°C) 2.8	0_W/m².°C	0	49 Btu/hr.ft ² .°	°F	Footprint	t Aspect Ratio (L:W) 5
					Percent C	Conditioned Space 100%
Window/Wall Ratio (W/WAR) (%) 0.1	5				Defined a	as Exterior Zone
Shading Coefficient (SC) 0.6	5				Typical #	# Stories 1
					Floor to F	Floor Height (m) 3.7 m 12.2 ft
VENTILATION SYSTEM, BUILDING CONTR	OLS & IND	OOR CONDITIONS				
Ventilation System Type			CAV	CAVR F		
venuation System Type		System Present (%)	90%	CANK L		10%
		Min. Air Flow (%)				50%
		(Minimum Throttled Ai	Volume as Pe	ercent of Full Flow		
Occupancy or People Density		10 m²/pe	son	108 ft²/pe	son	%OA 8.74%
Occupancy Schedule Unoco Period		90%				
Fresh Air Requirements or Outside Air		4 L/s pe	rson	8 CFM	person	
Fresh Air Control Type *(enter	a 1, 2 or 3)	1 If Fres	h Air Control T	ype = "2" enter %	FA. to the right:	34%
(1 = mixed air control, 2 = Fixed fresh air, 3 100	% fresh air)	If Fres	h Air Control T	ype = "3" enter Ma	ke-up Air Venti	ilation and operation 0.5 L/s.m ² 0.10 CFM/ft ²
						50% operation (%)
Sizing Factor		2		0.00 0.514		
I otal Air Circulation or Design Air Flow		4.58 L/S.M		0.90 CFM/	12	Separate Make-up air unit (100% OA)
Infiltration Rate		0.42 L/s.m ²		0.08 CFM/	†2	Operation occupied period 50%
(air infiltration is assumed to occur during unoco	upied	0.12 20.11		0.00 01 11/		Operation unoccupied period 50%
hours only if the ventilation system shuts down)						
						_
Economizer		Entl	nalpy Based	Dry-Bulb Base	ed Tota	
	Incidence	of Use	14.14	100%	100%	% Summary of Design Parameters
	Switchov	er Point	KJ/kg.	18 °C		Peak Design Cooling Load 764,589 Peak Zone Sensible Load 387,634
			Btu/IDITI	04.4 F		Room air enthalov 28.2 Btu/lbm
Controls Type	System F	resent (%)	HVAC	Room		Discharge air enthalpy 23.4 Btu/lbm
	ŕ		Equipment	Controls		Specific volume of air at 55F & 100% R 13.2 ft³/lbm
	All Pneum	natic				Design CFM 18,033
	DDC/Pne	umatic				Total air circulation or Design air 4.58 l/s.m ²
	All DDC	uld add up to 1000()				
	i otai (sho	build add-up to 100%)				
		Pi	oportional	PI / PID	Total	
Control mode	Control N	lode				
		Fixe	d Discharge	Reset		
	Control S	trategy				
				-		
Indoor Design Conditions	Cummor.	Terrenerature		Room	60.0 ×F	
	Summer	Humidity (%)	50%		09.0 F	100%
	Enthalpy	numuny (70)	65.5	KJ/ka.	28.2 Btu/lbm	54.5 KJ/ka. 23.4 Btu/lbm
	Winter Oo	cc. Temperature	21	°C	69.8 °F	15 °C 59 °F
	Winter Oo	cc. Humidity	30%			45%
	Enthalpy		53	KJ/kg.	22.8 Btu/lbm	45.5 KJ/kg. 19.6 Btu/lbm
	Winter Ur	nocc. Temperature	19.5	°C	67.1 °F	
	Fotbalov	IOCC. HUMIDITY	30%	K I/ka	21.5 Btu/lbm	
	Linuapy		50	NJ/Ng.		
Damper Maintenance			Incidence	Frequency		
			(%)	(years)		
	Control A	rm Adjustment				
	Lubricatio	n al Danlagement				
	Diade Se	ai Replacement				
Air Filter Cleaning	Changes/	Year		1		
			L	_		
		_		Incide	nce of Annual F	Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenan	ce					
	A		1	1 I		Annual Maintenance Table
	Annual M	amienance l'asks				Annual Ivraintenance Lasks Incidence
	Calibratio	n of Transmitters	(70)	1		Inspection/Calibration of Room Thermostat
	Calibratio	n of Panel Gauges		1		Inspection of PE Switches
	Inspection	n of Auxiliary Devices]		Inspection of Auxiliary Devices
	Inspection	n of Control Devices]		Inspection of Control Devices (Valves,
						(Dampers, VAV Boxes)

NEW BUILDINGS: School Baseline	SIZE: All	COMMER	CIAL SECTOR BU VINTAGE: New	ILDING PROFIL	E	REGION: Labrador	Interconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 0.85 12.9 W/m ²	46.5 ft-candles								
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 85% 15%	Light Level (Lux) % Distribution Weighted Average		300 500 100%	700 T12	1000 T8 HIF	T5HO LED	Total 100% 500		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	0.	0.7 0.7 65 0.65	0.6	100% 0.6 0.6 0.80 0.80	0% 0% 0.6 0.6 0.80 0.80	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		I	15 50	12	66 65	30 30	EUI	kWh/ft².yr	2.8
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	400 Lux 0.15 16.5 W/m ²	37.2 ft-candles						<u> </u>	MJ/II ² .yi	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2000 6760 90% 15%	Light Level (Lux) % Distribution Weighted Average	10	400 500 0%	700	1000		Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	1 1 () 0.	NC CFL 0% 20% 0.7 0.7 65 0.65 15 50	T12 0.6 0.75 72	T8 HIE 10% 20% 0.6 0.6 0.80 0.80 88 65	T5HO LED 30% 10% 0.6 0.6 0.80 0.80 95 90	TOTAL 100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		I.	EUI = Load	X Hrs. X SF	TX GLFF		EUI	kWh/ft².yr MJ/m².yr	0.6
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles		F	loor fraction	check: should = "	.00 1.00	I		
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	2500 6260 100%	Light Level (Lux) % Distribution Weighted Average						Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF	(0.	NC CFL 0% 0.7 0.7 65 0.65	T12 0.6 0.75 73	T8 0.6 0.6 0.80 0.80	MH HPS 100% 0% 0.6 0.6 0.55 0.55	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot	Efficacy (L/W)		15 50	12	04 00	5 90	EUI	kWh/ft².yr M. I/m² yr	
TOTAL LIGHTING						Overall LF	2 13.46 W/m ²	EUI TOTAL	kWh/ft².yr MJ/m².yr	3 132
OFFICE EQUIPMENT & PLUG LOA	DS									
Equipment Type	Computers	Monitors	Printers	Copie	ers	Servers	Plug Loads]		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year)	55 0.05 0.3 W/m 0.0 W/ft 90% 50% 2000	2 0.05 2 0.3 W/m ² 90% 50% 2000	100 0.02 0.2 W/m ² 0.02 W/ft ² 90% 50% 2000	200 0.02 0.4 V 0.04 V 90% 50% 2000	//m² //ft²	217 0.01 0.01 W/m ² 0.01 W/ft ² 100% 100% 2000	0.2 W/m² 0.02 W/tt² 100% 50% 3000			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.3 W/m	2 0.1 W/ft ² 2 0.1 W/ft ²	to see notes (cells v	with red indicator	in upper rig	6760	IFT Camputer Servers	; EUI	kWh/ft².yr MJ/m².yr	0.10 3.68
Usage during occupied period Usage during unoccupied period	100% 59%						Computer Equipmen	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.54 21.01 0.11 4.23
FOOD SERVICE EQUIPMENT Provide description below: Cafeteria	Fuel Oil / Propane Fuel St	nare:	Electricity Fuel Sha	re: 100.0%	EL	Fuel Oil / Propa JI kWh/ft².yr MJ/m².yr	ne EUI 0.2 8.0	All	Electric EUI kWh/ft².yr MJ/m².yr	0.1
REFRIGERATION Provide description below: Unknown]					EUI	kWh/ft².yr MJ/m².yr	0.1
BLOCK HEATERS & MISCELLANE	ous						Block Heaters Miscellaneous	EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.0 2 0.0 2

NEW BUILDINGS: School Baseline	SIZE: Ali	c	COMMER	CIAL SECT VINTAGE New	OR BUILD	NG PROF	ILE	F	REGION: _abrador li	nterconne	cted		
SPACE HEATING													
Heating Plant Type	Syst Eff⊿ Perf (kW)	em Present (%) COP ormance (1 / Eff.) KW)		Fu Bo Stan. 73% 1.37	el Oil / Propa ilers High 83% 1.20	ne Packaged Unit 75% 1.33	A/A HP 2.60 0.38	Elect W. S. HP H 3.10 0.32	tric H/R Chiller 4.50 0.22	Resistance 100% 1.00 1.00	Total		
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	42.9 W/m ² 313 MJ/m ² .yr	13.6 E	Btu/hr.ft² kWh/ft².yr									All Electric El II	
Electric Fuel Share	100.0% Fuel Oil / Pr	opane Fuel Share]	Oil Fuel Sha	re					-	kWh/ft².yr	8.1 313
Boiler Maintenance	Annual Mainten Fire Side Insper Water Side Insp Inspection of C Inspection of B Flue Gas Analy:	ance Tasks ction pection for Scale Buildu ontrols & Safeties urner sis & Burner Set-up	h	Incidence (%) 75% 100% 100% 100% 90%								Fuel Oil / Propane EU kWh/ft2.yr MJ/m2.yr Market Composite EL kWh/ft2.yr MJ/m2.yr	JI 8.1 313
SPACE COOLING											1		
A/C Plant Type	Syst COF Perf (kW/ Addi Rela	(%) ormance (1 / COP) /kW) tional Refrigerant ted Information	Centrifugal Standard 2.5 0.40	I Chillers HE 5.4 0.19	Screw Chillers 4.4 0.23	Reciprocat Open 3.6 0.28	ing Chillers DX 100.0% 3 0.33	Absorption W. H. 0.9 1.11	Chillers CW 1 1.00	Total 100.0%			
Control Mode	Incid Chill Con	ence of Use F s ed Water denser Water	Fixed Setpoint	Reset									
Setpoint	Chill Con Supp	ed Water denser Water ply Air	7 30 13.0	ວ ວ ວ	44.6 86 55.4	°F °F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	60 W/m² 74.8 MJ/m².yr	19 Btu/hr.ft² 1.9 kWh/ft².yr	628	ft²/Ton									
Sizing Factor	1.00	(Operation	(occ. perio	4000	hrs/year	Note value	cannot be le	ess than 2,	900 hrs/ye	ar)		
A/C Saturation (Incidence of A/C)	10.0%												
Electric Fuel Share	100.0% Fuel Oil / Pr	opane Fuel Share]									
Chiller Maintenance	Annual Mainten Inspect Control Inspect Couplin Megger Motors Condenser Tub Vibration Analy Eddy Current T Spectrochemic	ance Tasks , Safeties & Purge Unit g, Shaft Sealing and Be e Cleaning sis esting al Oil Analysis	earings	Incidence (%)	Frequency (years)						F	All Electric EUI kWb/tf2.yr	0.9
Cooling Tower/Air Cooled Condenser	Maintenan Annual Mainten Inspection/Clea Inspect/Service Megger Motors Inspect/Verify C	ance Tasks n Spray Nozzles Fan/Fan Motors Deperation of Controls		Incidence (%)	Frequency (years)							MJ/m².yr Fuel Oil / Propane EU kt/hyft².yr MJ/m².yr Market Composite EU kt/hyft².yr MJ/m².yr	34
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fuel SH System Presen Eff./COP	W Std. Tank t (%) 0.550	PV Tank 0.600	Cond. Tnk 0.900	Std. Boiler 0.750	Cnd. Boil. 0.00% 0.900		Fuel Share Blended Eff	iciency	Fossil 0% 0.90	_	Elec. Res. 100% 0.91	
(Tertiary Load) Wetting Use Percentage	90%			A	Il Electric EL	JI 0.5		Fuel O	il / Propan Wh/ft².yr	e EUI 0.5	F	Market Composite EU kWh/ft².yr	JI 0.5



NEW BLONDS: BZ: NYT AGE: BEOM NACK ANAL PUMPS Note of the content of the stand interconnected in the stand interconnected in the stand interconnected				COMMER	CIAL SECTOR BUILDING PROFILE							
Stabel Al Nev Landroit Network NUMP Fundamental Set UNPS Segment Balagi A Set UNPS Segment	NEW BUILDINGS:	SIZE:			VINTAGE:		REGION:					
Build Standard S	School	All			New		Labrador	Interconne	cted			
HVAC FASS Variation and Education & Excent for Excent	Baseline											
Number of Bases Number of	HVAC FANS & PUMPS											
Understand 200 control 1000000000000000000000000000000000000												
Symme Date Present Earlier Earlier Local to m Symme Date Present 100 Image Date Present 100 Image Date Present 100 Symme Date Present 100 Image Date Present 100 Image Date Present 100 Symme Date Present 100 Image Date Present 100 Image Date Present 100 Symme Date Present 100 Image Dat	SUPPLY FANS					Ventilation	and Exhau	ist Fan Ope	eration & Co	ontrol		
Splittle Bage Art Psize 000 10000 1000 1000 10	Outer Design Air Slow	4.6 1/0 m2	0.00	0514/62	Oriential	Ventilat	tion Fan	Exhau	ist Fan	4		
Sprime Sprime 100 1	System Design Air Flow	4.6 L/S.M-	12	CFM/IT ²	Control	Fixea	Flow	Fixed	Flow			
Spin Ellings Operation Continued Streads Operation Bit Mont Filtering 100 0.	System Static Pressure VAV	300 Pa	1.2	wa	Incidence of Use	100%	TIOW	100%	1101	-		
Env More Triesceve Non Design Factor Non Design Control 100 Bits 200 White Design Control 100 Design Control 100 ERVAILST FAAS Comments: Comments:<	Fan Efficiency	60%			Operation	Continuou	Scheduled	Continuous	Scheduled			
Sing Face 100 Implementation 20% 70% 20% 70% Sing Face 100 0.00 With 0.00 Comments: Implementation Sing Face 100 1.00 1.00 1.00 0.00 With 0.00 Comments: Implementation Sing Face 1.00 1.00 1.00 1.00 1.00 Comments: Implementation	Fan Motor Efficiency	88%										
Sin Design Load CAV Z.B With* O.24 With* Comments: EXAULT F ANS	Sizing Factor	1.00	r	1	Incidence of Use	25%	75%	25%	75%	-		
Induce Camments Camments Value for the second sec	Fan Design Load CAV	2.6 W/m ²	0.24	W/ft ²	0							
EXHAUST FANS	Fan Design Load VAV	2.6 W/m ²	0.24	VV/ft ²	Comments:							
Waterom E-Audi Waterom E-Audi Waterom E-Audi E-Audi Brance E-Audi Brance E-Audi Brance E-Audi Brance E-Audi Brance E-Audi Brance E-Audi Brance E-Brance Brance br>Brance E-Brance Brance E-Brance	EXHAUST FANS											
Wathrom Eshalat 00 U. warkrom 0.00 FMWathrom Other Eshalat 0.00 CFMWathrom 0.00 FMWathrom Other Eshalat 0.00 CFMWathrom 0.00 FMWathrom Other Eshalat 0.00 CFMWathrom 0.00 FMWathrom States States States States 0.00 CFMWathrom 0.00 FMWathrom States States 0.00 Winth 0.00 FMWathrom 0.00 FMWathrom States States 0.00 Winth 0.00<												
Wathcome Exhaust per gross unitset 0.1 U.A.P. 0.05 CFM/VF Total Statig Contension 0.02 CFM/VF 0.03 CFM/VF Total Statig Contension 0.02 CFM/VF 0.03 CFM/VF Total Statig Factor 0.03 CFM/VF 0.03 CFM/VF Total Statig Factor 0.03 CFM/VF 0.03 CFM/VF Total Statig Factor 0.03 CFM/VF 0.03 CFM/VF AttRLAPK COOLING EXDUPMENT (Condenser Pump and Cooling Tower/PCondenser Fans) 0.02 W/VF 0.07 Average Condenser Pump 0.02 W/VF 0.07 W/UTon Condenser Punp 0.005 Lk.KW 3.0 U.S. gm/VTon Pump Design Flow 0.005 Lk.m² 0.006 U.S. gm/VTon Pump Contenser A 0.005 Lk.m² 0.006 U.S. gm/VTon Pump Design Flow 0.000 Lk.m² 0.000 U.S. gm/VTon Pump Design Flow 0.000 Lk.m² 0.000 U.S. gm/VTon Pump Design Flow	Washroom Exhaust	100 L/s.washr	room	212 CFM/was	shroom							
Othe E-based Stroking Contention 0.1 U.M. J. J. J. J. J. J. J. J. J. J. J. J. J.	Washroom Exhaust per gross unit area	0.1 L/s.m ²		0.01 CFM/ft ²								
Cold Eduction Schwart Pressure Bert Spring Fam Motor Efficiency String Fator Par Motor Efficiency String Fator Purp Design Pow Purp Des	Other Exhaust (Smoking/Conference)	0.1 L/s.m ²		0.02 CFM/ft ²								
Enhance Support State Pressore Final Notice Efforts Strain Factor Enhance End Connected Load 0.2 W/m ² 0.0	Total Building Exhaust	0.2 L/s.m ²		0.03 CFM/ft ²								
Fam Mass Private Finances 100 String Factor 100 String Factor 0.02 AUXELARY COOLING EQUPMENT (Condenser Pump and Cooling Tower/Condenser Pams) Average Coolenser Fan Power Daw 0.020 Cooling Tower/Condenser Pump 0.020 Pump Design Flow 0.020 Pump Design Flow 0.020 Pump Design Flow Pump 0.0050 Pump Efficiency 0.0050 String Factor 0.0050 Pump Efficiency 0.0050 String Factor 0.0050 Pump Design Flow 0.0050 Pump Efficiency 0.0050 String Factor 0.0050 Pump Design Flow & S °C (10 °F) delta T 0.0050 Pump Design Flow & S °C (10 °F) delta T 0.0050 Pump Design Flow & S °C (10 °F) delta T 0.0050 String Factor 0.005 String	Exhaust System Static Pressure	250 Pa		1.0 Wg								
Similar Series Top Exhaust Fan Connected Load 0.2 W/m* 0.020 W/m* AUXLARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) 0.020 W/WTon 0.011 W/Ten Chooling Tower/Exp. Condenser Pamp 0.020 W/WW 0.071 W/Ten Chooling Tower/Exp. Condenser Pamp 0.020 W/WW 0.011 W/Te Pump Delight Phony per unit from area 0.0030 U.K.M* 0.0030 U.K.M* 0.0030 U.K.P* 0.0030 U.K.P* 0.0030 U.K.P* 0.0030 U.K.P* 0.003 W/Te U.K.P* 0.003 U.K.P* 0.003 U.K.P* 0.003 W/Te U.K.P* U.K.P* 0.003 U.K.P* 0.003 W/Te U.K.P* U.K.P	Fan Motor Efficiency	75%										
Extract Fan Connected Load 0.02 W/m* 0.02 W/m* AUXLARY COOLING EQUIPMENT (Condenser Fump and Cooling Tower/Condenser Fams) 0.07 W/WW 0.07 W/W 0.03 W/W 0.03 W/W 0.03 W/W 0.03 W/W 0.03 W/W 0.03 <td>Sizing Factor</td> <td>1.0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Sizing Factor	1.0										
AUXILARY COULINE GUIPPIRENT (Condenser Fung) AUXILARY COOLING GUIPPIRENT (Condenser) 0.000 W/WW 0.07 0.000 W/WW 0.07 0.000 W/WW 0.07 Condenser Fung 0.000 Pump Design Pow prunt floor area Pump Design Pow prunt floor area Pump Ediations or area Pump Ediations of the second of	Exhaust Fan Connected Load	0.2 W/m ²	0.02	W/ft ²								
AUXLIARY COOLING EQUIPMENT (Condenser Pump and Cooling Tower/Condenser Fans) Average Condenser Fan Power Draw (Cooling Tower/Even, Condenser Air Cooled Condenser) 0.000 0.												
AUXILARY COOLING EQUIPMENT (Condenser / Junp and Cooling Tower/Condenser / Junp (Cooling Tower/Evap. Condenser) 000000000000000000000000000000000000					-							
Average Condenser Fan Pown Chaw 0.000	AUXILIARY COOLING EQUIPMENT (Cor	ndenser Pump a	Ind Cooling Tow	ver/Condenser Fans)							
Cooling Tower/Even, Condensed // Ir Cooled Condenser) 0	Average Condenser Fan Bower Draw			0.020 WW/WW	0.07 kW//Top							
Conderser Punp Punp Design Flow per unt floor area Punp Design Flow per unt floor area Punp Design Flow a to floor area Punp Bedign	(Cooling Tower/Evan, Condenser/ Air Coo	led Condenser)		1.21 W/m ²	0.11 W/ft2							
Condenser Pump Pemp Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow per unit floor area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pum II theore area Pump Design Phow Pim II theore area Pump De												
Pump Design Flow per unit floor area Pump Head Pressure Pump Head Pressure Pump Edit Pressure Pump Efficiency Pump Motor Efficiency Pump Connected Load	Condenser Pump											
Pump Design Flow per unit flor area Pump Design Flow per unit flor area Pump Design Flow per unit flor area Pump Heindery Pump Efficiency Starge Factor Pump Conserted Load CRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Design Flow @ 5 °C (10 °F) delta T Pump Design Flow @ 5 °C (10 °F) delta T Pump Efficiency Pump Efficiency Pump Efficiency Pump Efficiency Pump Efficiency Starge Factor Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Efficiency Pump Efficiency Boyle Starge Factor Pump Efficiency Pump Effici												
Pump Beigh Flow per unit floor area Pump Beigh Flow per unit floor area Pump Beigh Flow per unit floor area Pump Beigh Flow per unit floor area Pump Beigh Flow per unit floor area Pump Beigh Flow (§ 5°C (10°F) delta T Pump Beag Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (§ 5°C (10°F) delta T Stappet Flow (10°F) delta T Stappet Flow (10°F) delta T Stappet Flow	Pump Design Flow			0.053 L/s.KW	3.0 U.S. gpm/Ton							
Prum Bead Pressure 45 kP4a 15 lt Prum Ethicitory 80% 80% 10.038 W/m² 0.033 W/t² 0.05 W/t? 0.05 W/	Pump Design Flow per unit floor area			0.003 L/s.m ²	0.005 U.S. gpm/ft ²							
Primp Britisherky Primp Motor Efficiency Bising Factor Primp Connected Load CIRCULATING PUMP (Heating & Cooling) Pump Beag Flow @ 5 °C (10 °F) deta T Pump Head Pressure Pump Head Pressure Pump Head Pressure Pump Motor Efficiency Pump Motor Efficiency Pump Connected Load Subjey Fan Occ. Period Supply Fan Occ. Period Supply Fan Occ. Period Supply Fan Occ. Period Supply Fan Coc. Period Supply Fan Coc. Period Supply Fan Coc. Period Supply Fan Coc. Period Supply Fan Coc. Period Supply Fan Energy Consumption Conderser Pump Energy Consumption Circulating Pump Starty Consumptio	Pump Head Pressure			45 kPa	15 ft							
Output Chrinelicy 0.0 Pump Connected Load 0.0 OCRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T 0.003 Upm Efficiency 50% Pump Efficiency 50% Pump Connected Load 0.05 Wim ² 0.003 US. gpm/ft ² Supply Fan Occ. Period 80% Supply Fan Unocc. Period 6760 Supply Fan Unocc. Period 6760 Supply Fan Unocc. Period 6760 Supply Fan Cocc. Period 6760 Supply Fan Energy Consumption 0.8 Cooling Town (Condenser Fans Energy Consumption 0.5 Cooling Town (Condenser Fans Energy Consumption 0.5 Circulating Pump Staintenance 1000 Inrs./year Fans and Pumps Maintenance 1000 Inrs./year Fans and Pumps Maintenance 1000 Inrs./year Inspect/Service Fans & Motors 1000 Inrs./year <tr< td=""><td>Pump Efficiency</td><td></td><td></td><td>50%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>	Pump Efficiency			50%								
Pump Connected Load ORCULATING PUMP (Heating & Cooling) Pump Lead Pressure Pump Head Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Kead Pressure Pump Connected Load O.05 W/m² Supply Fan Occ. Period Supply Fan Coc. Period Supply Fan Coc. Period Corder Pump Energy Consumption Exhaust Fan Occ. Period Exhaust Fan Coc. Period Corder Pump Energy Consumption O.5 W/hrv2 yr Corder Pump Energy Consumption O.5 W/hrv2 yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption Circulating Pump Energy Consumption Fars and Pumps Maintenance Inspect/Service Pump & Motors	Sizing Factor			1.0								
CIRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T 0.003 L/s.m² 0.0038 U.S. gpm/ft² 2.4 U.S. gpm/Ton Pump Efficiency 50% 33 It 33 It 2.4 U.S. gpm/Ton Pump Efficiency 60% 80% 33 It 2.4 U.S. gpm/Ton Strip Factor 0.003 0.05 W/f² 2.4 U.S. gpm/Ton Supply Fan Occ. Period 0.000 hrs./year 80% Supply Fan Occ. Period 2000 hrs./year 80% Supply Fan Energy Consumption 9.6 W/hrm².yr 80% Exhaust Fan Conce. Period 2000 hrs./year 80% Exhaust Fan Unocc. Period 2000 hrs./year 80% Exhaust Fan Energy Consumption 0.6 W/hrm².yr 80% Conderser Pump Energy Consumption 0.6 W/hrm².yr 80% Corolarg Town Condemer Fans Energy Consumption 0.5 W/hrm².yr 80% Circulating Pump Energy Consumption 0.5 W/hrm².yr 80% Circulating Pump Energy Consumption 0.5 W/hrm².yr 100 Fans and Pumps Maintenance Anrual Maintenance Insks Incidence Frequency 10 Inspect/Service Fans & Motors 10 10	Pump Connected Load			0.36 W/m ²	0.03 W/ft ²							
CRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5 °C (10 °F) delta T Pump Etad Pressure Pump Klord Pressure Pump Klord Pressure Pump Klord Pressure Strip Factor Pump Connected Load Suppl Fan Occ. Period Suppl Fan Uncc. Period Pump Klord Consumption Exhaust Fan Lenergy Consumption Condenser Fans Energy Consumption Condenser Fans Energy Consumption Circulating Pump Energy Consumpti												
CRCULATING PUMP (Heating & Cooling) Pump Design Flow @ 5°C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Efficiency B0% B0% B0% B0% B0% B0% B0% B0% B0% B0%												
Pump Design Flow @ 5 °C (10 °F) delta T US, m² US, m² US, gpm/Tet	CIRCULATING PUMP (Heating & Cooling	g)										
Print plesgi Pridvi es C (10 P) delia 1 Pump Head Pressure Pump Head Pressure Pump Motor Efficiency Pump Motor Efficiency Pump Motor Efficiency Supply Fan Conce Period Supply Fan Conce. Period Supply Fan Conce. Period Exhaust Fan Occ. Period Exhaust Fan Corc. Period Exhaust Fan Energy Consumption Condenser Pump Energy Consumption Circulating Pump Yearly Operation Circulating Pump Yearly Operation Circulating Pump Energy Consumption Exhaust Fan Energy Consumption Exhaust Fan Energy Consumption Exhaust Fan Energy Consumption Circulating Pump Shaintenance Annual Maintenance Tasks Inspect/Service Fans & Motors Inspect/Service Fans & Motors Inspect/Service Pump & Motors EUI WM/ff*yr 1.0 EUI WM/ff*yr 1.0	Dump Design Flow @ 5 °C (10 °F) date	-	0.002	1 /0 -002	0.0020 11 6 mm////		T					
Print Print Pressure 100 Ara 33 11 Pump Efficiency 50% 80% 30% Pump Connected Load 0.5 W/m² 0.05 W/ft² Supply Fan Occ. Period 6760 hrs./year 50% 50% Exhaust Fan Occ. Period 6760 hrs./year 50% 50% Exhaust Fan Unocc. Period 6760 hrs./year 50% 50% Condenser Pump Energy Consumption 0.8 KWh/m².yr 50% 50% Cordenser Pump Energy Consumption 0.5 KWh/m².yr 50% 50% Circulating Pump Energy Consumption 0.5 KWh/m².yr 50% 50% 50% Circulating Pump Energy Consumption 0.5 50% 10% 60% 60% 60% 60% 60% 60% 60% 60% 60% 60% 60% 60%	Pump Design Flow @ 5 °C (10 °F) delta 1 Pump Hood Brosouro	1	0.003	L/S.M ²	0.0038 U.S. gpm/ft ² 2.4	10.5. gpm/	Ion					
Annual Maintenance Annual Maintenance Tasks Incidence Frequency Circulating Pump Service Pump Service Pump Service Pump Service Pump Service Pump & Motors Annual Maintenance Tasks Incidence Frequency EUI KWh/fP.yr 1.00 1.00 1.00 1.00 Inspect/Service Pump & Motors 0.05 1.00 1.00 1.00 Inspect/Service Pump & Motors 0.05 1.00 1.00 1.00 KWh/fP.yr 1.00 1.00 1.00 1.00 1.00	Pump Efficiency		50%	кга	35 11							
Sizing Factor 100 Sizing Facto	Pump Motor Efficiency		80%									
Pump Connected Load 0.5 W/m² 0.05 W/ft² Supply Fan Occ. Period 2000 hrs./year Supply Fan Energy Consumption 9.6 kV/h/m².yr Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 kW/h/m².yr Condenser Pump Energy Consumption 0.5 kW/h/m².yr Condenser Fans Energy Consumption 0.5 kW/h/m².yr Condenser Fans Energy Consumption 0.5 kW/h/m².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Service Pump & Motors 1.0 Inspect/Service Pump & Motors 0.0 1.0	Sizing Factor		0.8	-								
Supply Fan Docc. Period 2000 hrs./year Supply Fan Unocc. Period 6760 hrs./year Supply Fan Energy Consumption 9.6 WWh/m².yr Exhaust Fan Unocc. Period 2000 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 WWh/m².yr Condenser Pump Energy Consumption 0.5 KWh/m².yr Cordenser Fans Energy Consumption 0.5 KWh/m².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption 0.5 kWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors 10 Inspect/Service Pump & Motors 10	Pump Connected Load		0.5	W/m ²	0.05 W/ft ²							
Supply Fan Occ. Period 2000 hrs./year Supply Fan Energy Consumption 9.6 WWh/m².yr Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Occ. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Condenser Pump Energy Consumption 0.8 WWh/m².yr Condenser Pump Energy Consumption 0.5 KWh/m².yr Coling Tower /Condenser Fans Energy Consumption 0.5 KWh/m².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Pump & Motors 1.0 With/fk.yr 1.0 Number of 2001 Inspect/Service Pump & Motors 1.0 Number of 2001												
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Supply Part Direct. Period 0/00 Ints/year Supply Fan Energy Consumption 9.6 KWh/m².yr Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 KWh/m².yr Condenser Pump Energy Consumption 0.5 KWh/m².yr Condenser Pump Energy Consumption 0.5 KWh/m².yr Condenser Fans Energy Consumption 0.5 KWh/m².yr Corolating Pump Yearly Operation 0.5 KWh/m².yr Circulating Pump Energy Consumption 3000 hrs./year KWh/m².yr Ministenance 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Pump & Motors 1.0	Supply Fan Occ. Period		2000	hrs./year								
Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 kWh/m².yr Condenser Pump Energy Consumption 0.5 kWh/m².yr Condenser Fans Energy Consumption 0.5 kWh/m².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors 10 10 Inspect/Service Pump & Motors 10 10	Supply Fan Energy Consumption		9.6	his./year kWb/m² vr								
Exhaust Fan Occ. Period 2000 hrs./year Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 WM/vm².yr Condenser Pump Energy Consumption	Supply Fair Energy Consumption		3.0	Kvviviii .yi								
Exhaust Fan Unocc. Period 6760 hrs./year Exhaust Fan Energy Consumption 0.8 WWh/m².yr Condenser Pump Energy Consumption 0.5 kWh/m².yr Coling Tower /Condenser Fans Energy Consumption 0.5 kWh/m².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors 10 Inspect/Service Pump & Motors	Exhaust Fan Occ. Period		2000	hrs./vear								
Exhaust Fan Energy Consumption 0.8 WWVm².yr Condenser Pump Energy Consumption 0.5 WWVm².yr Coining Tower /Condenser Fans Energy Consumption 0.5 WWVm².yr Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption MWVm².yr Incidence Frequency Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors	Exhaust Fan Unocc. Period		6760	hrs./year								
Condenser Pump Energy Consumption wWh/m².yr Cooling Tower /Condenser Fans Energy Consumption 0.5 Circulating Pump Yearly Operation 3000 Circulating Pump Energy Consumption wWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Inspect/Service Fans & Motors (%) Inspect/Service Pump & Motors 10 EUI kWh/ft².yr Numps Maintenance 10 Inspect/Service Pump & Motors 10	Exhaust Fan Energy Consumption		0.8	kWh/m².yr								
Condenser Pump Energy Consumption kWM/m².yr Cooling Tower /Condenser Fans Energy Consumption 0.5 Circulating Pump Yearly Operation 3000 Circulating Pump Energy Consumption 3000 Fans and Pumps Maintenance Annual Maintenance Tasks Inspect/Service Fans & Motors inspect/Service Pump & Motors Inspect/Service Pump & Motors 0.5			r	1								
Cooling Tower /Condenser Fans Energy Consumption 0.5 KWh/m².yr Circulating Pump Yearly Operation Circulating Pump Energy Consumption 3000 hrs./year Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) Inspect/Service Fans & Motors Inspect/Service Pump & Motors EUI KWh/f².yr EUI KWh/f².yr 1.0	Condenser Pump Energy Consumption			kWh/m².yr								
Circulating Pump Yearly Operation 3000 hrs./year Circulating Pump Energy Consumption MWh/m².yr Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Service Pump & Motors EUI KWh/t².yr	Cooling Tower /Condenser Fans Energy C	onsumption	0.5	kWh/m².yr								
Circulating Pump Energy Consumption Instruction Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors Inspect/Service Pump & Motors	Circulating Rump Yearly Operation		3000	bre /vear								
Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft2-yr 1.0	Circulating Pump Energy Consumption		3000	kWh/m ² vr								
Fans and Pumps Maintenance Annual Maintenance Tasks Incidence Frequency (%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors Inspect/Service Pump & Motors	Energy condemption		L	1								
(%) (years) Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI KWh/ft²-yr 1.0 Multi-2ur 20.0	Fans and Pumps Maintenance	Annual M	laintenance Task	s	Incidence Frequency							
Inspect/Service Fans & Motors Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI KWh/ff2.yr 1.0 NU/r2.yr 200	-				(%) (years)							
Inspect/Adjust Belt Tension on Fan Belts Inspect/Service Pump & Motors EUI kWh/ft².yr 1.0 UI kw/h/t².yr 200		Inspect/Se	ervice Fans & M	otors								
Inspect/Service Pump & Motors		Inspect/Ar	djust Belt Tensio	n on Fan Belts	<u> </u>					E.U.	134/1-/612	
RA DAPAZ OF ALL LI		Inspect/Se	ervice Pump & N	IOTOI'S						EUI	KVVh/ft².yr M.I/m² vr	1.0 39.0

			COMMERCIAL SECT	OR BUILDI	NG PROFILE			
NEW BUILDINGS:	:	SIZE:	VINTAGE:				REGION:	
School		All	New				Labrador Interconnected	
Baseline								
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:		14.5 kWh/ft².yr 562.7 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	2.8	107.3		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr	
SECONDARY LIGHTING	0.6	25.1	SPACE HEATING	8.1	312.9			
TERTIARY LIGHTING			SPACE COOLING	0.1	3.4			
OTHER PLUG LOADS	0.1	4.2	DOMESTIC HOT WATER	0.5	19.0	0.0	0.0	
HVAC FANS & PUMPS	1.0	39.0	FOOD SERVICE EQUIPMENT	0.1	4.0			
REFRIGERATION	0.1	3.0						
MISCELLANEOUS	0.0	1.5						
BLOCK HEATERS	0.0	1.5						
COMPUTER EQUIPMENT	0.5	21.0						
COMPUTER SERVERS	0.1	3.7						
OUTDOOR LIGHTING	0.4	17.0						

		COMMERCIAL SECTOR BUIL	DING PROFILE
NEW BUILDINGS:	SIZE:	VINTAGE:	REGION:
Baseline			
CONSTRUCTION			
Wall U value (W/m ² .°C) 0.2	8 W/m².°C	0.05 Btu/hr.ft ² .°F	Typical Building Size 6,506 m ² 70,000 ft ²
Roof U value (W/m ² .°C) 0.1	9 W/m².°C	0.03 Btu/hr.ft ² .°F	Typical Footprint (m ²) 3,253 m ² 35,000 ft ²
Glazing U value (W/m ² .°C) 2.8	0_W/m².°C	0.49 Btu/hr.ft ² .°F	Footprint Aspect Ratio (L:W) 7
			Percent Conditioned Space 100% Percent Conditioned Space 50%
Window/Wall Ratio (WIWAR) (%) 0.3	0		Defined as Exterior Zone
Shading Coefficient (SC) 0.6	5		Floor to Floor Height (m) 3.7 m 12.0 ft
VENTILATION SYSTEM, BUILDING CONTR	OLS & INDOOR CONDIT	ONS	
Ventilation System Type		CAV CAVR DDM	Z DDMZVV VAV VAVR IU 100% O.A TOTAL
	System Prese	nt (%) 50%	50% 100%
	(Minimum Thr	%) ottled Air Volume as Percent of Full Flow)	50%
			0/ 04 49.200/
Occupancy of People Density Occupancy Schedule Occ. Period	90%	in-person 151 h-person	%OA 16.36%
Occupancy Schedule Unocc. Period	10		
	10		
Fresh Air Control Type *(enter	a 1, 2 or 3) 1	If Fresh Air Control Type = "2" enter % FA.	to the right: 34%
(1 = mixed all control, 2 = Fixed fresh alf, 3 100	no nesnan)	in Fresh All Control Type = "3" enter Make-	p An ventulation and operation 0.5 US.m ² 0.10 CFM/R ²
Sizing Factor	1.0		
Total All Circulation of Design All Flow	3.8	0.77 CFM/tt ²	Separate Make-up air unit (100% OA)
Infiltration Rate	0.4	0.08 CFM/ft ²	Operation occupied period 50%
hours only if the ventilation system shuts down)	Jupieu		
Economizer		Enthaloy Based Dry-Bulb Based	Total
Loonomizer	Incidence of Use	100%	100% Summary of Design Parameters
	Switchover Point	KJ/kg. 18 °C	Peak Design Cooling Load ########
		Buibin 04.4 1	Room air enthalpy 28.2 Btu/lbm
Controls Type	System Present (%)	HVAC Room	Discharge air enthalpy 23.4 Btu/lbm
	All Pneumatic		Design CFM 33,483
	DDC/Pneumatic All DDC		Total air circulation or Design air 3.89 l/s.m ²
	Total (should add-up to 1	00%)	
		Proportional PI / PID Tota	a l
Control mode	Control Mode	Find Discharge Deset	_
	Control Strategy	Fixed Discharge Reset	
Indoor Decign Conditions		Room	Supply Air
indee. Design Conditions	Summer Temperature	24 °C 75	2] °F 13] °C 55.4] °F
	Summer Humidity (%)	50%	2 Btu/lbm 54.5 K l/kg 23.4 Btu/lbm
	Winter Occ. Temperature	22 °C 71.	6 °F 16 °C 60.8 °F
	Winter Occ. Humidity Enthalpy	30% 53 K.I/kg 223	45% Btv/lbm 45.5 K.//kg. 19.6 Btv/lbm
	Winter Unocc. Temperate	ire 21 °C 69	8] °F
	Winter Unocc. Humidity Enthaloy	30% 50 K.I/kg 21 5	Btu/lbm
	()	55 Noring. 21.4	
Damper Maintenance		Incidence Freauency	
• • • • • • •		(%) (years)	
	Lubrication		
	Blade Seal Replacement		
Air Filter Cleaning	Changes/Year		
		Incidence	of Annual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenan	ce		
	Annual Maintenance Tasl	s Incidence	Annual Maintenance Tasks Incidence
	Calibration of Transmitte	(%) s	(%)
	Calibration of Panel Gau	jes	Inspection of PE Switches
	Inspection of Auxiliary De	vices	Inspection of Auxiliary Devices
		1	(Dampers, VAV Boxes)
1			

NEW BUILDINGS: University/College Baseline	SIZE: All	COMMERCIAL SEC VINTAGI New	TOR BUILDING PROFILE E:	REGION: Labrador Interconnected	3
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	500 Lux 4 0.90 11.9 W/m ²	6.5 ft-candles 1.1 W/ft²			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 90% 20%	Light Level (Lux) % Distribution Weighted Average	300 500 70 100%		Total 100% 500
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0.7 0.65 0.65 0.7 15 50 7	12 18 HID 15HO 95% 4% 1% 6 0.6 0.7 0.6 '5 0.80 0.80 0.80 '2 88 65 95	LED IOTAL 0% 100.0% 0.6 0.80 90 90
Relamping Strategy & Incidence of Practice	Group Spot		- <u> </u>		EUI kWh/ft².yr 4.5
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 2 0.10 9.6 W/m ²	7.9 ft-candles 0.9 W/ft²			Monte-yi 173
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 100% 50%	Light Level (Lux) % Distribution Weighted Average	300 500 70 100%		Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL IT 3% 15%	12 13 HID 15HO 80% 0% 0 0 0 66 0.6 0.6 0.6 0 0 75 0.80 0.80 0.80 0 0 72 88 65 95 95 0	LED IOTAL 2% 100.0% 0.6 0.80 90 90
Relamping Strategy & Incidence of Practice	Group Spot		EUI = Load X Hrs.	. X SF X GLFF	EUI kWh/ft².yr 0.6 MJ/m².yr 22
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles	Floor fra	action check: should = 1.00	1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average			
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 11 0% 0.7 0.7 0.1 0.65 0.65 0.7 15 50 7	12 18 MH 100% 100% 6 0.6 0.6 5 0.80 0.80 0.55 '2 84 88 65	HPS IOTAL 0% 100.0% 0.6 0.55 90 0
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 11.65 W/r	n ² EUI TOTAL kWh/ft².yr 5 MJ/m².yr 197
OFFICE EQUIPMENT & PLUG LOA	DS				
Equipment Type	Computers	Monitors P	rinters Copiers	Servers Plug Load	et s
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	54.55 0.31 1.2 W/m ² 0.1 W/ft ² 90% 50% 2000 6760	51 10 0.31 0.0 1.1 W/m² 0.0 0.1 W/t² 0.0 90% 90% 90% 50% 50% 50% 2000 2000 2000 6760 6760 6760	2 200 2 0.02 1W/m² 0.3 W/m² 1W/tt² 0.3 W/t² 6 90% 6 50% 0 2000 0 66	217 0.01 0.1 W/m² 0.1 W/m	n² ²
Total end-use load (occupied period) Total end-use load (unocc. period)	3.9 W/m² 2.2 W/m²	0.4 W/ft ² to see no 0.2 W/ft ²	tes (cells with red indicator in uppe	er right corner, type "SHIFT @@mputer S	Servers EUI kWh/ft².yr 0.10 MJ/ft².yr 3.68
Usage during occupied period Usage during unoccupied period	100% 55%			Computer Equ	Loads EUI KWh/tf².yr 1.34 MJ/m².yr 51.73 EUI KWh/tf².yr 0.65 MJ/m².yr 25.18
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity	⁷ Fuel Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/f².yr 0.5 MJ/m².yr 20.0	All Electric EUI EUI kWh/ft².yr 0.4 MJ/m².yr 15.0
REFRIGERATION Provide description below: Unknown					EUI kWh/ft².yr 0.5 MJ/m².yr 20.0
BLOCK HEATERS & MISCELLANE	ous			Block F Miscella	leaters EUI kWh/ft².yr 0.1 MJ/m².yr 5 5 aneous EUI kWh/ft².yr 0.1

NEW BUILDINGS: University/College Baseline	SIZE: All			COMMER	CIAL SECT VINTAGE New	OR BUILD	NG PROF	ILE		REGION: Labrador I	nterconnec	ted		
SPACE HEATING														
Heating Plant Type					Fu	el Oil / Propa	ne		Elec	tric				
0 71					Bo	ilers High	Packaged	A/A HP	W. S. HPI	H/R Chiller	ResistanceT	otal		
		System Present	(%)		Jian.	riigii	Offic	4 70		4.50	100%	100%		
		Eff./COP Performance (1	/ Eff.)		75%	83%	95% 1.05	1.70	3.00 0.33	4.50 0.22	1.00			
		(kW/kW)												
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	41.6 W/m ² 445 MJ/m ² .yr	E	13.2 11.5	Btu/hr.ft² kWh/ft².yr								_		
Electric Fuel Share	100.0% Fuel C	0il / Propane Fuel	Share]	Oil Fuel Sha	re]			-	kWh/ft².yr	11.5
Boiler Maintenance	Annual Ma	aintenance Tasks			Incidence]						L	MJ/m².yr	445
	Fire Side	Inspection			(%)							_	Fuel Oil / Propane E kWh/ft².vr	UI
	Water Sid	le Inspection for S	Scale Buil	dup	100%								MJ/m².yr	
	Inspection	of Burner	arelies		100%								Market Composite E	UI
	Flue Gas	Analysis & Burne	r Set-up		90%	J							kWh/ft².yr MJ/m².yr	11.5 445
SPACE COOLING														
A/C Flaht Type				Centrifuga	al Chillers	Screw	Reciprocat	ing Chiller	Absorption	Chillers	Total			
		System Present	(%)	Standard	HE 25.0%	Chillers	Open	DX 75.0%	W. H.	CW	100.0%			
		COP Performance (1		4.7	5.4	4.4	3.6	2.7	0.9	1				
		(kW/kW)	/ 001)	0.21	0.13	0.23	0.20	0.57	1.11	1.00				
		Additional Refrig Related Information	gerant tion											
Control Mode		Incidence of Use	e	Fixed	Reset									
		Chilled Water		Setpoint										
		Condenser Wate	ər											
		.			7									
Setpoint		Chilled Water Condenser Wate	ər	7 30	°C °C	44.6 86	°F °F							
		Supply Air		13.0	0°C	55.4	°F							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	78 W/m² 85.9 MJ/m².yr	25 2.2	Btu/hr.ft² ‹Wh/ft².yr	483	ft²/Ton									
Sizing Factor	1.00			Operation	(occ. perio	4000	hrs/year	Note valu	e cannot be	less than 2,	900 hrs/yea	r)		
A/C Saturation	70.0%													
(Incidence of A/C)	10.070													
Electric Fuel Share	100.0% Fuel C	0il / Propane Fuel	Share]									
Chiller Maintenance	Annual Ma	aintenance Tasks			Incidence	Frequency								
	Inspect C	ontrol Safeties &	Purge Lir	oit	(%)	(years)								
	Inspect C	oupling, Shaft Sea	aling and l	Bearings										
	Megger N Condense	lotors er Tube Cleaning												
	Vibration	Analysis												
	Spectroch	nemical Oil Analys	is										All Electric EUI	
													kWh/ft².yr MJ/m².yr	1.0 39
Cooling Tower/Air Cooled Condense	er Maintenan Annual Ma	aintenance Tasks			Incidence	Frequency							Fuel Oil / Propage E	
	Inspection	VClean Spray No:	zzles		(78)	(years)							kWh/ft².yr	01
	Inspect/Se Megger M	ervice Fan/Fan Me lotors	otors										MJ/m².yr	
	Inspect/V	erify Operation of	Controls									F	Market Composite E	UI
													MJ/m².yr	39
DOMESTIC HOT WATER														
Service Hot Water Plant Type	FoesilFu	al SHW	Std. Tank	PV Tank	Cond Tri	Std Boiler	Cnd Boil	ſ			Fossil	1	Elec. Res	
	System P	resent (%)				5.0. 50101	0.00%		Fuel Share		0%		100%	
Service Hot Water load (MJ/m ² .vr)	Eff./COP 22.8		0.550	0.600	0.900	0.750	0.900		Blended Ef	ticiency	0.90		0.91	
(Tertiary Load)					<u>م</u>	II Electric El	11		Fuel C)il / Proper	FIII	F	Market Composito E	1.11
Wetting Use Percentage	90%				F	kWh/ft ² .yr	0.6		FuelC	kWh/ft².yr	0.7	F	kWh/ft².yr	0.6
					1	MJ/m².yr	25		1	MJ/m².yr	25		MJ/m².yr	25.0



NEW BUILDINGS: University/College Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: New	F	REGION: Labrador I	nterconne	ected			
HVAC FANS & PUMPS										
SUPPLY FANS			[]	Ventilation a	and Exhau	st Fan Ope	eration & Co	ontrol		
System Design Air Flow System Static Pressure CAV System Static Pressure VAV Fan Efficiency	3.9 L/s.m ² 750 Pa 750 Pa 60%	0.77 CFM/ft ² 3.0 wg 3.0 wg	Control Incidence of Use Operation	Fixed 50% Continuous	Variable Flow 50% Scheduled	Fixed 100% Continuous	Variable Flow Scheduled			
Fan Motor Emicency Sizing Factor Fan Design Load CAV Fan Design Load VAV	80% 1.00 6.1 W/m ² 6.1 W/m ²	0.56 W/ft ² 0.56 W/ft ²	Incidence of Use Comments:	50%	50%	50%	50%			
EXHAUST FANS				1						
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Exhaust Fan Connected Load	100 U/s.wash 0.1 U/s.m² 0.1 U/s.m² 0.2 U/s.m² 250 Pa 25% 1.0 0.2 W/m²	212 CFM/was 0.01 CFM/tr2 0.02 CFM/tr2	hroom							
AUXILIARY COOLING EQUIPMENT (Cond	lenser Pump a	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Coole	d Condenser)	0.020 kW/kW 1.57 W/m ²	0.07 kW/Ton 0.15 W/ft ²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 U/s.KW 0.004 U/s.m ² kPa 50% 80% 1.0 W/m ²	3.0 U.S. gpm/Ton 0.006 U.S. gpm/ft ² ft W/ft ²							
CIRCULATING PUMP (Heating & Cooling)										
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.003 L/s.m ² 100 kPa 50% 80% 0.8 0.8 0.7 W/m ²	0.0050 U.S. gpm/ft ² 2.4 50 ft 0.06 W/ft ²	U.S. gpm/T	ōn					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 28.6 kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 1.3 kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Co	nsumption	kWh/m².yr 0.5 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000 hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/A	faintenance Tasks Service Fans & Motors Idjust Belt Tension on Fan Belts	Incidence Frequency (%) (years)							
	Inspect/S	Service Pump & Motors						EUI	kWh/ft².yr MJ/m².yr	2.8 109.8

			COMMERCIAL SECT	OR BUILD	NG PROFILE					
NEW BUILDINGS:		SIZE:	VINTAGE:				REGION:			
University/College		All	New				Labrador Interconnected			
Baseline										
EUI SUMMARY										
TOTAL ALL END-USES:	Electricity:		24.5 kWh/ft².yr 947.2 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr			
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane			
GENERAL LIGHTING	4.5	175.2		kWh/ft².yr	MJ/m ² .yr	kWh/ft².yr	MJ/m².yr			
SECONDARY LIGHTING	0.6	22.1	SPACE HEATING	11.5	445.1					
TERTIARY LIGHTING			SPACE COOLING	0.7	27.6					
OTHER PLUG LOADS	0.7	25.2	DOMESTIC HOT WATER	0.6	25.0	0.0	0.0			
HVAC FANS & PUMPS	2.8	109.8	FOOD SERVICE EQUIPMENT	0.4	15.0					
REFRIGERATION	0.5	20.0								
MISCELLANEOUS	0.1	5.0								
BLOCK HEATERS	0.1	5.0								
COMPUTER EQUIPMENT	1.3	51.7								
COMPUTER SERVERS	0.1	3.7								
ELEVATORS										
OUTDOOR LIGHTING	0.4	17.0								

		COMMERCIAL SECTOR BUILDING	G PROFILE
NEW BUILDINGS: Warebouse/Wholesale	SIZE:	VINTAGE:	REGION:
Baseline		1101	
CONSTRUCTION			
Wall U value (W/m ² .°C) 0.28	W/m².°C 0.05	Btu/hr.ft ² .°F Ty	vpical Building Size 1,859 m ² 20,000 ft ²
Roof U value (W/m ² .°C) 0.19	W/m².°C 0.03	Btu/hr.ft ² .°F Ty	ypical Footprint (m ²) 1,859 m ² 20,000 ft ²
Glazing U value (W/m ² .°C) 2.80	W/m².°C 0.49	Btu/hr.ft ² .°F FC	Dotprint Aspect Ratio (L:W) 1
		Pé	ercent Conditioned Space 40%
Window/Wall Ratio (WIWAR) (%) 0.05		D	efined as Exterior Zone
Shading Coefficient (SC) 0.80		FI	oor to Floor Height (m) 6.1 m 19.9 ft
VENTILATION SYSTEM, BUILDING CONTROL	S & INDOOR CONDITIONS		
Ventilation System Type		CAV CAVR DDMZ D	DMZVV VAV VAVR IU 100% O.A TOTAL
	System Present (%)	100%	100%
	Min. Air Flow (%) (Minimum Throttled Air V	olume as Percent of Full Flow)	50%
	400	4070 424	V OA (10.749/
Occupancy or People Density Occupancy Schedule Occ. Period	100 m²/perso 90%	n 1076 ft²/person	%UA 10.74%
Occupancy Schedule Unocc. Period			
Fresh Air Requirements or Outside Air	20 L/s.perso	in 42 CFM/person	
Fresh Air Control Type *(enter a	1, 2 or 3) 1 If Fresh A	ir Control Type = "2" enter % FA. to th	
1 = mixed air control, 2 = Fixed tresh air, 3 100%	iresnair) ir Fresh A	in Control Type = "3" enter Make-up A	In ventulation and operation U.S L/S.m ² 0.10 CFM/tt ²
Sizing Factor	1	0.07 0004/42	
I Gran All Circulation of Design All Flow	1.86 L/S.M ²	0.37 CFM/II ²	Separate Make-up air unit (100% OA)
Infiltration Rate	0.40 L/s.m ²	0.08 CFM/ft ²	Operation occupied period 50%
hours only if the ventilation system shuts down)	Jeu		
Economizer	Enthalr	w Based Dry-Bulb Based	Total
Loonomizer	Incidence of Use	100%	100% Summary of Design Parameters
	Switchover Point	KJ/kg. 18 °C	Peak Design Cooling Load 234,761
			Room air enthalpy 28.2 Btu/lbm
Controls Type	System Present (%)	HVAC Room Equipment Controls	Discharge air enthalpy 23.4 Btu/lbm Specific volume of air at 555 & 100% B 13.2 ft ³ /lbm
	All Pneumatic		Design CFM 7,331
	DDC/Pneumatic All DDC		Total air circulation or Design air 1.86 l/s.m ²
	Total (should add-up to 100%)		
	Prop	ortional PI / PID Total	
Control mode	Control Mode	Nachara Darat	
	Control Strategy	Ischarge Reset	
Indoor Design Conditions		Room	Supply Air
indee. Design conditions	Summer Temperature	22 °C 71.6 °I	F 13 °C 55.4 °F
	Summer Humidity (%)	50%	100%
	Winter Occ. Temperature	21 °C 69.8 °I	F 16 °C 60.8 °F
	Winter Occ. Humidity Enthaloy	30% 53 KJ/kg. 22.8 B	45% tu/lbm 45.5 K.//kg. 19.6 Btu/lbm
	Winter Unocc. Temperature	21 °C 69.8 °I	F
	Winter Unocc. Humidity Enthalov	30% 50 KJ/kg. 21.5 B	:tu/lbm
	···· • • • •	21.0 B	
Damper Maintenance		Incidence Frequency	
	Central Arm Advator	(%) (years)	
	Lubrication		
	Blade Seal Replacement		
Air Filter Cleaning	Changes/Year		
		Incidence of A	nnual Room Controls Maintenance
Incidence of Annual HVAC Controls Maintenance			
	Annual Maintenance Tasks	Incidence	Annual Maintenance Tasks Incidence
	Calibration of Transmitters	(%)	(%) Inspection/Calibration of Room Thermostat
	Calibration of Panel Gauges		Inspection of PE Switches
	Inspection of Auxiliary Devices Inspection of Control Devices		Inspection of Auxiliary Devices Inspection of Control Devices (Valves,
	· · · · · · · · · · · · · · · · · · ·	·	(Dampers VAV Boyes)

NEW BUILDINGS: Warehouse/Wholesale Baseline	SIZE: Ali	COMMERCIAL SECT VINTAGE: New	OR BUILDING PROFILE	REGION: Labrador Interconnec	led
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 3 0.95 9.1 W/m ²	7.2 ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3500 5260 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 70 50% 50%		Total 100% 400
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.7 0. 0.65 0.65 0.7 15 50 7	12 18 HID 15HO 15% 15% 70% .6 0.6 0.7 0.6 75 0.80 0.80 0.80 '2 88 65 95	100.0% 0.6 0.80 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr 3.5 MJ/m².yr 134
SECONDARY LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 2 0.05 9.4 W/m ²	7.9 ft-candles			
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	3000 5760 100% 15%	Light Level (Lux) % Distribution Weighted Average	300 500 70 100%		Total 100% 300
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL 1* 3% 10%	12 18 HID 15HO 85% 0% 6 6 0.6 0.6 0.6 6 0.6 0.6 0.6 0.80 0.80 0.80 75 0.80 0.80 0.80 95 95 95	LED TOTAL 2% 100.0% 0.6 0.80 90
Relamping Strategy & Incidence of Practice	Group Spot		FIII – Load X Hrs	X SE X GI FE	EUI kWh/ft².yr 0.2 M l/m².yr 7
TERTIARY LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux	ft-candles W/ft²	Floor fra	action check: should = 1.00	1.00
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300 500 70		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	INC CFL I 0% 0% 0% 0.7 0.7 0.7 0.65 0.65 0.7 15 50 7	12 18 MH .6 0.6 0.6 0.6 75 0.80 0.80 0.55 '2 84 88 65	HPS IOTAL 0% 0.0% 0.6 0.5 90 90
Relamping Strategy & Incidence of Practice	Group Spot				EUI kWh/ft².yr MJ/m².yr
TOTAL LIGHTING				Overall LP 9.13 V	V/m² EUI TOTAL kWh/ft².yr 3.6 MJ/m².yr 140
OFFICE EQUIPMENT & PLUG LOA	DS				
Equipment Type	Computers	Monitors Prir	ters Copiers	Servers Plug Lo	ads
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	54.55 0.59 0.3 W/m ² 0.0 W/ft ² 90%	51 100 0.59 0.03 0.3 W/m² 0.0 0.0 W/tt² 0.00 90% 90% 90%	200 0.03 W/m² 0.1 W/ft² 0.01 W/ft² 0.01 90% 0	217 0.06 0.1 W/m ² 0.01 W/ft ² 100% 90%	V/m² V/ft²
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 50% 2000 2000 6760 6760	50% 2000 6760	100% 25% 2000 3500 6760 5260	
Total end-use load (occupied period) Total end-use load (unocc. period)	2.6 W/m ² 1.0 W/m ²	0.2 W/ft ² to see note	s (cells with red indicator in uppe	er right corner, type "SHIFT @a mpute	r Servers EUI kWh/ft².yr 0.11 MJ/m².yr 4.42
Usage during occupied period Usage during unoccupied period	100% 39%			Computer E	uppment EUI kWh/ft².yr 0.34 MJ/m².yr 13.30 ug Loads EUI kWh/ft².yr 0.83 MJ/m².yr 32.15
FOOD SERVICE EQUIPMENT Provide description below:	Fuel Oil / Propane Fuel Share:	Electricity f	uel Share: 100.0%	Fuel Oil / Propane EUI EUI kWh/ft².yr MJ/m².yr	All Electric EUI EUI kWh/ft?.yr MJ/m².yr
REFRIGERATION Provide description below: Large refrigeration storage					EUI kWh/ft².yr 1.5 MJ/m².yr 60.0
BLOCK HEATERS & MISCELLANE	ous			Block	c Heaters EUI kWh/tf².yr 0.1 MJ/m².yr 5 ellaneous EUI kWh/tf².yr 0.1 M./m².yr 5

	0175	COMME	RCIAL SEC	TOR BUILD	ING PROF	ILE					
NEW BUILDINGS: Warehouse/Wholesale	All		New					Labrador	Interconnected		
	Γ				11-110/-1	0			Electric .		
Heating Plant Type					Packaged	A/A HP	W. S. HPH	I/R Chiller	Electric ResistanceTotal	1	
		System Present (%)	Boiler	Unit Heater	Rooftop				100% 1	100%	
		Eff./COP Performance (1 / Eff.)	75%	75% 3 1.33	95% 1.05	1.70 0.59	3.00 0.33	4.50	1.00		
	l	(KW/KW)									
Peak Heating Load Seasonal Heating Load	37.3 W/m ² 310 MJ/m ² .yr	11.8 Btu/hr.ft ² 8.0 kWh/ft ² .y	r								
(Tertiary Load) Sizing Factor	1.00										
Electric Fuel Share	100.0% Euel Oi	I / Propage Fuel Share		Oil Fuel Sha	ire		1			All Electric EU	80
Boiler Maintenance	Annual Mai	intenance Tasks	Incidence				J			MJ/m².yr	310
Bolier Walkenande	Fire Side I		(%)	_						Fuel Oil / Propane	EUI
	Water Side	e Inspection for Scale Buildup	100%	<u>></u>						MJ/m².yr	
	Inspection	of Burner	100%							Market Composite	EUI
	Flue Gas A	nalysis & Burner Set-up	90%	<u>,</u>						kWh/tt².yr MJ/m².yr	8.0 310
SPACE COOLING											
A/C Plant Type											
		Centrifug Standard	gal Chillers	Screw Chillers	Reciprocat Open	ting Chillers DX	Absorption W. H.	Chillers CW	Total		
		System Present (%) COP 4	.7 5.4	4.4	3.6	100.0%	0.9	1	100.0%		
		Performance (1 / COP) 0.2 (kW/kW)	0.19	0.23	0.28	0.34	1.11	1.00			
		Additional Refrigerant									
Control Mode		Incidence of Use Fixed	Reset								
		Chilled Water		-							
	l	Condenser Water									
Setpoint		Chilled Water	7 °C	44.6	°F						
		Condenser Water 3 Supply Air 13	0°C .0°C	86 55.4	°F °F						
Peak Cooling Load	37 W/m ²	12 Btu/hr.ft ² 102	2 ft²/Ton								
Seasonal Cooling Load (Tertiary Load)	29.4 MJ/m ² .yr	0.8 kWh/ft².yr									
Sizing Factor	1.00	Operatio	n (occ. peric	4000	hrs/year	Note value	e cannot be l	ess than 2	,900 hrs/year)		
A/C Saturation	10.0%										
(Incidence of A/C)											
Electric Fuel Share	100.0% Fuel Oi	I / Propane Fuel Share									
Chiller Maintenance	Annual Mai	intenance Tasks	Incidence	Frequency							
	Inspect Co	ntrol, Safeties & Purge Unit	(70)	(years)							
	Megger Mo	otors									
	Vibration A	nalysis									
	Eddy Curre Spectroche	ent Testing emical Oil Analysis								All Electric EU	11
				-						kWh/ft².yr MJ/m².yr	0.3 12
Cooling Tower/Air Cooled Condense	er Maintenan Annual Mai	intenance Tasks	Incidence (%)	Frequency (years)						Fuel Oil / Propane	EUI
	Inspection/ Inspect/Se	Clean Spray Nozzles rvice Fan/Fan Motors								kWh/ft².yr MJ/m².yr	
	Megger Mo Inspect/Ve	otors rify Operation of Controls								Market Composite	EUI
	<u> </u>									kWh/ft².yr MJ/m².yr	0.3 12
DOMESTIC HOT WATER											
Service Hot Water Plant Type	Fossil Fuel	SHW Std Tank PV/Tan	k Cond Th	Std. Boiler	Cnd. Boil	T			Fossil	Elec. Res	
	System Pr	esent (%)		0.750	0.00%	ł	Fuel Share	ficiency	0%	100%	
Service Hot Water load (MJ/m ² .yr)	18.2	0.550 0.80	0.900	, 0.7 <u>0</u> 0	0.900	J		потенсу	0.30	0.91	
	00%			All Electric EL	JI]	Fuel C	il / Propan	e EUI	Market Composite	EUI
vveπing Use Percentage	90%			кvvn/ft².yr MJ/m².yr	0.5 20			kvvn/tt².yr MJ/m².yr	0.5 20	kWh/tt².yr MJ/m².yr	0.5 20.0



NEW BUILDINGS: WarehouseWholesale Raseline	SIZE: All		COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: New		REGION: Labrador I	Interconne	cted			
HVAC FANS & PUMPS											
SUPPLY FANS					Ventilation	and Exhau	st Fan Ope	ration & Co	ontrol		
System Design Air Flow 1. System Static Pressure CAV 30	9 L/s.m² 10 Pa	0.37	CFM/ft ² wg	Control	Fixed	Variable Flow	Fixed	Variable Flow			
System Static Pressure VAV 30 Fan Efficiency 60 Fan Motor Efficiency 80	00 Pa	1.2	wg	Incidence of Use Operation	100% Continuou	Scheduled	100% Continuous	Scheduled			
Sizing Factor 1.0 Fan Design Load CAV 1	0 .2 W/m²	0.11	W/ft ²	Incidence of Use	50%	50%	50%	50%			
Fan Design Load VAV 1.	2 W/m ²	0.11	W/ft ²	Comments:							
EXHAUST FANS											
Washroom Exhaust 10 Washroom Exhaust erg gross unit area 0. Other Exhaust (Smoking/Conference) 0. Total Building Exhaust 0. Exhaust System Static Pressure 22 Fan Efficiency 25 Fan Motor Efficiency 75 Sizing Factor 1. Exhaust Fan Connected Load 0.	0 L/s.washrood 1 L/s.m ² 1 L/s.m ² 2 L/s.m ² 2 L/s.m ² 30 Pa 30 30 W/m ²	0.03	212 CFM/was 0.02 CFM/tt ² 0.02 CFM/tt ² 0.04 CFM/tt ² 1.0 wg	shroom							
AUXILIARY COOLING EQUIPMENT (Conder	ser Pump and	Cooling Tow	er/Condenser Fans))							
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air Cooled (Condenser)		0.020 kW/kW 0.74 W/m ²	0.07 kW/Ton 0.07 W/ft ²							
Condenser Pump											
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		-	0.053 L/s.KW 0.002 L/s.m ² kPa 50% 80% 1.0 W/m ²	3.0 U.S. gpm/Ton 0.003 U.S. gpm/ft ² ft W/ft ²							
CIRCULATING PUMP (Heating & Cooling)											
Pump Design Flow @ 5 °C (10 °F) delta T Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.002 50% 80% 0.8	L/s.m² kPa W/m²	0.0023 U.S. gpm/ft ² 2 ft W/ft ²	2.4]U.S. gpm/	Ton					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 5260 7.1	hrs./year hrs./year kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 5260 1.7	hrs./year hrs./year kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy Consu	Imption	0.2	kWh/m².yr kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		7000	hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual Mair Inspect/Serv Inspect/Adju Inspect/Serv	ntenance Tasks rice Fans & Mo st Belt Tension rice Pump & Mo	tors on Fan Belts otors	Incidence Frequency (%) (years)					EUI	kWh/ft².yr M.1/m².yr	0.8

			COMMERCIAL SECT	OR BUILD	NG PROFILE			
NEW BUILDINGS:		SIZE:	VINTAGE	:			REGION:	
Warehouse/Wholesale		All	New				Labrador Interconnect	ed
Baseline								
EUI SUMMARY								
TOTAL ALL END-USES:	Electricity:	: [16.5 kWh/ft².yr 641.0 MJ/m².yr	Fuel Oil /	Propane:	0.0 kWh/ft².yr	0.0 MJ/m².yr	
END USE:	kWh/ft².yr	MJ/m ² .yr	END USE:	Electr	icity	Fuel Oil /	Propane	
GENERAL LIGHTING	3.5	133.8		kWh/ft².yr	MJ/m ² .yr	kWh/ft ² .yr	MJ/m ² .yr	
SECONDARY LIGHTING	0.2	6.5	SPACE HEATING	8.0	310.2			
TERTIARY LIGHTING			SPACE COOLING	0.0	1.2			
OTHER PLUG LOADS	0.8	32.1	DOMESTIC HOT WATER	0.5	20.0	0.0	0.0	
HVAC FANS & PUMPS	0.8	32.4	FOOD SERVICE EQUIPMENT					
REFRIGERATION	1.5	60.0						
MISCELLANEOUS	0.1	5.0						
BLOCK HEATERS	0.1	5.0						
COMPUTER EQUIPMENT	0.3	13.3						
COMPUTER SERVERS	0.1	4.4						
ELEVATORS								
OUTDOOR LIGHTING	0.4	17.0						
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EXISTING BUILDINGS: Restaurant Raseline	SIZE: All	COMMERC	IAL SECTOR BUILDIN VINTAGE: New	G PROFILE	REGION: Labrador Interconnected
CONSTRUCTION Wall U value (W/m².°C) 0.28 Roof U value (W/m².°C) 0.19 Glazing U value (W/m².°C) 2.80 Window/Wall Ratio (WIWAR) (%) 0.36 Shading Coefficient (SC) 0.58	W/m².°C W/m².°C W/m².°C	0.05 Btu/hr.ft² .°F 0.03 Btu/hr.ft² .°F 0.49 Btu/hr.ft² .°F	T F F F F F F	ypical Building Size ypical Footprint (m ³) ootprint Aspect Ratio (L:W) ercent Conditioned Space lercent Conditioned Space lefined as Exterior Zone ypical # Stories loor to Floor Height (m)	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$
VENTILATION SYSTEM, BUILDING CONTRO	OLS & INDOOR CONDITIO	NS			
Ventilation System Type Occupancy or People Density	System Present Min. Air Flow (% (Minimum Throt	CAV (%) 60%)) Ided Air Volume as Percer m²/person	CAVR DDMZ I nt of Full Flow) 215 ft²/person	DDMZVV VAV VAVF 60%	IU 100% O.A TOTAL 40% 100% %OA 10.83%
Occupancy Schedule Occ. Period Occupancy Schedule Unocc. Period Fresh Air Requirements or Outside Air	90%	L/s.person	16 CFM/person		
Fresh Air Control Type *(enter : (1 = mixed air control, 2 = Fixed fresh air, 3 100	a 1, 2 or 3) 1 % fresh air)	f Fresh Air Control Type = f Fresh Air Control Type =	= "2" enter % FA. to the = "3" enter Make-up Air \	ight: entilation and operation	L/s.m ² CFM/ft ²
Sizing Factor Total Air Circulation or Design Air Flow	1.3 3.46	L/s.m²	0.68 CFM/ft ²		
Infiltration Rate (air infiltration is assumed to occur during unoccu hours only if the ventilation system shuts down)	0.40	L/s.m²	0.08 CFM/ft ²	Separate Make-up a Operatior Operatior	Ir unit (100% OA) L/s.m ² CFM/ft ² I occupied period 50% unoccupied period 50%
Economizer	Incidence of Use Switchover Point	Enthalpy Based KJ/kg. Btu/lbm	Dry-Bulb Based 100% 18 °C 64.4 °F	Total 100% Summary Peak Des Peak Zon	of Design Parameters ign Cooling Load 191,742 e Sensible Load 112,725 extension 2022 Builtern
Controls Type	System Present (%) All Pneumatic DDC/Pneumatic All DDC Total (should add-up to 100	HVAC Equipment	Room Controls	Discharge Specific vol Design C Total air o	en ranky 23.2 Brullom ume of air at 55F & 100% R 13.2 ft%/lbm FM 5,244 irrculation or Design air 3.46 Vs.m ²
Control mode	Control Mode Control Strategy	Proportional Fixed Discharge	PI/PID Total Reset		
Indoor Design Conditions	Summer Temperature Summer Humidity (%) Enthalpy Winter Occ. Temperature Winter Occ. Humidity Enthalpy Winter Unocc. Temperature Winter Unocc. Humidity Enthalpy	24 50% 65.5 21 30% 53 9 21 30% 53 9 21 30% 50	Room 75.2 °C 75.2 KJ/kg. 28.2 °C 69.8 KJ/kg. 22.8 °C 69.8 KJ/kg. 21.5	Supply Ai 14 °C 98% 54.5 Ku/lbm 54.5 KJ/kg. 7 45% 45.5 KJ/kg. 7 F 38.7	57.2 °F 23.4 Btu/lbm 59 °F 19.6 Btu/lbm
Damper Maintenance	Control Arm Adjustment Lubrication Blade Seal Replacement	Incidence (%)	Frequency (years)		
Air Filter Cleaning	Changes/Year		Incidence of A	Annual Room Controls Mainter	nance
Incidence of Annual HVAC Controls Maintenanc	e				
	Annual Maintenance Tasks Calibration of Transmitters Calibration of Panel Gauge Inspection of Auxiliary Devic Inspection of Control Devic	s ces		Annual Maintenance Inspection/Calibratio Inspection of PE Sw Inspection of Auxilia Inspection of Contro (Dampers, VAV Box	Tasks Incidence (%) n of Room Thermostati itches

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EXISTING BUILDINGS: Restaurant Baseline	SIZE: Ali	COMME	RCIAL SECTOR BUILDIN VINTAGE: New	IG PROFILE	REGION: Labrador Ir	nterconnected			
LIGHTING GENERAL LIGHTING Light Level Floor Fraction (GLFF) Connected Load	400 Lux 33 0.50 10.3 W/m ²	7.2 ft-candles							
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	400 100%	550 650		7510	Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	0.7 0. 0.65 0.7 50 7	18 HID 100.0%	15HO LED 0.6 0.6 0.80 0.80 95 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot						EUI	kWh/ft².yr	2.3
ARCHITECTURAL LIGHTING Light Level Floor Fraction (ALFF) Connected Load	300 Lux 23 0.50 21.2 W/m ²	7.9 ft-candles 2.0 W/ft ²						MJ/IIP.yl	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4300 4460 100% 10%	Light Level (Lux) % Distribution Weighted Average	200	300 44 100	00 500 %		Total 100% 400		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	30% 0.7 0.65 15	CFL 112 50%	18 HID .6 0.6 0.6 75 0.80 0.80 72 84 65	TSHO LED 20% 0.6 0.6 0.80 0.80 0.80 95 90 90	100.0%		
Relamping Strategy & Incidence of Practice	Group Spot		r	-UI = Load X Hrs	X SE X GLEE		EUI	kWh/ft².yr M.I/m² yr	4.7
SPECIAL PURPOSE LIGHTING Light Level Floor Fraction (HBLFF) Connected Load	Lux W/m²	ft-candles W/ft ²		Floor fra	action check: should = 1.0	00 1.00]	<u></u>	
Occ. Period(Hrs./yr.) Unocc. Period(Hrs./yr.) Usage During Occupied Period Usage During Unoccupied Period	4000 4760 0% 100%	Light Level (Lux) % Distribution Weighted Average	300	500 70	00 1000		Total		
Fixture Cleaning: Incidence of Practice Interval	years	System Present (%) CU LLF Efficacy (L/W)	0.7 0.65 15	CFL T 0.7 0. 0.65 0.7 50 7	12 T8 .6 0.6 0.6 75 0.80 0.80 72 84 88	MH HPS 0.6 0.6 0.55 0.55 65 90			
Relamping Strategy & Incidence of Practice	Group Spot					i	EUI	kWh/ft².yr	
TOTAL LIGHTING					Overall LP	15.75 W/m²	EUI TOTAL	kWh/ft².yr MJ/m².yr	7 269
OFFICE EQUIPMENT & PLUG LOA	DS								
Equipment Type	Computers	Monitors	Printers	Copiers	Servers	Plug Loads]		
Measured Power (W/device) Density (device/occupant) Connected Load Diversity Occupied Period	55 0.16 0.4 W/m ² 0.0 W/ft ² 80%	51 0.16 0.4 W/m ² 0.0 W/ft ² 80%	100 0.01 0.1 W/m ² 0.00 W/ft ² 80%	200 W/m ² W/ft ² 80%	217 0.06 0.1 W/m ² 0.01 W/ft ² 100%	1.15 W/m² 0.11 W/ft² 80%			
Diversity Unoccupied Period Operation Occ. Period (hrs./year) Operation Unocc. Period (hrs./year)	50% 2000 6760	50% 2000 6760	50% 2000 6760	50% 2000 6760	100% 2000 6760	50% 4100 4660			
Total end-use load (occupied period) Total end-use load (unocc. period)	1.8 W/m ²	0.2 W/ft ² 0.1 W/ft ²				Computer Servers	EUI	kWh/ft².yr MJ/m².yr	0.11 4.42
Usage during occupied period Usage during unoccupied period	100% 65%					Computer Equipmen	t EUI s EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².yr	0.41 16.00 0.60 23.23
FOOD SERVICE EQUIPMENT Provide description below: Lunch room/cafeteria/restaurant	Fuel Oil / Propane Fuel Share:		Electricity Fuel Share:	100.0%	Fuel Oil / Propane EUI kWh/ft².yr MJ/m².yr	EUI 0.1 5.0	All EUI	Electric EUI kWh/ft².yr MJ/m².yr	34.3 1330.0
REFRIGERATION Provide description below: Lunch room/cafeteria/restaurant							EUI	kWh/ft².yr MJ/m².yr	16.8 650.0
BLOCK HEATERS & MISCELLANE	ous					Block Heaters Miscellaneous	s EUI	kWh/ft².yr MJ/m².yr kWh/ft².yr MJ/m².vr	0.1 5 0.1 5

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EXISTING BUILDINGS: Restaurant Baseline	SIZE: All		COMME	CIAL SECT VINTAGE New	OR BUILDI	NG PROFI	LE		REGION: Labrador Ir	nterconnec	ted		
SPACE HEATING													
Heating Plant Type				Fu	el Oil / Propa	ne		Elec	ctric		T		
				Stan.	High	Packaged Unit	A/A HP	W. S. HP	H/R Chiller	Resistance	I otal		
		System Present (% Eff./COP	6)	70%	80%	70%	1.70	3.00	4.50	100% 1.00	100%		
		Performance (1 / (kW/kW)	Eff.)	1.43	1.25	1.43	0.59	0.33	0.22	1.00			
Peak Heating Load Seasonal Heating Load (Tertiary Load) Sizing Factor	51.4 W/m ² 427 MJ/m ² .yr		16.3 Btu/hr.ft ² 11.0 kWh/ft ² .yr								Г		
Electric Fuel Share	100.0% Fuel 0	0il / Propane Fuel St	nare	Ι	Oil Fuel Sha	re]				kWh/ft².yr	11.0
Boiler Maintenance	Annual M	aintenance Tasks		Incidence	1						L	MJ/m².yr	427
	Fire Side	Inspection		(%) 75%	_							Fuel Oil / Propane E kWh/ft².yr	UI
	Water Sid	te Inspection for Sca of Controls & Safe	ale Buildup ties	100%	-						L	MJ/m².yr	
	Inspection Flue Gas	n of Burner Analysis & Burner S	Set-up	100%	-						-	Market Composite E kWh/ft².vr	UI 11.0
	1.100 000		or up	0070	1							MJ/m².yr	427
SPACE COOLING													
A/C Plant Type			Quatrifu		MOUD	D i			Ohillens	Tetel			
			Standard	HE	WSHP	Open	DX	W. H.	CW	l otal			
		System Present (% COP	6) 4.	7 5.4	3.5	3.5	100.0%	6 0.9	1	100.0%			
		Performance (1 / (kW/kW)	COP) 0.2	1 0.19	0.29	0.29	0.38	3 1.11	1.00				
		Additional Refriger	ant										
Control Mode		Incidence of Use	Fixed	Reset	1								
		Chilled Water	Setpoint		-								
		Condenser Water]								
Setopint		Chilled Water			11.6	∘⊏							
Sepon		Condenser Water	30	0°C	86	°F							
		Supply Air	14.		57.2	۴							
Peak Cooling Load Seasonal Cooling Load (Tertiary Load)	60 W/m ² 65.7 MJ/m ² .yr	19 Btu 1.7 kW	ı/hr.ft² 620 /h/ft².yr	<u>ft²</u> /Ton									
Sizing Factor	1.00		Operation (o	cc. period)	3000	hrs/year	Note value	e cannot be	less than 2,9	900 hrs/yea	ır)		
A/C Saturation (Incidence of A/C)	90.0%												
Electric Fuel Share	100.0% Fuel 0	0il / Propane Fuel St	nare	I									
Chiller Maintenance	Annual M	aintenance Tasks		Incidence	Frequency								
	Inspect C	ontrol, Safeties & P	urge Unit	(%)	(years)								
	Inspect C Megger M	oupling, Shaft Sealii Iotors	ng and Bearings										
	Condense Vibration	er Tube Cleaning Analysis											
	Eddy Cur Spectrock	rent Testing									Г	All Electric ELU	
	opeeneer	iennical On Analysis										kWh/ft².yr	0.7
Cooling Tower/Air Cooled Condense	r Maintenan Annual M	aintenance Tasks		Incidence	Frequency						L	MJ/m².yr	29
	Inspection	∿Clean Spray Nozz	es	(%)	(years)							Fuel Oil / Propane E kWh/ft².yr	UI
	Inspect/S Megger N	ervice Fan/Fan Mote lotors	ors								L	MJ/m².yr	
	Inspect/V	erify Operation of C	ontrols								F	Market Composite E kWb/ft² vr	UI 0.7
												MJ/m².yr	29
DOMESTIC HOT WATER													
Service Hot Water Plant Type	Fossil Fue	el SHW	Tank			Boiler]			Fossil		Elec. Res.	
	System P Eff./COP	resent (%)	0.65			0%	-	Fuel Share Blended E	e fficiencv	0% 0.75	F	<u>100%</u> 0.91	
Service Hot Water load (MJ/m ² .yr) (Tertiary Load)	700.0			- u					· · -/				
Wetting Line Descenter	000/			ŀ	All Electric EL	10.5]	Fuel C	Dil / Propane	EUI	F	Market Composite E	UI
wetting Use Percentage	90%				кvvn/tt².yr MJ/m².yr	19.9 769			кvvn/tt².yr MJ/m².yr	24.1 933		kvvn/tt².yr MJ/m².yr	19.9 769.2



EXISTING BUILDINGS: Restaurant Baseline	SIZE: All	COMMER	CIAL SECTOR BUILDING PROFILE VINTAGE: New		REGION: Labrador I	nterconne	cted			
HVAC FANS & PUMPS										
SUPPLY FANS				Ventilation	and Exhau	st Fan Ope	ration & Contr	ol		
System Design Air Flow	3.5 L/s.m ²	0.68 CFM/ft ²	Control	Ventilat Fixed	tion Fan Variable	Exha	aust Fan Variable			
System Static Pressure CAV System Static Pressure VAV	350 Pa 350 Pa 52%	1.4 wg 1.4 wg	Incidence of Use	60%	Flow	100% Continuous	Flow			
Fan Motor Efficiency Sizing Factor	85% 1.00		Incidence of Use	75%	25%	75%	25%	I		
Fan Design Load CAV Fan Design Load VAV	2.7 W/m ² 2.7 W/m ²	0.25 W/ft ² 0.25 W/ft ²	Comments:							
EXHAUST FANS								ι		
Washroom Exhaust Washroom Exhaust per gross unit area Other Exhaust (Smoking/Conference) Total Building Exhaust Exhaust System Static Pressure Fan Efficiency Fan Motor Efficiency Sizing Factor Efficiency Exhaust Fan Connected Load	100 L/s.wast 0.2 L/s.m² 0.1 L/s.m² 0.3 L/s.m² 250 Pa 40% 80% 1.0 U/m²	212 CFM/washrov 0.04 CFM/tr2 0.06 CFM/tr2 0.06 CFM/tr2 0.06 CFM/tr2 0.07 W/tr2	m							
AUXILIARY COOLING EQUIPMENT (C	Condenser Pump	and Cooling Tower/Condenser Fans)								
Average Condenser Fan Power Draw (Cooling Tower/Evap. Condenser/ Air C	ooled Condenser)	0.020 kW/kW 1.19 W/m²	0.07 kW/Ton 0.11 W/ft ²							
Condenser Pump										
Pump Design Flow Pump Design Flow per unit floor area Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load		0.053 L/s.KW 0.003 L/s.m ² 900 kPa 55% 90% 1.0 0.58 W/m ²	3.0 U.S. gpm/Ton 0.005 U.S. gpm/ft ² 30 ft 0.05 W/ft ²							
CIRCULATING PUMP (Heating & Coo	ling)									
Pump Design Flow @ 5 °C (10 °F) delt Pump Head Pressure Pump Efficiency Pump Motor Efficiency Sizing Factor Pump Connected Load	аT	0.003 L/s.m ² 150 kPa 55% 90% 0.5 0.4 W/m ²	0.0038 U.S. gpm/ft ² 2.4 50 ft 0.04 W/ft ²	U.S. gpm/	Ton					
Supply Fan Occ. Period Supply Fan Unocc. Period Supply Fan Energy Consumption		3500 hrs./year 5260 hrs./year 12.2 kWh/m².yr								
Exhaust Fan Occ. Period Exhaust Fan Unocc. Period Exhaust Fan Energy Consumption		3500 hrs./year 5260 hrs./year 1.8 kWh/m².yr								
Condenser Pump Energy Consumption Cooling Tower /Condenser Fans Energy	Consumption	0.3 kWh/m².yr 0.4 kWh/m².yr								
Circulating Pump Yearly Operation Circulating Pump Energy Consumption		5000 hrs./year kWh/m².yr								
Fans and Pumps Maintenance	Annual M Inspect/S Inspect/S	Aaintenance Tasks Service Fans & Motors Idjust Belt Tension on Fan Belts Jervice Pump & Motors	Incidence Frequency (%) (years)					EUI	kWh/ft².yr	1.4

EXISTING BUILDINGS: SIZE: VINTAGE: REGION: Restaurant All New Labrador Interconnected Baseline EUI SUMMARY
Restaurant All New Labrador Interconnected Baseline
Baseline EUI SUMMARY
TOTAL ALL END-USES: Electricity: 92.8 kWh/ft².yr 3,594.3 MJ/m².yr Fuel Oil / Propane: 0.0 kWh/ft².yr 0.0 MJ/m².yr
END USE: kWh/ft².yr M.J/m².yr END USE: Electricity Fuel Oil / Propane
GENERAL LIGHTING 2.3 88.3 kWh/tf².yr MJ/m².yr kWh/tf².yr MJ/m².yr
ARCHITECTURAL LIGHTING 4.7 180.8 SPACE HEATING 11.0 426.7
SPECIAL PURPOSE LIGHTING SPACE COOLING 0.7 25.7
OTHER PLUG LOADS 0.6 23.2 DOMESTIC HOT WATER 19.9 769.2 0.0 0.0
HVAC FANS & PUMPS 1.4 53.0 FOOD SERVICE EQUIPMENT 34.3 1,330.0
REFRIGERATION 16.8 650.0
MISCELLANEOUS 0.1 5.0
BLOCK HEATERS 0.1 5.0
COMPUTER EQUIPMENT 0.4 16.0
COMPUTER SERVERS 0.1 4.4
ELEVATORS
OUTDOOR LIGHTING 0.4 17.0

Terms Used in Building Profile Summaries

Profile Term	Explanation
Building envelope	Defines the thermal characteristics of a building's exterior components
U-value	The rate of heat loss, in Btu per hour per square foot per
	degree Fahrenheit (BTU/hr. f ^{2.o} F) through walls, roofs
	and windows. The U-value is the reciprocal of the R-
	value
Shading coefficient (SC)	Is a measure of the total amount of heat passing through
	the glazing compared with that through a single clear
Window to wall ratio	glass
General lighting	Defines the lighting types that are used within the main
General lighting	areas of a building e.g. for a School the area is
	classrooms and the lighting type is fluorescent: for a
	Food Retail store, the main area is the retail floor.
LPD	Lighting power density expressed in terms of W/ft ²
Lux	The amount of visible light per square meter incident on
	a surface (lumen/m ²)
Inc	Incandescent lamps
CFL	Compact fluorescent lamps
	112 fluorescent lamps with magnetic ballasts
	18 fluorescent lamps with electronic ballasts
	High procesure addium lompo
	High intensity discharge lighting includes both MH and
	HPS
Т5НО	T5 High Output fluorescent lamps
	Light Emitting Diode lamps
Secondary lighting	Defines the lighting types that are used within the
	secondary areas of a building, e.g., for a School, the
Outdoor lighting	Defines the outdoor lighting including parking lot and
	facade
Overall LPD	The total floor weighted LPD that includes general,
	secondary, and outdoor
Fans	Defines the mix of air handling systems
CAV	Constant air volume
VAV	Variable air volume
Space heating	Defines the mix of heating equipment types found within
ACUD	the stock of buildings
	Air-source heat pump
Resistance	Electric resistance heating equipment including hollers
Resistance	and baseboard heaters
Fuel Oil / Propane	Fossil fuel fired equipment, including space heating,
	domestic hot water heating, and cooking equipment
Space cooling	Defines the mix of cooling equipment types found within
	the stock of buildings
Centrifugal	Standard centrifugal chillers with a full load performance of 0.75 kW/ton
Centri HE	High-efficiency centrifugal chillers assumed to have a
	performance of <0.65 kW/ton
Recip open	Semi-hermetic reciprocating chillers
DX	Direct expansion cooling equipment that use small
	tonnage hermetic compressors

Appendix D Background-Section 6: Reference Case Peak Load

Introduction

The following exhibits show the Reference Case peak load profiles for each region.

Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	3.7	0.7	2.3	0.2	0.4	9.3	7.0	0.4	1.1	0.6	0.1	2.4	3.8	30.2	-	62.3
	2017	-	3.9	0.7	2.3	0.2	0.4	9.4	7.3	0.4	1.2	0.6	0.1	2.4	3.9	30.9	-	63.8
Large Office	2020	-	4.1	0.7	2.4	0.2	0.4	9.5	7.7	0.4	1.2	0.6	0.1	2.4	4.1	31.9	-	65.9
Large Onice	2023	-	4.4	0.8	2.6	0.2	0.4	9.8	8.2	0.5	1.3	0.6	0.1	2.4	4.3	33.2	-	68.8
	2026	-	4.6	0.8	2.6	0.2	0.5	9.9	8.6	0.5	1.4	0.6	0.1	2.4	4.5	34.2	-	70.8
	2029	-	4.8	0.9	2.7	0.2	0.5	10.0	9.0	0.5	1.5	0.6	0.2	2.4	4.6	35.3	-	73.2
	2014	-	3.0	0.5	1.9	-	-	6.9	3.0	0.3	0.9	0.5	0.1	0.9	3.0	23.8	-	45.0
	2017	-	3.1	0.6	2.0	-	-	6.9	3.2	0.3	1.0	0.5	0.1	0.9	3.0	24.2	-	45.8
Small Office	2020	-	3.4	0.6	2.1	-	-	7.1	3.5	0.4	1.0	0.5	0.1	0.9	3.2	25.3	-	47.9
	2023	-	3.6	0.6	2.2	-	-	7.2	3.7	0.4	1.1	0.5	0.1	0.9	3.3	26.2	-	49.8
	2026	-	3.7	0.7	2.3	-	-	7.3	3.9	0.4	1.1	0.5	0.1	0.9	3.4	26.8	-	51.1
	2029	-	3.9	0.7	2.3	-	-	7.4	4.2	0.4	1.2	0.5	0.1	0.9	3.5	27.5	-	52.6
	2014	-	0.3	0.1	0.6	-	1.4	5.9	4.3	0.2	0.4	0.5	0.7	0.6	1.2	10.9	-	26.9
	2017	-	0.3	0.1	0.7	-	1.5	5.9	4.4	0.2	0.4	0.5	0.7	0.6	1.2	11.1	-	27.3
Large Non-food Retail	2020	-	0.3	0.1	0.7	-	1.6	6.1	4.6	0.2	0.4	0.5	0.7	0.6	1.3	11.5	-	28.5
Largonten rotan	2023	-	0.4	0.1	0.7	-	1.6	6.2	4.8	0.2	0.5	0.5	0.8	0.6	1.3	11.9	-	29.5
	2026	-	0.4	0.1	0.8	-	1.7	6.2	4.9	0.2	0.5	0.5	0.8	0.6	1.4	12.2	-	30.2
	2029	-	0.4	0.1	0.8	-	1.8	6.3	5.1	0.2	0.5	0.5	0.8	0.6	1.4	12.5	-	31.0
	2014	-	0.4	0.1	1.0	-	-	7.1	4.5	0.2	0.6	0.7	-	0.8	1.8	15.6	-	32.7
	2017	-	0.4	0.1	1.0	-	-	7.1	4.5	0.2	0.6	0.7	-	0.7	1.8	15.8	-	33.0
Small Non-food Retail	2020	-	0.5	0.1	1.0	-	-	7.2	4.7	0.2	0.6	0.7	-	0.7	1.9	16.5	-	34.2
	2023	-	0.5	0.1	1.1	-	-	7.3	4.9	0.2	0.6	0.7	-	0.8	2.0	17.2	-	35.4
	2026	-	0.5	0.1	1.1	-	-	7.4	5.1	0.3	0.7	0.7	-	0.8	2.0	17.7	-	36.3
	2029	-	0.5	0.1	1.1	-	-	7.5	5.2	0.3	0.7	0.7	-	0.7	2.1	18.3	-	37.3
	2014	-	0.3	0.1	1.2	-	3.3	2.9	1.8	0.1	0.4	0.3	10.0	0.5	0.6	7.5	-	28.9
	2017	-	0.4	0.1	1.3	-	3.3	2.9	1.8	0.1	0.4	0.3	10.1	0.5	0.6	7.5	-	29.2
Food Retail	2020	-	0.4	0.1	1.3	-	3.5	2.9	1.9	0.1	0.4	0.3	10.5	0.5	0.6	7.8	-	30.3
	2023	-	0.4	0.1	1.4	-	3.6	3.0	1.9	0.1	0.4	0.4	10.9	0.5	0.6	8.0	-	31.4
	2026	-	0.4	0.1	1.4	-	3.7	3.0	2.0	0.1	0.4	0.4	11.2	0.5	0.7	8.2	-	32.1
	2029	-	0.4	0.1	1.5	-	3.8	3.1	2.0	0.1	0.5	0.4	11.5	0.5	0.7	8.3	-	32.9

Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	0.2	0.0	5.6	0.0	1.2	1.0	0.9	0.1	0.2	0.1	0.2	1.1	0.4	5.2	-	16.3
	2017	-	0.2	0.0	5.7	0.0	1.2	1.0	0.9	0.1	0.2	0.1	0.2	1.1	0.4	5.3	-	16.6
Large Accomodation	2020	-	0.2	0.0	6.0	0.0	1.2	1.1	0.9	0.1	0.2	0.1	0.2	1.1	0.5	5.6	-	17.4
Large Accomodation	2023	-	0.2	0.0	6.3	0.0	1.2	1.1	1.0	0.1	0.2	0.2	0.2	1.2	0.5	5.9	-	18.1
	2026	-	0.2	0.0	6.5	0.0	1.3	1.1	1.0	0.1	0.2	0.1	0.2	1.2	0.5	6.0	-	18.6
	2029	-	0.2	0.0	6.8	0.0	1.3	1.1	1.0	0.1	0.2	0.1	0.2	1.2	0.5	6.3	-	19.2
	2014	-	0.1	0.0	2.6	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.8	-	7.3
	2017	-	0.1	0.0	2.7	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.8	-	7.4
Small Accomodation	2020	-	0.1	0.0	2.8	-	0.3	0.6	0.2	0.0	0.1	0.1	0.1	0.3	0.2	2.9	-	7.7
Small Accomodation	2023	-	0.1	0.0	2.9	-	0.3	0.6	0.2	0.1	0.1	0.1	0.1	0.3	0.2	3.0	-	8.0
	2026	-	0.1	0.0	3.0	-	0.3	0.6	0.2	0.1	0.1	0.1	0.1	0.3	0.2	3.1	-	8.2
	2029	-	0.1	0.0	3.1	-	0.3	0.6	0.3	0.1	0.1	0.1	0.1	0.3	0.2	3.2	-	8.4
	2014	-	0.5	0.1	3.1	0.1	3.1	0.7	3.6	0.1	0.9	0.5	0.2	2.9	0.9	16.2	-	32.9
lealthcare	2017	-	0.5	0.1	3.1	0.1	3.2	0.7	3.6	0.1	1.0	0.5	0.2	2.9	0.9	16.3	-	33.1
	2020	-	0.5	0.1	3.2	0.1	3.3	0.7	3.8	0.1	1.0	0.5	0.2	2.9	0.9	16.7	-	33.9
	2023	-	0.5	0.1	3.4	0.1	3.3	0.7	3.9	0.1	1.1	0.5	0.2	2.9	0.9	17.1	-	34.9
	2026	-	0.6	0.1	3.5	0.1	3.4	0.7	4.0	0.2	1.1	0.5	0.2	2.9	0.9	17.4	-	35.6
	2029	-	0.6	0.1	3.7	0.1	3.5	0.7	4.1	0.2	1.1	0.5	0.2	2.9	1.0	17.8	-	36.3
	2014	-	1.1	0.2	2.0	-	0.5	9.3	1.3	0.2	0.2	0.8	0.1	1.5	0.1	25.7	-	43.1
	2017	-	1.2	0.2	2.1	-	0.5	9.3	1.3	0.2	0.2	0.8	0.1	1.5	0.1	26.1	-	43.6
Schools	2020	-	1.2	0.2	2.2	-	0.6	9.5	1.4	0.2	0.2	0.8	0.1	1.5	0.1	27.4	-	45.5
00110013	2023	-	1.3	0.2	2.3	-	0.6	9.7	1.5	0.2	0.3	0.8	0.1	1.5	0.2	28.7	-	47.4
	2026	-	1.4	0.2	2.4	-	0.6	9.8	1.5	0.2	0.3	0.8	0.1	1.5	0.2	29.7	-	48.7
	2029	-	1.4	0.3	2.5	-	0.6	9.9	1.6	0.2	0.3	0.8	0.1	1.5	0.2	30.9	-	50.3
	2014	-	1.5	0.1	0.4	0.1	1.1	6.4	5.4	0.3	0.7	0.5	0.4	0.8	0.5	3.8	-	22.0
	2017	-	1.6	0.1	0.5	0.1	1.1	6.4	5.4	0.3	0.8	0.4	0.4	0.8	0.5	3.9	-	22.2
Universities and	2020	-	1.6	0.1	0.5	0.1	1.1	6.3	5.5	0.3	0.8	0.4	0.4	0.7	0.6	4.2	-	22.7
Colleges	2023	-	1.7	0.1	0.5	0.1	1.1	6.3	5.6	0.3	0.8	0.4	0.4	0.7	0.6	4.4	-	23.1
	2026	-	1.7	0.1	0.6	0.1	1.1	6.2	5.7	0.3	0.8	0.4	0.4	0.7	0.7	4.5	-	23.5
	2029	-	1.8	0.1	0.6	0.1	1.2	6.2	5.7	0.3	0.9	0.4	0.4	0.7	0.7	4.7	-	23.8
	2014	-	0.2	0.1	0.7	-	-	3.6	0.6	0.2	0.6	0.3	1.0	0.5	0.0	7.8	-	15.6
	2017	-	0.2	0.1	0.8	-	-	3.6	0.6	0.2	0.6	0.3	1.0	0.5	0.0	8.0	-	15.8
Warehouse/Wholesele	2020	-	0.3	0.1	0.8	-	-	3.7	0.6	0.2	0.6	0.3	1.1	0.5	0.0	8.4	-	16.5
warenouse/wnoiesale	2023	-	0.3	0.1	0.9	-	-	3.7	0.6	0.2	0.7	0.3	1.1	0.5	0.0	8.7	-	17.1
	2026	-	0.3	0.1	0.9	-	-	3.8	0.6	0.2	0.7	0.3	1.2	0.5	0.1	9.0	-	17.5
	2029	-	0.3	0.1	0.9	-	-	3.8	0.7	0.2	0.7	0.3	1.2	0.5	0.1	9.3	-	18.0

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	-	0.1	0.0	7.1	-	12.6	0.3	0.5	0.0	0.1	0.1	2.0	1.2	0.4	3.6	-	27.9
	2017	-	0.1	0.0	7.2	-	12.8	0.3	0.5	0.0	0.1	0.1	2.0	1.2	0.4	3.7	-	28.4
Restaurants	2020	-	0.1	0.0	7.6	-	13.5	0.3	0.6	0.0	0.1	0.1	2.1	1.2	0.4	4.0	-	29.9
ne staurants	2023	-	0.1	0.0	7.9	-	14.0	0.3	0.6	0.0	0.1	0.1	2.2	1.2	0.4	4.3	-	31.2
	2026	-	0.1	0.0	8.1	-	14.4	0.3	0.6	0.0	0.1	0.1	2.2	1.2	0.4	4.5	-	32.1
	2029	-	0.1	0.0	8.4	-	14.9	0.3	0.6	0.0	0.1	0.1	2.3	1.2	0.4	4.7	-	33.2
	2014	-	1.0	0.2	2.9	0.1	3.0	4.9	3.2	0.2	0.6	0.5	1.9	1.5	1.0	13.6	-	34.5
	2017	-	1.1	0.2	3.0	0.1	3.0	4.9	3.3	0.2	0.6	0.5	1.9	1.5	1.0	13.8	-	35.0
Large Other Buildings	2020	-	1.1	0.2	3.1	0.1	3.2	4.9	3.5	0.2	0.7	0.5	2.0	1.5	1.1	14.5	-	36.5
	2023	-	1.2	0.2	3.3	0.1	3.3	5.0	3.6	0.2	0.7	0.5	2.1	1.5	1.1	15.0	-	37.8
	2026	-	1.2	0.2	3.4	0.1	3.4	5.1	3.7	0.2	0.7	0.5	2.1	1.5	1.2	15.4	-	38.7
	2029	-	1.3	0.2	3.5	0.1	3.5	5.1	3.8	0.2	0.8	0.5	2.2	1.5	1.2	15.9	-	39.8
	2014	-	0.9	0.2	2.6	0.0	2.7	4.7	2.7	0.2	0.6	0.5	1.8	1.2	0.9	13.0	-	31.9
	2017	-	0.9	0.2	2.5	0.0	2.6	4.6	2.7	0.2	0.6	0.5	1.8	1.2	0.9	12.9	-	31.7
mall Other Buildings	2020	-	1.0	0.2	2.6	0.0	2.7	4.6	2.8	0.2	0.6	0.4	1.8	1.2	1.0	13.2	-	32.3
	2023	-	1.0	0.2	2.7	0.0	2.8	4.6	2.9	0.2	0.7	0.4	1.9	1.2	1.0	13.7	-	33.3
	2026	-	1.1	0.2	2.8	0.0	2.9	4.6	2.9	0.2	0.7	0.4	1.9	1.2	1.0	14.1	-	34.1
	2029	-	1.1	0.2	2.9	0.0	2.9	4.7	3.0	0.2	0.7	0.4	2.0	1.2	1.1	14.4	-	34.9
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Institutional	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2014	-	-	-	-	-	-	-		30.3	-	-	-			-	-	30.5
	2017	-	-	-	-	-	-	-		30.9	-	-	-	-	-	-	-	30.9
Non-Buildings	2020	-	-	-	-	-	-	-		32.0	-	-	-	-	-	-	-	32.0
	2025	-	-	-	-	-	-	-	-	32.9	-	-	-	-	-	-	-	32.9
	2020	-	-	-	-	-	-	-	-	34.3	-	-	-	-	-	-	-	34.3
	2014			-	-	-	-	-								-	- 19	 ∕1 Q
	2017			_		_	_	_		_				_		_	4.3	4.8
	2020	-	-	-	-	_	-	-	-	-	-	-	-	-	-	-	4.8	4.8
Street Lighting	2023	-	-	-	-	-	-	-		-	-	-	-	-	-	-	4.8	4.8
	2026	-	-	-	-	-	-	-		-	-	-	-	-	-	-	4.8	4.8
	2029	-	-	-	-	-	-	-		-	-	-	-	-	-	-	4.8	4.8
	2014	0.0	13.4	2.3	34.0	0.5	29.6	63.6	39.0	33.0	7.4	6.0	18.5	16.1	14.9	179.6	4.9	462.7
	2017	0.0	13.9	2.4	34.6	0.5	30.0	63.3	39.7	33.5	7.6	5.8	18.7	16.0	15.1	182.5	4.8	468.5
One of Table	2020	0.0	14.7	2.5	36.4	0.5	31.2	64.4	41.5	34.7	8.1	5.9	19.5	16.0	15.8	189.7	4.8	485.9
Grand Total	2023	0.0	15.6	2.7	38.1	0.5	32.4	65.5	43.3	35.8	8.5	5.9	20.2	16.1	16.6	197.3	4.8	503.4
	2026	0.0	16.3	2.8	39.4	0.6	33.3	66.0	44.7	36.5	8.9	5.8	20.8	16.1	17.1	202.8	4.8	515.9
	2029	0.0	17.0	2.9	40.9	0.6	34.3	66.7	46.2	37.3	9.3	5.8	21.4	16.2	17.7	209.1	4.8	530.3

Exhibit 126 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Island Interconnected Region (MW) (cont'd...)

Domestic Hot Water Miscellaneous Equipment Food Service Equipment Other Plug Loads Computer Equipment HVAC Fans { Pumps Refrigeration Secondary Lighting **Grand Total** Computer Servers Elevator General Lighting Outdoor Lighting Space Cooling Street Lighting Space Heating **Block Heat** Sub-Sector Year 2014 0.0 0.0 0.1 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.5 0.8 --2017 0.0 0.1 0.0 --0.1 0.0 0.0 0.0 0.0 -0.0 0.0 0.5 -0.8 0.0 2020 -0.0 0.1 0.0 0.0 --0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.5 -0.9 Small Office 2023 0.0 0.1 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.9 ---0.0 0.5 -2026 0.0 0.0 0.9 0.1 0.0 --0.1 0.0 0.0 0.0 0.0 -0.0 0.0 0.5 -2029 0.0 0.1 0.0 0.0 --0.1 0.0 0.0 0.0 0.0 -0.0 0.0 0.5 -0.9 2014 -0.0 0.0 0.0 0.1 0.1 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 -1.8 2017 0.0 0.0 0.0 0.1 -0.1 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 1.8 -2020 0.0 0.0 0.0 0.1 0.1 0.4 0.2 0.0 0.0 0.0 0.0 0.0 1.8 -0.0 0.9 -Large Non-food Retail 2023 0.0 0.0 0.0 0.1 -0.1 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 -1.8 2026 0.0 0.0 0.1 1.8 0.0 -0.1 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 -2029 0.0 0.0 0.0 0.1 -0.1 0.4 0.2 0.0 0.0 0.0 0.1 0.0 0.0 0.9 -1.9 2014 0.0 0.0 0.0 0.1 0.7 0.2 0.0 0.1 3.6 -0.1 0.1 0.0 2.2 ---2017 0.0 0.0 0.0 0.1 --0.7 0.2 0.0 0.1 0.1 -0.1 0.0 2.2 -3.6 2020 0.0 0.0 0.0 0.1 --0.7 0.2 0.0 0.1 0.1 -0.1 0.0 2.3 -3.7 Small Non-food Retai 2023 0.0 0.0 --0.7 --3.7 0.0 0.1 0.2 0.0 0.1 0.1 0.1 0.1 2.4 2026 0.0 0.0 0.0 0.1 --0.7 0.2 0.0 0.1 -2.4 -3.8 0.1 0.1 0.1 2029 0.0 0.0 0.0 0.1 -0.7 0.2 0.0 0.1 0.1 0.1 0.1 2.5 -3.9 --2014 0.0 0.0 0.0 0.1 -0.2 0.2 0.0 0.0 0.0 0.0 0.5 0.0 0.0 1.6 -2.6 2017 0.0 0.0 0.0 0.1 -0.2 0.1 0.0 0.0 0.0 0.0 0.5 0.0 0.0 1.6 -2.6 2020 0.0 -0.0 0.0 0.1 0.2 0.1 0.0 0.0 0.0 0.0 0.5 0.0 0.0 1.6 2.6 Food Retail 2023 0.0 0.0 0.0 0.1 0.2 0.1 0.1 0.0 0.0 0.0 0.5 0.0 0.0 1.6 2.6 --2026 0.0 0.0 0.0 0.1 -0.2 0.1 0.1 0.0 0.0 0.0 0.5 0.0 0.0 1.6 -2.6 2029 0.0 0.0 0.0 0.1 -0.2 0.1 0.1 0.0 0.0 0.0 0.5 0.0 0.0 1.6 -2.6 2014 0.0 0.0 0.0 0.1 0.1 0.1 0.0 0.0 0.7 1.8 0.6 -0.0 0.0 0.1 0.0 -2017 1.8 0.0 0.0 0.0 0.6 -0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.1 0.0 0.7 -2020 0.0 0.0 --1.8 0.0 0.6 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.1 0.0 0.7 Large Accomodation 2023 0.0 0.0 0.0 0.6 -0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.1 0.0 0.7 -1.8 2026 0.0 0.0 0.0 -0.1 0.1 0.1 0.0 0.0 0.1 0.7 -1.8 0.6 0.0 0.0 0.0 2029 0.0 0.0 0.0 -0.1 0.1 0.1 0.7 -1.8 0.6 0.0 0.0 0.0 0.0 0.1 0.0 2014 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.2 -0.0 -2017 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.2 --2020 0.0 0.0 0.0 0.1 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 -0.2 Small Accomodation 2023 0.0 0.0 0.0 0.1 -0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 -0.2 2026 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 -0.3 -2029 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.3 -0.0 0.0 0.0 0.0 0.0 0.0 0.1 -2014 0.1 0.1 0.0 0.7 0.1 0.5 0.0 0.1 0.0 0.4 3.4 0.0 0.4 0.1 0.0 0.8 -2017 0.1 0.1 0.0 0.6 0.0 0.3 0.1 0.4 0.0 0.1 0.1 0.0 0.3 0.0 0.6 -2.6 2020 0.1 0.1 0.0 0.6 0.0 0.3 0.1 0.4 0.0 0.1 0.1 0.0 0.3 0.0 0.6 -2.6 Healthcare 2023 0.1 0.1 0.0 0.6 0.0 0.3 0.1 0.4 0.0 0.1 0.0 0.0 0.3 0.0 0.6 2.6 -2026 0.1 0.1 0.0 0.6 0.0 0.3 0.1 0.4 0.0 0.0 0.3 0.6 2.6 0.1 0.0 0.0 -2029 -2.6 0.1 0.1 0.0 0.6 0.0 0.4 0.1 0.4 0.0 0.1 0.0 0.0 0.3 0.0 0.6

Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.8
	2017	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.8
Schools	2020	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.9
00110013	2023	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.8	-	2.9
	2026	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	-	2.9
	2029	0.0	0.1	0.0	0.1	-	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	-	2.9
	2014	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2017	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
Universities and	2020	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
Colleges	2023	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2026	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2029	0.0	0.0	0.0	0.0	-	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-	0.7
	2014	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
	2017	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
WarahawaaMhalaaala	2020	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
warenouse/wholesale	2023	0.0	0.0	0.0	0.1	-	-	0.3	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.7
	2026	0.0	0.0	0.0	0.1	-	-	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.8
	2029	0.0	0.0	0.0	0.1	-	-	0.2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	1.1	-	1.8
	2014	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
	2017	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
Bastouronto	2020	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
Restaurants	2023	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.5
	2026	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.6
	2029	0.0	0.0	0.0	0.7	-	1.2	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	-	2.6
	2014	0.1	0.2	0.0	2.0	0.0	1.8	1.4	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1	-	14.8
	2017	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.1	-	14.8
Larga Othar Buildinga	2020	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
Large Other Buildings	2023	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2026	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2029	0.1	0.2	0.0	2.1	0.0	1.8	1.3	1.0	0.0	0.3	0.2	0.7	0.7	0.1	6.2	-	14.8
	2014	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3	-	9.6
	2017	0.1	0.2	0.0	1.0	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.3	-	9.6
Ormall Other Duilding	2020	0.1	0.2	0.0	1.1	0.0	1.0	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.4	-	9.8
Small Other Buildings	2023	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.6	0.0	0.2	0.1	0.4	0.4	0.1	4.5	-	10.0
	2026	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.7	0.0	0.2	0.1	0.4	0.4	0.1	4.6	-	10.2
	2029	0.1	0.2	0.0	1.1	0.0	1.1	1.1	0.7	0.0	0.2	0.1	0.5	0.4	0.1	4.7	-	10.4

Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW) (cont'd...)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	2.7	-	9.2
	2017	0.2	0.2	-	0.9	-	0.2	2.2	1.3	0.1	0.3	0.2	0.2	0.7	0.1	9.0	-	15.5
Other Institutional	2020	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.3	0.2	0.2	0.7	0.1	13.5	-	20.0
	2023	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.3	0.2	0.2	0.7	0.1	13.5	-	20.0
	2026	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.4	0.2	0.2	0.7	0.1	13.5	-	20.0
	2029	0.2	0.2	-	0.9	-	0.2	2.1	1.3	0.1	0.4	0.2	0.2	0.6	0.1	13.6	-	20.0
	2014	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2017	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
lon-Buildings	2020	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
Non-Duildings	2023	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2026	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2029	-	-	-	-	-	-	-	-	0.8	-	-	-	-	-	-	-	0.8
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	0.2
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
Street Lighting	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
off cer Lighting	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
	2014	0.6	0.9	0.1	6.6	0.0	5.0	7.2	4.1	0.9	1.1	0.8	2.2	2.8	0.5	23.4	0.2	56.4
	2017	0.6	0.9	0.1	6.4	0.0	5.0	7.0	4.1	0.9	1.1	0.8	2.2	2.6	0.4	29.6	0.3	62.0
Grand Total	2020	0.6	0.9	0.1	6.5	0.0	5.0	7.0	4.1	1.0	1.1	0.8	2.2	2.6	0.5	34.4	0.3	67.0
Grand Total	2023	0.6	1.0	0.1	6.5	0.0	5.1	6.9	4.2	1.0	1.2	0.7	2.2	2.6	0.5	34.6	0.3	67.4
	2026	0.6	1.0	0.2	6.6	0.0	5.1	6.8	4.2	1.0	1.2	0.7	2.2	2.5	0.5	34.8	0.3	67.8
	2029	0.6	1.0	0.2	6.7	0.0	5.2	6.8	4.3	1.0	1.2	0.7	2.3	2.5	0.5	35.1	0.3	68.2

Exhibit 127 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Labrador Interconnected Region (MW) (cont'd...)

Exhibit 128 Electric Peak Loads, by Milestone Year, End Use and Sub sector Type, Isolated Region (MW)

Sub-Sector	Year	Block Heaters	Computer Equipment	Computer Servers	Domestic Hot Water	Elevator	Food Service Equipment	General Lighting	HVAC Fans & Pumps	Miscellaneous Equipment	Other Plug Loads	Outdoor Lighting	Refrigeration	Secondary Lighting	Space Cooling	Space Heating	Street Lighting	Grand Total
	2014	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	3.0
	2017	0.1	0.2	-	0.1	-	0.2	1.2	0.2	-	0.1	0.1	0.4	0.2	-	0.2	-	2.9
Labrador Isolated C/I	2020	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.5	0.3	-	0.2	-	3.3
Buildings	2023	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.5	0.3	-	0.3	-	3.4
	2026	0.1	0.2	-	0.1	-	0.2	1.4	0.2	-	0.1	0.1	0.5	0.3	-	0.3	-	3.6
	2029	0.1	0.2	-	0.1	-	0.2	1.4	0.3	-	0.1	0.1	0.5	0.3	-	0.3	-	3.7
	2014	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
sland Isolated C/I	2017	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.2
	2020	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
Buildings	2023	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
	2026	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.3
	2029	-	0.0	-	-	-	0.0	0.1	0.0	-	0.0	0.0	0.1	0.0	-	-	-	0.3
	2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
Street Lighting	2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2029	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
	2014	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.4	0.3	-	0.2	0.1	3.3
	2017	0.1	0.2	-	0.1	-	0.2	1.3	0.2	-	0.1	0.1	0.4	0.3	-	0.2	0.1	3.2
Grand Total	2020	0.1	0.2	-	0.1	-	0.2	1.4	0.2	-	0.1	0.1	0.5	0.3	-	0.2	0.1	3.7
	2023	0.1	0.2	-	0.1	-	0.2	1.5	0.3	-	0.1	0.1	0.5	0.3	-	0.3	0.1	3.8
	2026	0.1	0.2	-	0.1	-	0.3	1.5	0.3	-	0.2	0.1	0.6	0.3	-	0.3	0.1	3.9
	2029	0.1	0.2	-	0.1	-	0.3	1.5	0.3	-	0.2	0.1	0.6	0.3	-	0.3	0.1	4.1

Appendix E Background-Section 7: Technology Assessment: Energy Efficiency Measures

Introduction

The following exhibits show the full list of energy efficiency and peak demand measures that were considered for analysis, with comments for the measures not included in this study.

Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector

Energy Efficiency Measures	Include	Comments
LIGHTING		General comment: ensure resolution of technology aligns with baseline; need to group
LED Screw-In Lamps	х	
LED High Bay Fixtures	х	MH baseline
LED Tubular Lamps	х	T8 baseline since T12 are being phased out
LED Troffers	х	
LED Outdoor Fixtures	х	To include representative lighting fixture for outdoor applications
LED Exit Signs	х	
LED Downlight Fixture or Retrofit Kit		Potential to be captured by LED Screw-In Lamps measure
Lighting Controls		More descriptive measures included below
High Performance T8 Fixtures	х	T8 baseline since T12 are being phased out
Low Ballast-Factor T8 systems		Removed since this is now the baseline (i.e. T12 being phased out)
T5HO Fixtures	х	For high bay (>16 ft) applications
Occupancy Sensors (Lighting)	х	
Dimming Control (Daylighting)	х	
Lighting Controls (Outdoor)	х	
Billboard lighting		Exclude since this is very specific
CFLs		To exclude since this is a transition technology (i.e. LEDs capture opportunity)
HVAC		
High-Efficiency Air Source Heat Pumps	х	
Ductless Mini-Split Heat Pumps	х	
Ground Source Heat Pumps	x	Institutional sector is presently main market due to long payback
Hotel Occupancy Sensors	х	Consider only for hotels and expand to include lighting. Originally HVAC Occupancy Sensors.
Demand Control Ventilation (DCV)	x	
High Efficiency HVAC Air Filters		Very specific measure beyond resolution of baseline
VFDs on HVAC Motors	x	
Ventilation Heat Recovery	x	
Air Curtains		Included under building envelope category
Radiant Infrared Heaters	x	
High Efficiency Chillers	х	
High Efficiency RTUs	х	
Adjustable Speed Drives		Same as VFDs measure included above
Premium Efficiency Motors	x	
Advanced Building Automation Systems	x	
Building Recommissioning	х	

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Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector (cont'd...)

Energy Efficiency Measures	Include	Comments
Programmable Thermostats	х	
Demand Control Kitchen Ventilation (DCKV)	х	Specific to sub sectors with commercial kitchens
REFRIGERATION		General Comment: There is a lot of very specific measures that are beyond resolution of baseline
LED Refrigerated Display Case Lighting	х	Moved from Lighting end use
Air Curtains		Included under building envelope category
Variable Speed Drives		Generally not added to existing compressor motors
Cooler Night Covers	х	
Refrigerated Cases with Doors	x	Original measure was focused on adding doors to existing display cases, which is not common
ECM Motors and Evaporator Fan Motor Controllers	x	Included ECM motors as well
Freezer Defrost Controllers	х	
Outside Air Economizers for Walk-In Coolers		Not a mature or commonly implemented measure
Refrigerated Vending Machine Controllers	х	Vending Miser
High Efficiency Compressors	х	Usually not practical as a retrofit
ECM Evaporator Fan Motor		Merged with evaporator fan motor controllers measure
Automatic Door Closers (Walk-In Coolers)	x	
Door Gaskets		Excluded since there is a very wide range of savings
VSD Screw Compressors		Covered by high efficiency compressors measure
Refrigeration Heat Recovery	х	Focus on arenas
Refrigeration Controls	х	To be represented by floating head pressure controls
Refrigeration Free Cooling		Not a mature or commonly implemented measure
CEE-Rated Refrigerators and Freezers	x	May be difficult to get cost data
High efficiency supermarket refrigeration		Covered by other measures
DOMESTIC HOT WATER		
On-Demand Water Heaters	х	To consider only for hotels
High-Efficiency Water Heaters		Not available ENERGY STAR electric water heaters are actually HPWHs
Heat Pump Water Heaters	х	
Efficient CIP Systems (Clean In Place)		Excluded since this is an industrial measure
Low-Flow Pre-Rinse Spray Valves	х	To consider only for sub sector with commercial kitchens
Low-Flow Faucet Aerators	х	
Low-Flow Showerheads	х	To consider only for hotels
Drainwater Heat Recovery	х	To consider only for hotels
Tankless Water Heaters		Excluded since this is identical to on-demand water heaters
PROCESS		
Compressed Air - air entraining nozzles		Excluded since this is an industrial measure
APPLIANCES (ENERGY STAR)		
ENERGY STAR Dishwashers	x	To consider only for sub sector with commercial kitchens

Exhibit 129 Full List of Potential Energy Efficiency Measures for the Commercial Sector (cont'd...)

Energy Efficiency Measures	Include	Comments
Hot Food Holding Cabinets		Excluded since this is a very specific application
Commercial Clothes Washers		To be considered by residential sector
High-Efficiency Cooking Equipment	x	Measure added to capture other specific measures
Fryers		Too specific general measure added above
Griddles		Too specific general measure added above
Steam Cookers		Too specific general measure added above
Convection Ovens		Too specific general measure added above
High-Efficiency Ice makers		Exclude since there is no incremental cost for ENERGY STAR ice makers
Combination Oven		Too specific general measure added above
Induction Ranges		Too specific general measure added above
Clothes Dryers		Excluded since there is no ENERGY STAR category for clothes dryer. Better technology (e.g. microwave and heat pumps) is still many years away.
Vending Machines		Excluded since this is covered by VendingMiser measure
BUILDING ENVELOPE		
Roof Insulation	х	
Wall Insulation	х	
ENERGY STAR Windows		Covered below
High Performance Glazing Systems	х	
Door Systems		Too specific and covered by measures immediately above and below
Air Curtains	x	Focus on sub sectors with loading docks and/or doors that are opening and closing often
Skylights		Excluded since this is too specific and not very common
Slab/Floor Insulation		Included in new construction measures
COMPUTER EQUIPMENT (ENERGY STAR)		
ENERGY STAR Computers	x	
ENERGY STAR Office Equipment	x	
Energy-Efficient Server Technologies	x	To consider enterprise servers, since these are more wide-spread throughout building stock
NEW CONSTRUCTION		
New Construction (25% More Efficient)	x	
New Construction (40% More Efficient)	x	
STREET LIGHTING		
Electrodeless Induction Lighting		Considering LED street lighting instead
Dimming Controls		Considering LED street lighting instead
LED Street Lighting	x	Not including controls

Exhibit 130 Full List of Potential Peak Demand Measures for the Commercial Sector

Peak Demand Measures	Include	Comments
HVAC		
Building Automated Controls		Demand impacts covered by EE measures
Electric Thermal Storage	х	
Space Heating Controls	х	To consider utility controlled load switch
Load Shifting (Preheating)		See electric thermal storage measure
VFDs		Demand impacts covered by EE measure
HVAC Fans and Pumps	х	
DOMESTIC HOT WATER		
Electric DHW Controls	х	To consider utility controlled load switch
LIGHTING		
Street Lighting and Parking Lot Lighting Controls		Demand impacts covered by EE measures
Lighting Controls	х	Control of non-critical loads
REFRIGERATION		
Refrigeration Controls	х	Control of non-critical loads
OTHER		
Soft Starters		Industrial measure (i.e. for large motors)
Plug Load Controls		Not relevant to commercial sector
Kitchen and Laundry Load Controls		Demand impacts covered by EE measures
Fuel Switching		Outside of study scope
Curtailment		Outside of study scope

Appendix F Background-Section 8: Economic Potential: Electric Energy Forecast

Introduction

The following three exhibits provide the economic potential energy efficiency results for the island Interconnected, Labrador Interconnected, and Isolated regions, respectively. The three exhibits following those provide the economic potential load reduction results for the Island Interconnected, Labrador Interconnected and Isolated regions respectively. The latter three exhibits do not include the load reduction associated with energy efficiency measures, which were already presented by region in Exhibit 52.

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Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	тотаг
	2017	35,396	21,111	14,702	112	2,009	7,233	4,890	1,856	-	2,385	2,000	-	643	92,337
	2020	40,728	20,671	15,130	118	2,047	9,231	4,640	2,251	-	2,430	2,048	-	1,093	100,389
Large Office	2023	47,060	20,538	15,984	132	2,129	9,532	4,441	2,669	-	2,563	2,101	-	1,114	108,262
	2026	51,318	25,502	16,999	148	2,227	9,797	4,260	2,988	-	2,728	2,149	-	1,135	119,251
	2029	58,110	25,654	18,382	170	2,363	10,076	4,119	2,902	-	2,967	2,199	-	1,156	128,099
	2017	43,695	15,509	6,925	-	1,486	5,876	1,806	1,509	-	2,370	211	-	523	79,910
	2020	44,071	15,207	7,141	-	1,618	7,533	1,710	1,830	-	2,393	226	-	889	82,619
Small Office	2023	45,395	15,168	7,670	-	1,794	7,766	1,634	2,175	-	2,497	240	-	907	85,245
	2026	45,364	18,334	8,223	-	1,973	7,974	1,560	2,432	-	2,606	251	-	924	89,642
	2029	47,874	19,050	8,975	-	2,145	8,191	1,497	2,357	-	2,767	263	-	941	94,060
	2017	9,064	16,499	9,307	2,188	453	561	1,346	1,372	-	936	774	-	-	42,500
	2020	10,503	16,111	9,430	2,213	466	721	1,282	1,667	-	942	789	-	-	44,124
Large Non-food Retail	2023	12,172	15,965	9,764	2,294	496	744	1,236	1,988	-	981	804	-	-	46,444
	2026	13,875	15,841	10,122	2,380	529	765	1,192	2,230	-	1,024	819	-	-	48,778
	2029	15,705	15,864	10,614	2,502	573	787	1,158	2,174	-	1,087	835	-	-	51,299
	2017	16,763	14,887	7,117	-	690	809	1,812	1,984	-	1,078	-	-	-	45,139
	2020	17,976	14,504	7,281	-	705	1,034	1,723	2,405	-	1,090	-	-	-	46,719
Small Non-food Retail	2023	19,461	14,304	7,585	-	734	1,066	1,648	2,843	-	1,130	-	-	-	48,770
	2026	20,405	17,157	7,962	-	769	1,094	1,579	3,176	-	1,185	-	-	-	53,328
	2029	22,336	17,218	8,479	-	818	1,124	1,523	3,070	-	1,267	-	-	-	55,836
	2017	6,396	9,878	3,832	32,765	855	651	927	1,014	-	466	746	163	-	57,693
	2020	7,290	9,650	3,872	32,955	872	833	894	1,232	-	467	761	326	-	59,151
Food Retail	2023	8,394	9,545	3,992	33,738	915	857	878	1,472	-	480	776	488	-	61,536
	2026	9,494	9,451	4,122	34,589	961	880	864	1,654	-	494	790	543	-	63,843
	2029	10,667	9,433	4,303	35,824	1,024	903	860	1,618	-	517	805	543	-	66,497
	2017	8,938	4,578	1,930	360	6,323	327	2,200	438	-	342	356	58	-	25,850
Large Assemblation	2020	9,283	4,444	1,954	363	6,725	419	2,096	531	-	344	363	58	-	26,579
Large Accomodation	2023	9,799	4,344	2,022	374	7,268	432	2,036	632	-	358	370	58	-	27,692
	2020	10,331	4,240	2,090	300	7,020	443	1,901	101	-	3/3	311	50	-	20,024
	2029	10,900	4,107	2,199	403	0,470	400	1,954	200	-	397	304 160	00	-	30,135
	2017	4,395	2,320	220	2	3,243	100	506	200	-	09	109	-	-	12 050
Small Accomodation	2023	4,707	2,201	255	2	3,443	204	590	202	-	90	175	-	-	12,000
	2026	4,090 5 005	2,100	275	12	3,090	204	560	230 230	-	102	170	-		12,491
	2029	5,090	2,121	401	20	4 259	209	550	300		113	183	-		13 461
	2017	36,357	1 653	13 606	162	2 216	1 076	3 668	1 446	-	685	136	- 155	- 126	61.285
	2020	36 898	1,000	13 706	168	2 427	1,372	3 533	1 747	_	683	139	310	213	62,811
Healthcare	2023	37 698	1 598	13,914	179	2 688	1 410	3 461	2 056	_	691	141	465	213	64,521
	2026	38 491	1 800	14 172	193	2,000	1 444	3 418	2,000	-	705	144	517	222	66.364
	2029	39,517	1,856	14,532	212	3,248	1,480	3,429	2,192	-	728	147	517	226	68,083

Exhibit 131 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Island Interconnected (MWh/yr.)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Refrigeration	Domestic Hot Water	Computer Equipment	Secondary Lighting	Outdoor Lighting	Street Lighting	Space Cooling	Other Plug Loads	Food Service Equipment	Computer Servers	TOTAL
	2017	42,862	16,399	2,197	110	2,092	2,184	2,885	2,440	-	60	291	-	-	71,520
	2020	43,806	16,176	2,234	115	2,124	2,796	2,752	2,954	-	66	297	-	-	73,319
Schools	2023	45,191	16,074	2,307	123	2,177	2,883	2,647	3,480	-	76	302	-	-	75,262
	2026	46,690	16,023	2,395	133	2,240	2,961	2,555	3,871	-	89	308	-	-	77,266
	2029	48,389	16,166	2,520	147	2,325	3,043	2,636	3,718	-	106	314	-	-	79,363
	2017	2,543	19,772	16,991	774	461	2,919	1,381	1,325	-	390	940	-	105	47,602
Universities and	2020	2,909	19,335	17,037	777	471	3,711	1,319	1,596	-	400	959	-	178	48,693
Collogos	2023	3,555	18,937	17,113	784	486	3,798	1,262	1,867	-	419	977	-	181	49,379
Colleges	2026	4,380	18,677	17,315	808	524	3,883	1,221	2,073	-	475	996	-	185	50,537
	2029	5,381	18,416	17,514	832	561	3,968	1,182	1,972	-	530	1,014	-	188	51,559
	2017	8,606	11,033	658	852	526	517	423	911	-	16	-	-	-	23,543
	2020	10,286	10,757	677	862	533	662	392	1,098	-	17	-	-	-	25,284
Warehouse/Wholesale	2023	12,266	10,620	720	930	560	682	370	1,300	-	19	-	-	-	27,467
	2026	14,067	10,669	759	989	584	700	347	1,445	-	21	-	-	-	29,581
	2029	15,992	10,567	808	1,071	616	719	489	1,387	-	24	-	-	-	31,673
	2017	6,203	971	815	1,675	6,327	122	3,637	178	-	218	-	623	-	20,767
	2020	6,567	955	835	1,770	6,457	156	3,484	217	-	222	-	1,245	-	21,907
Restaurants	2023	7,121	950	868	1,946	6,683	161	3,351	256	-	230	-	1,868	-	23,433
	2026	7,840	949	908	2,157	6,950	165	3,224	286	-	241	-	2,075	-	24,796
	2029	8,530	957	962	2,451	7,315	169	3,116	277	-	258	-	2,075	-	26,109
	2017	17,479	12,612	7,954	338	3,232	1,966	2,796	1,386	-	786	1,172	-	-	49,721
	2020	19,417	12,323	8,060	410	3,271	2,515	2,663	1,678	-	794	1,195	-	-	52,326
Large Other Buildings	2023	21,647	12,101	8,224	521	3,336	2,589	2,548	1,976	-	813	1,218	-	-	54,974
	2026	24,822	12,093	8,604	783	3,494	2,657	2,493	2,222	-	872	1,241	-	-	59,281
	2029	27,617	12,087	8,985	1,044	3,652	2,726	2,440	2,149	-	932	1,264	-	-	62,897
	2017	17,883	8,799	4,372	-	1,648	1,795	2,288	1,387	-	547	-	-	-	38,719
	2020	18,884	8,508	4,417	30	1,666	2,287	2,165	1,671	-	546	-	-	-	40,174
Small Other Buildings	2023	20,163	8,294	4,521	104	1,710	2,351	2,060	1,962	-	557	-	-	-	41,722
	2026	21,613	9,848	4,750	270	2,235	2,411	1,989	2,192	-	593	-	-	-	45,901
	2029	23,378	9,778	5,003	455	2,439	2,472	1,927	2,104	-	635	-	-	-	48,192
	2017	-	-	-	-	-	-	-	-	17,083	-	-	-	-	17,083
	2020	-	-	-	-	-	-	-	-	16,530	-	-	-	-	16,530
Street Lighting	2023	-	-	-	-	-	-	-	-	15,941	-	-	-	-	15,941
	2026	-	-	-	-	-	-	-	-	15,311	-	-	-	-	15,311
	2029	-	-	-	-	-	-	-	-	14,638	-	-	-	-	14,638
	2017	256,779	156,029	90,735	39,336	31,564	26,192	30,686	17,455	17,083	10,367	6,796	998	1,397	685,417
	2020	273,325	152,508	92,111	39,782	32,827	33,467	29,250	21,127	16,530	10,483	6,950	1,938	2,373	712,673
Grand Total	2023	294,817	150,623	95,040	41,131	34,672	34,476	28,149	24,974	15,941	10,911	7,105	2,879	2,419	743,138
	2026	313,786	162,711	98,802	42,849	37,244	35,383	27,243	27,896	15,311	11,510	7,255	3,192	2,464	785,647
	2029	339,787	163,279	103,678	45,132	39,815	36,329	26,880	26,929	14,638	12,328	7,406	3,192	2,510	821,902

Exhibit 131 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Island Interconnected (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Domestic Hot Water	Outdoor Lighting	Secondary Lighting	Computer Equipment	Refrigeration	Other Plug Loads	Space Cooling	Food Service Equipment	Computer Servers	ΤΟΤΑΙ
	2017	380	130	45	29	30	36	119	-	4	14	-	11	798
	2020	437	187	45	29	37	34	153	-	4	14	-	18	958
Small Office	2023	456	186	45	36	43	33	156	-	5	14	-	19	992
	2026	479	185	46	39	47	31	160	-	5	14	-	19	1,025
	2029	506	186	47	41	45	29	164	-	5	15	-	19	1,056
	2017	639	705	289	36	99	65	41	69	56	12	-	-	2,011
	2020	802	706	290	36	119	62	52	87	57	12	-	-	2,223
Large Non-food Retail	2023	970	688	293	37	138	58	53	111	58	12	-	-	2,419
	2026	1,351	672	296	37	152	55	54	112	59	13	-	-	2,800
	2029	1,501	656	300	37	144	53	55	112	60	13	-	-	2,931
	2017	1,507	1,186	291	70	190	125	79	-	-	27	-	-	3,474
Small Non-food Retail	2020	2,254	1,375	297	70	229	119	100	-	-	27	-	-	4,472
	2023	2,387	1,400	306	71	268	113	103	-	-	28	-	-	4,678
	2026	2,679	1,391	320	73	297	109	106	-	-	30	-	-	5,005
	2029	3,704	1,381	338	75	284	105	108	-	-	32	-	-	6,027
	2017	1,773	312	77	54	58	24	37	737	42	6	-	-	3,120
	2020	2,245	378	106	54	69	30	48	918	43	7	19	-	3,918
Food Retail	2023	2,455	369	107	54	81	36	49	1,192	44	7	28	-	4,423
	2026	2,671	361	108	55	89	35	50	1,194	45	7	32	-	4,646
	2029	2,891	354	109	55	84	34	51	1,198	46	7	32	-	4,860
	2017	816	356	121	665	42	196	27	0	34	13	-	-	2,270
	2020	868	343	121	730	51	185	34	0	35	12	-	-	2,380
Large Accomodation	2023	923	349	123	770	59	174	35	15	36	12	-	-	2,497
	2026	978	336	124	804	65	164	36	15	36	12	-	-	2,572
	2029	1,570	324	126	838	61	154	36	15	37	12	-	-	3,173
	2017	129	60	9	92	6	16	4	0	5	2	-	-	321
	2020	132	58	9	102	7	15	5	0	5	2	-	-	334
Small Accomodation	2023	137	58	9	108	8	14	5	0	5	2	-	-	345
	2026	237	56	10	113	9	13	5	0	5	2	-	-	450
	2029	243	55	10	120	8	13	5	0	5	2	-	-	460
	2017	334	17	916	371	160	181	121	-	15	7	18	14	2,153
	2020	870	107	1,240	431	192	174	153	0	15	18	35	24	3,259
Healthcare	2023	1,036	105	1,245	469	223	168	156	0	16	18	53	24	3,513
	2026	1,196	102	1,252	500	246	162	160	0	16	18	58	25	3,735
	2029	1,350	130	1,261	522	232	158	163	1	16	18	58	25	3,933

Exhibit 132 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Labrador Interconnected (MWh/yr.)

Exhibit 132 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Labrador Interconnected (MWh/yr.) (cont'd...)

Subsector	Milestone Years	Space Heating	General Lighting	HVAC Fans & Pumps	Domestic Hot Water	Outdoor Lighting	Secondary Lighting	Computer Equipment	Refrigeration	Other Plug Loads	Space Cooling	Food Service Equipment	Computer Servers	TOTAL
	2017	1,463	359	220	139	134	40	122	-	16	3	-	-	2,496
	2020	1,535	354	220	139	161	38	155	0	16	3	-	-	2,621
Schools	2023	2,132	413	219	144	188	83	158	0	17	3	-	-	3,357
	2026	2,206	839	242	145	207	78	161	0	17	3	-	-	3,898
	2029	2,283	828	242	146	196	74	165	0	17	3	-	-	3,955
	2017	379	225	152	29	21	10	48	0	15	6	-	2	886
Universities and	2020	499	241	153	29	26	10	60	0	15	6	-	3	1,041
Colleges	2023	669	236	154	30	30	10	62	7	16	6	-	3	1,220
concegoo	2026	738	231	154	30	33	9	63	7	16	6	-	3	1,289
	2029	809	227	155	30	31	9	64	7	16	6	-	3	1,356
	2017	886	205	69	48	67	20	38	-	-	1	-	-	1,334
	2020	1,162	655	70	48	80	18	49	1	-	1	-	-	2,084
Warehouse/Wholesale	2023	1,446	639	74	49	94	25	50	56	-	1	-	-	2,433
	2026	2,292	625	76	49	103	23	51	57	-	1	-	-	3,278
	2029	2,584	612	78	50	98	22	52	59	-	1	-	-	3,557
	2017	190	42	33	366	16	294	11	35	-	4	59	-	1,050
	2020	505	57	33	368	19	281	14	37	-	4	118	-	1,436
Restaurants	2023	526	56	34	612	23	268	15	126	-	4	177	-	1,841
	2026	597	56	34	619	25	256	15	131	-	4	197	-	1,934
	2029	731	55	35	629	24	244	15	138	-	5	197	-	2,071
	2017	5,808	1,595	1,856	1,330	562	990	419	1	500	59	-	-	13,119
	2020	7,843	1,900	1,877	1,853	674	938	532	3	510	59	-	-	16,189
Large Other Buildings	2023	10,863	2,307	1,886	1,857	785	887	543	8	520	58	-	-	19,714
	2026	12,039	2,247	1,898	1,862	862	839	553	13	530	58	-	-	20,902
	2029	13,660	2,189	1,913	1,869	814	792	564	21	539	58	-	-	22,419
	2017	3,604	1,249	976	625	394	583	332	0	-	46	-	-	7,810
Small Other Buildings	2020	3,881	1,479	997	631	475	556	425	8	-	47	-	-	8,499
Small Other Buildings	2023	5,790	1,831	1,019	641	556	534	435	21	-	48	-	-	10,875
	2020	0,295	1,000	1,050	000	615	515	440	40	-	50	-	-	13,470
	2029	9,032	1,794	1,090	947 546	500	301	457	60	-	53	-	-	14,527
	2017	9,042	-	1,179	546	547 621	22	200	-	-	19	-	-	12,412
Other Institutional	2020	17,020	-	1,200	540	716	19	350	-	-	10	-	-	20,000
	2025	23,123	29	1,239	550	710	24	307	4	-	10	-	-	20,001
	2020	20,009	2,027	2,411	550	847	21	304	11		47		-	36,924
	2017	27 750	2,000	6,232	4 308	2 327	2 602	1 655	842	- 687		- 76	- 27	53 255
	2020	<u>21,130</u> <u>40.861</u>	7 8/1	6 665	5 067	2,327	2,002	2 130	1 05/	700	210	172	21 45	70 014
Grand Total	2023	52 913	8 667	6 754	5 429	3 212	2,425	2,130	1 540	714	230	258	46	84 367
	2026	63 845	11 537	8 022	5 537	3 548	2 317	2 223	1 577	728	265	200	47	99.933
	2029	70.873	11.391	8,143	5.918	3,453	2,220	2,220	1.627	741	272	286	48	107.242

Subsector	Milestone Years	General Lighting	Refrigeration	Outdoor Lighting	Secondary Lighting	Computer Equipment	HVAC Fans & Pumps	Other Plug Loads	Domestic Hot Water	TOTAL
	2017	2,812	647	542	431	306	277	157	49	5,223
Labrador Isolatod C/I	2020	2,864	1,034	529	428	405	310	160	53	5,783
Ruildings	2023	2,895	1,427	516	423	418	343	164	56	6,241
Bulluliys	2026	2,951	1,610	507	425	431	384	167	59	6,534
	2029	3,013	1,702	502	434	443	436	170	64	6,763
	2017	263	61	51	42	29	26	15	-	486
Island Isolatod C/I	2020	270	98	50	42	38	30	15	-	542
Buildings	2023	274	135	49	42	39	33	15	-	587
Dunungs	2026	280	153	48	42	41	37	16	-	616
	2029	287	162	48	43	42	42	16	-	641
Grand Total	2017	3,075	708	593	473	334	303	172	49	5,709
	2020	3,134	1,131	579	470	443	340	176	53	6,325
	2023	3,169	1,562	565	465	457	375	179	56	6,828
	2026	3,231	1,763	555	468	471	421	182	59	7,150
	2029	3,300	1,864	549	477	485	478	186	64	7,403

Exhibit 133 Total Economic Potential Electricity Savings by End Use, Sub sector and Milestone Year, Isolated (MWh/yr.)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	1	0	1
	2020	0	3	0	1	2	5
Large Office	2023	0	3	0	1	2	5
	2026	0	3	0	1	2	5
	2029	0	3	0	1	2	5
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Office	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	2	0	0	1	2
Large Non-food Retail	2023	0	2	0	0	1	2
	2026	0	2	0	0	1	2
	2029	0	2	0	0	1	2
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Small Non-food Retail	2023	0	0	0	0	1	1
	2026	0	0	0	0	1	1
	2029	0	0	0	0	1	1
	2017	0	0	0	0	0	0
	2020	0	1	1	0	0	2
Food Retail	2023	0	1	1	0	0	2
	2026	0	1	1	0	0	2
	2029	0	1	1	0	0	2
	2017	0	0	0	0	0	0
	2020	2	0	0	0	1	3
Large Accomodation	2023	2	0	0	0	1	4
	2026	2	0	0	0	1	4
	2029	2	0	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	1
Small Accomodation	2023	1	0	0	0	0	1
	2026	1	0	0	0	0	1
	2029	1	0	0	0	0	1

Exhibit 134 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Island Interconnected (MW)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
	2017	0	0	0	0	0	0
	2020	1	1	0	0	1	4
Healthcare	2023	2	1	0	0	1	4
	2026	2	1	0	0	1	4
	2029	2	1	0	0	1	4
	2017	0	0	0	0	0	0
	2020	0	1	0	0	1	2
Schools	2023	0	1	0	0	1	2
	2026	0	1	0	0	1	2
	2029	0	1	0	0	1	2
	2017	0	0	0	0	0	0
Universities and	2020	0	1	0	0	0	2
Collogos	2023	0	1	0	0	0	2
Colleges	2026	0	2	0	0	0	2
	2029	0	2	0	0	0	2
	2017	0	0	0	0	0	0
	2020	0	0	0	0	1	1
Warehouse/Wholesale	2023	0	0	0	0	0	1
	2026	0	0	0	0	0	1
	2029	0	0	0	0	0	1
	2020	3	0	0	0	0	4
Poetaurante	2023	3	0	0	0	0	4
Restaurants	2026	4	0	0	0	0	4
	2029	4	0	0	0	0	4
	2017	0	0	0	0	0	0
	2020	1	1	0	0	1	3
Large Other Buildings	2023	1	1	0	0	1	4
	2026	1	1	0	0	1	4
	2029	1	1	0	0	1	4
	2017	0	0	0	0	0	0
	2020	1	0	0	0	1	2
Small Other Buildings	2023	1	0	0	0	1	2
	2026	1	0	0	0	1	2
	2029	1	0	0	0	1	2
	2017	0	0	0	3	0	3
	2020	10	9	1	3	11	34
Grand Total	2023	11	10	1	3	11	35
	2026	11	10	1	3	11	36
	2029	11	10	1	3	11	36

Exhibit 134 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Island Interconnected (MW) (cont'd...)

Sub sector	Milestone Year	Domestic Hot	HVAC Fans &	Refrigeration	Secondary	Space	Grand Total
		Water	Pumps	Reingeration	Lighting	Heating	Chana rotar
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Office	2023	0	0	0	0	0	0
Sub sector Small Office Large Non-food Retail Small Non-food Retail Food Retail Large Accomodation Small Accomodation Healthcare Schools	2026	0	0	0	0	0	0
Sub sector Small Office Large Non-food Retail Small Non-food Retail Food Retail Large Accomodation Small Accomodation Healthcare	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Large Non-food Retail	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Non-food Retail	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Food Retail	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Large Accomodation	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Small Accomodation	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Healthcare	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Schools	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0

Exhibit 135 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Labrador Interconnected (MW)

Sub sector	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Refrigeration	Secondary Lighting	Space Heating	Grand Total
Universities and Colleges	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Warehouse/Wholesale	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2020	0	0	0	0	0	0
Restaurants	2023	0	0	0	0	0	0
	2026	0	0	0	0	0	0
	2029	0	0	0	0	0	0
	2017	0	0	0	0	0	0
	2020	1	0	0	0	0	2
Large Other Buildings	2023	1	0	0	0	0	2
	2026	1	0	0	0	0	2
	2029	1	0	0	0	0	2
	2017	0	0	0	0	0	0
Small Other Buildings	2020	1	0	0	0	0	1
	2023	1	0	0	0	0	1
	2026	1	0	0	0	0	1
	2029	1	0	0	0	0	1
	2017	0	0	0	0	0	0
Other Institutional	2020	0	1	0	0	1	2
	2023	0	1	0	0	1	1
	2020	0	0	0	0	1	1
Grand Total	2029	0	0	0	1	1	1
	2017	0	1	0	1	0	7
	2020	2	1	0	1	2	7
	2023	2	1	0	1	2	0
	2020	2	1	0	1	2	6
	2029	2	1	0	1	2	0

Exhibit 135 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Labrador Interconnected (MW) (cont'd...)

Exhibit 136 Economic Potential Load Reduction by End Use, Sub sector and Milestone Year, Isolated (MW)

Building Category	Milestone Year	Domestic Hot Water	HVAC Fans & Pumps	Secondary Lighting	Space Heating	Grand Total
Labrador Isolated C/I	2017	0.0	0.0	0.1	0.0	0.1
	2020	0.0	0.0	0.1	0.0	0.1
	2023	0.0	0.0	0.1	0.0	0.1
Dunungs	2026	0.0	0.0	0.1	0.0	0.1
	2029	0.0	0.0	0.1	0.0	0.1
Island Issisted C/	2017	0.0	0.0	0.0	0.0	0.0
	2020	0.0	0.0	0.0	0.0	0.0
Buildings	2023	0.0	0.0	0.0	0.0	0.0
Dunungs	2026	0.0	0.0	0.0	0.0	0.0
	2029	0.0	0.0	0.0	0.0	0.0
Grand Total	2017	0.0	0.0	0.1	0.0	0.1
	2020	0.0	0.0	0.1	0.0	0.1
	2023	0.0	0.0	0.1	0.0	0.2
	2026	0.0	0.0	0.1	0.0	0.2
	2029	0.0	0.0	0.1	0.0	0.2

Appendix G Background-Section 10: Achievable Workshop Action Profile Slides

Opportunities for Today's Workshop

	Primary End Use	Percent of 2029 Economic Potential Savings
LED Tubes	Lighting	3%
High-Efficiency Air Source Heat Pumps	Space Heating	15%
Evaporator Fan Upgrades	Refrigeration	1%
VFDs on HVAC Motors	HVAC Fans and Pumps	3%
Advanced BAS	Multiple	4%
High Performance New Construction	Multiple	7%
PC Power Management	Computer Equipment	1%
Glazing	Space Heating	3%
Electric Thermal Storage Systems	Space Heating - Demand	0%





Commercial Opportunity 1: LED Tubes Assumptions	
Focus Building Type	Office
Focus Region	Island
Typical Application:	
Cost	\$23.81
Useful Life	11.8 years
Savings:	
General lighting	31%

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Commercial Opportunity 1: LED Tubes Economic Indicators				
Simple Payback (L. Office - Island)	5.0 years			
Average CCE (¢/kWh):				
Island	7.23			
Labrador	5.30			
Isolated	8.65			
Basis	Incremental			
Eligibility Timeline	At replacement			
Eligible participants:				
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 230			
Principal region	Island			





Commercial Opportunity 2: Air Source Heat Pumps

Cold climate air source heat pumps (ASHPs) utilise the vapour compression cycle to transfer heat from the outside air to the interior during the heating season.

Replace RTUs equipped with electric resistance heat with models equipped with CEE qualified ASHPs.





Commercial Opportunity 2: Air Source Heat Pumps Assumptions				
Focus Building Type	L. Office			
Focus Region	Island			
Typical Application:				
Cost	\$1,500			
Useful Life	15 years			
Savings:				
Space heating	45%			

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Simple Payback (L. Office - Island)0.8Average CCE (¢/kWh):Island	years
Average CCE (¢/kWh): Island	
Island	
	1.47
Labrador	1.02
Isolated	9.41
Basis Incren	nental
Eligibility Timeline At replace	ement
Eligible participants:	
Floor Area / # of Facilities by 2029 12,400,000 ft ²	² / 240
Principal region	Island





Commercial Opportunity 3: **Evaporator Fan Upgrades** Electrically commutated motors (ECMs) are more

efficient than shaded pole evaporator fan motors and emit less waste heat.

Replace existing evaporator fan motors for walk in coolers with ECMs.



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Commercial Opportunity 3: Evaporater Fan Upgrades Assumptions	
Focus Building Type	Food Retail
Focus Region	Island
Typical Application:	
Cost	\$460
Useful Life	16 years
Savings:	
Refrigeration	6%

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Simple Payback (Food Retail - Island)4.7 yearsAverage CCE (¢/kWh):Island4.73Labrador4.73Isolated4.73BasisFullEligibility TimelineImmediateEligible participants:Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Commercial Opportunity 3: Evaporator Fan Upgrades Economic Indicators	
Average CCE (c/kWh):Image: CCE (c/kWh):Island4.73Labrador4.73Isolated4.73BasisFullEligibility TimelineImmediateEligible participants:ImmediateFloor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Simple Payback (Food Retail - Island)	4.7 years
Island4.73Labrador4.73Isolated4.73BasisFullEligibility TimelineImmediateEligible participants:ImmediateFloor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Average CCE (¢/kWh):	
Labrador4.73Isolated4.73BasisFullEligibility TimelineImmediateEligible participants:For Area / # of Facilities by 2029Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Island	4.73
Isolated4.73BasisFullEligibility TimelineImmediateEligible participants:Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Labrador	4.73
BasisFullEligibility TimelineImmediateEligible participants:Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Isolated	4.73
Eligibility TimelineImmediateEligible participants:Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Basis	Full
Eligible participants:3,400,000 ft² / 540Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Eligibility Timeline	Immediate
Floor Area / # of Facilities by 20293,400,000 ft² / 540Principal regionIsland	Eligible participants:	
Principal region Island	Floor Area / # of Facilities by 2029	3,400,000 ft ² / 540
	Principal region	Island





Commercial Opportunity 4: VFDs on HVAC Motors

Variable frequency drives (VFDs) allow induction motor driven loads such as fans and pumps to operate at varying speed in response to changing load requirements.

Variable flow air systems and variable volume pumping systems are ideal candidates for retrofit.





Commercial Opportunity 4: VFDs on HVAC Motors Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$4,820
Useful Life	15 years
Savings:	
HVAC fans & pumps	11%

Commercial Opportunity 4: VFDs on HVAC Motors Economic Indicators	
Simple Payback (L. Office - Island)	3.2 years
Average CCE (¢/kWh):	
Island	3.49
Labrador	3.21
Isolated	3.09
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 70
Principal region	Island





Commercial Opportunity 5: Advanced Building Automation

Advanced Building Automation Systems (BAS) incorporate diagnostic tools and self tuning controls into existing BAS functions, and expand control to additional systems such as lighting and VAV boxes.

Most applicable to large, complex facilities such as office buildings, hotels, and healthcare.





Commercial Opportunity 5: Advanced Building Automation Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0.90/ft ²
Useful Life	15 years
Savings:	
Space heating, space cooling, general lighting, and HVAC fans & pumps	10%

Commercial Opportunity 5: Advanced Building Automation Economic Indicators	
Simple Payback (L. Office - Island)	3.8 years
Average CCE (¢/kWh):	
Island	5.90
Labrador	6.64
Isolated	N/A
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 250
Principal region	Island
	icfi.com 70









Commercial Opportunity 6: High-Performance New Construction Assumptions	
Focus Building Type	Office
Focus Region	Island
Typical Application:	
Cost	\$23.81
Useful Life	11.8 years
Savings:	
General lighting	31%

Commercial Opportunity 6: High-Performance New Construction Economic Indicators	
Simple Payback (L. Office - Island)	5.0 years
Average CCE (¢/kWh):	
Island	7.23
Labrador	5.30
Isolated	8.65
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 230
Principal region	Island





Commercial Opportunity 7: PC Power Management

Personal computers (PCs) have integrated power management systems that can shut off components when the PC is not in use but quickly return it to an active state when required.

This measure involves fully utilising existing power management systems on PCs.





Commercial Opportunity 7: PC Power Manage Assumptions	ement
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0
Useful Life	1 year
Savings:	
Computer Equipment	45%

Commercial Opportunity 7: PC Power Management Economic Indicators	
Simple Payback (L. Office - Island)	Immediate
Average CCE (¢/kWh):	
Island	0.00
Labrador	0.00
Isolated	0.00
Basis	Full
Eligibility Timeline	Immediate
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 270
Principal region	Island









Commercial Opportunity 8: High Performance Glazing Assumptions	
Focus Building Type	L. Office
Focus Region	Island
Typical Application:	
Cost	\$0.50/ft ²
Useful Life	20 years
Savings:	
Space heating	15%

Commercial Opportunity 8: High Performance G Economic Indicators	lazing
Simple Payback (L. Office - Island)	2.8 years
Average CCE (¢/kWh):	
Island	5.58
Labrador	4.92
Isolated	3.20
Basis	Incremental
Eligibility Timeline	At replacement
Eligible participants:	
Floor Area / # of Facilities by 2029	12,400,000 ft ² / 240
Principal region	Island





Appendix H Background-Section 10: Achievable Workshop Measure Worksheets



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR

C1: LED Tubular Lamps

			COMMENTS
Focus Region	Island Interconnected		
Focus Sub-Sector	Larg	Large Office	
	1	6.2	
Simple Payhack (years)		5.0	
	ļ	5.0	
Total Eleer Space (Approx)		12 400 000	
Total Number of Sites		280	
% Eligible		80%	
# Eligible Sites Per Vear		230	
# Eligible Sites Per Teat		230	
	% by 2029	Curve	
RALL Marketing	70%	R	
Aggrossive Marketing	80%	C	
	80%	C	
RALL Marketing	1	161	
Aggrossive Marketing		101	
	licabla)		
Other Sub-Sectors:	(II=Inglief, L=LOwer,	, 3-3ame, N/A-NOLAP	incable
Small Offices	1	Healthcare	н
Non-Food Retail	s	Schools	н
Food Retail	s		н
Large Hotels /Motels	н	Warehouses	1
Small Hotels/Motels	1	Restaurants	-
Other Regions:	-	hestadiants	-
Labrador	L	Isolated	L
Related Measures:	_		_
LED Lamps	н	LED Outdoor	н
LED Low Bay Fixtures	S	RW T8 Fixtures	L
LED High Bay Fixtures	Н		_
OTHER PARAMETERS			
Sensitivity to Incentives (High, Med, Low)			High
Primary Incentive Target (User, Channel Member, Both)			Both
Sensitivity to Direct Program Support (High, Med, Low)			Low
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			Demos and Cases Studies

GENERAL NOTES:

Technology is changing very rapidly and the cost is coming down quite quickly
 Province tends to use a "wait-and-see" approach to implementing EE
 Likely very limited investments in fluorescent technology in the future

Likely very miniced investments in nuorescent technology in the rut

BARRIERS:

Cost is currently the primary barrier
 The lamps are quite avaiable and starting to be popular (workshop)

participant's firm has sold about 18-20K of them in the last quarter)

- Not very popular in NL since there are no incentives currently

 - Customer awareness is a barrier (i.e. not aware that it's currently an option)
 - Government in the province tends to adopt technologies like this more quickly but private sector lags

- Public tendering act limits the technology that will be implemented in some facilities (i.e. lowest cost technology must be selected)

- Some fo the lower cost products may have performance issues

- Technology hasn't been around too long. Some people may be waiting for the technology to mature.

- Difficult for utilities to get in touch with the right contacts at the commercial facilities

- LED tubes may not work as well in some fixtures

- current economic crunch is limiting uptake at the moment

STRATEGIES/PARTNERS:

- Equipment typically goes through lighting distributors

- Implementers help spread the word

- Nobody is going to the marketplace to make the case for this technology currently

Incentives are key to the overall strategy and there is a high sensitivity to this
 Some facilities may be overlit already, which allows for a deeper savings opportunity

- Can use non-energy benefits to help sell the technology

- Government agencies are much more developed than they were 20 years ago and they can be an important partner



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR C2: High-Efficiency Air Source Heat Pumps

			COMMENTS
Focus Region	Island Int		
Focus Sub-Sector	Food Retail		
MEASURE INFORMATION			
CCE (¢/kWh)		1.0	La ser la seta
Simple Payback (years)		0.8	Incr. basis
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		86%	
# Eligible Sites Per Year		20	Incr. basis
# Eligible Sites By 2029		240	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	20%	В	
Aggressive Marketing	60%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		48	
Aggressive Marketing		144	
RELATIVE PARTICIPATION RATES (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	н	Healthcare	L
Non-Food Retail	S	Schools	S
Large Offices	L	Universities	L
Large Hotels/Motels	н	Warehouses	L
Small Hotels/Motels	L	Restaurants	S-H
Other Regions:			
Labrador	L	Isolated	L
Related Measures:		-	
Ductless Mini-Split HPs	н	High-Eff, RTUs	L
GSHP	L	High-Eff. Chillers	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	led, Low)		Low
Primary Incentive Target (User, Channel Member, Both)			User
Sensitivity to Direct Program Support (High, Med, Low)			Med
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			Contractor training, case

GENERAL NOTES:

- Technolgy is fairly mature but existing infrastructure is fairly old - Not many RTUs in large offices

- Savings may be too high in retail applications since lighting and internal loads create quite a bit of heat

- Variable refrigerant tehnology may make more sense in certain applications

- About 15% penetration currently, although this may be limited to smaller RTUs

BARRIERS:

- Existing infrastructure may limit the opportunity in offices

- Customers see more maintenance costs with the hours of operation for the compressors

- Not practical for many offices since RTUs aren't too common and since zoning would be required

- Awareness may be a barrier in the commercial sector

- HVAC contractors may not be pushing ASHPs

 A lost of the space is leased and landlords are putting in lowest cost equipment
 Chains from other jurisdictions have natural gas space heating and may not be aware that there is an opportunity in electric space heating

STRATEGIES/PARTNERS:

- Restaurants are adopting the technology

- Technology is being adopted to some degree without utility support (i.e. about 1 in 20 currently)

- Schools not allowed to be air conditioned



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR C3: ECM Motors and Evaporator Fan Motor Controllers

			COMMENTS
Focus Region	Island Inte		
Focus Sub-Sector	Food Retail		
MEASURE INFORMATION			
CCF (c/kWh)		4.7	
Simple Payback (years)		4.7	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		3,300,000	
Total Number of Sites		780	
% Eligible		70%	Verv small not eligible
# Eligible Sites Per Year		540	
# Eligible Sites By 2029		540	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	25%	В	
Aggressive Marketing	80%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		135	
Aggressive Marketing		432	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower; S	=Same; N/A=Not Appl	icable)
Other Sub-Sectors:			
Large Offices	N/A	Healthcare	N/A
Small Offices	N/A	Schools	N/A
Non-Food Retail	L	Universities	S
Large Hotels/Motels	S	Warehouses	н
Small Hotels/Motels	N/A	Restaurants	L
Other Regions:		·	-
Labrador	L	Isolated	Much L
Related Measures:			
Refrigerated Display Cases with Doors	L	Floating Head Pressure Control	L
LED Refrig. Lighting	н	Defrost Controllers	L
High Eff. Compressors	S	Door Closers	L
CEE Rated Equipment	н	Night Covers	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, Med, Low)			High
Primary Incentive Target (User, Channel Member, Both)			Both
Sensitivity to Direct Program Support (High, Med, Low)			High
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			Awareness, direct-install in smaller facilities

GENERAL NOTES:

- Larger facilities will have pretty sophisticated equipment in place already and lots of support

- Smaller communities in Isolated regions have a lot of residential-style equipment

- Load for each evaporator fan is small but there are a lot of units and they run 24/7

- Measure isn't being implemented very oftern in many more mature units

BARRIERS:

- Awareness is one of the primary barriers

- Cost is a barrier in smaller facilities

- Payback period is long for retail facilities

Potential landlord-tenant issues with smaller facilities as well
Service contracts that are in place may restrict retrofits

Technology may not be as prevelant or accessible as necessary
 There may be a perceived risk with food spoiling

STRATEGIES/PARTNERS:

- Likely going to need two different strategies; one for larger facilities and one for smaller "mom-and-pop" stores



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR C4: VFDs on HVAC Motors

			COMMENTS
Focus Region	Island Interconnected		
Focus Sub-Sector	Large Office		
MEASURE INFORMATION			
CCE (¢/kWh)		3.4	
Simple Payback (years)		3.2	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		24%	
# Eligible Sites Per Year		70	
# Eligible Sites By 2029		70	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	5%	В	
Aggressive Marketing	70%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		4	
Aggressive Marketing		49	
RELATIVE PARTICIPATION RATES ((H=Higher; L=Lower; S	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	н
Non-Food Retail	S	Schools	Н
Food Retail	S	Universities	н
Large Hotels/Motels	н	Warehouses	N/A
Small Hotels/Motels	N/A	Restaurants	N/A
Other Regions:			-
Labrador	L	Isolated	L
Related Measures:			
High Eff. Motors	н	Kitchen DCV	L
Demand Control Ventilation	L		
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	ied, Low)		High
Primary Incentive Target (User, C	hannel Member, Both	1)	Both
Sensitivity to Direct Program Sup	port (High, Med, Low))	High
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			Case studies, awareness, partnerships, whole building retrofits based on energy audits

GENERAL NOTES:

- Opportunity with both fans and pumps

- Awareness of the measure is quite high and it's commonly implemented - Can be applied in constant volume systems as well in some cases

BARRIERS:

- Applies easily in a portion of facilities but significant additional retrofits are required in some cases

- Additional costs to implement in some applications

- No issue with availability on the Island

- Incentives are only currently available under the custom program, which some contractors may not be aware of

- Potential landlord-tenant issues, especially in large offices

STRATEGIES/PARTNERS:

- A prescriptive incentives would help make incentives more accessible but there are potential issues with savings being quite variable

Bundled approach with additional retrofits would be useful in some application
 Working with controls contractors to help drum up sales and awareness
 Opportunity would likely be identified by energy audits

NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR

C5: Advanced BAS

			COMMENTS
Focus Region	Island Interconnected		
Focus Sub-Sector	Large Office		
MEASURE INFORMATION			
CCE (¢/kWh)		3.0	
Simple Payback (years)		2.5	
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		90%	
#Eligible Sites Per Year		250	
# Eligible Sites By 2029		250	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	20%	В	
Aggressive Marketing	70%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		50	
Aggressive Marketing		175	
RELATIVE PARTICIPATION RATES (H=Higher; L=Lower; S	=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	Н
Non-Food Retail	S	Schools	S-H
Food Retail	S	Universities	L
Large Hotels/Motels	S	Warehouses	Much L
Small Hotels/Motels	N/A	Restaurants	N/A
Other Regions:			
Labrador	S	Isolated	L
Related Measures:			
Programmable Tstats	н	Daylighting	S
Lighting Occupancy (Indoor)	н	Hotel Occupancy	L
Lighting Occupancy (Outdoor	н		
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	Sensitivity to Incentives (High, Med, Low)		
Primary Incentive Target (User, Channel Member, Both)			Both
Sensitivity to Direct Program Support (High, Med, Low)			High
Most Critical Program Support Type(s) (e.g. Trade Ally Training,			Education, case studies,
Certification, Technical Workshops, etc.) bunc			bundling

GENERAL NOTES:

- Cost is likely too high. Should be closer to \$600 per control point on average. - Savings are likely too conservative. Would expect 25% savings on average.

BARRIERS:

- Similar to VFDs, this isn't something that's done on its own (i.e. done as part of a more holistic retrofit)

- Doesn't require much O&M if equipment and controls are installed and commissioned properly

- Equipment can easily be flipped to manual mode rather than being tuned - Operators do not receive enough training to be able to operate sophisticated control systems

- Potential fear of the technology for building operators

- Potential issues with negative perception due to some systems not being operated properly

- Building owners may not want sign up to a service contract

- A lot of education required to ensure that systems are being operated properly

STRATEGIES/PARTNERS:

- Ensure that equipment is being maintained and that there is a service contract in place

- Education for both operators and contractors

- Ensure that equipment is properly commissioned and that M&V is being done - Continuous optimization may be an option (as per BC Hydro approach)

- Can be bundled with a recommissioning program



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR C6: High Performance New Construction

			COMMENTS
Focus Region	Island Int	erconnected	
Focus Sub-Sector	Large Office		
MEASURE INFORMATION			
CCE (¢/kWh)		2.6	
Simple Payback (years)		2.5	HPNC (25% Better)
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		1,800,000	
Total Number of Sites		40	
% Eligible		90%	
#Eligible Sites Per Year		3	Incr. basis
#Eligible Sites By 2029		40	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	50%	А	
Aggressive Marketing	80%	С	
ACHIEVABLE POTENTIAL			
BAU Marketing		20	
Aggressive Marketing		32	
RELATIVE PARTICIPATION RATES (H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	S
Non-Food Retail	L	Schools	Н
Food Retail	L	Universities	Н
Large Hotels/Motels	L	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:		-	
Labrador	S	Isolated	L
Related Measures:		-	
HPNC (40% Better)	Much L		
OTHER PARAMETERS			
Sensitivity to Incentives (High, M	ed, Low)		Med-Low
Primary Incentive Target (User, Channel Member, Both)			Both
Sensitivity to Direct Program Support (High, Med, Low)			Med
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			Training for design community and new building owners

GENERAL NOTES:

- Much of the new construction recently has been government and they already build to a high efficiency standard

- This has pushed the local industry to a higher standard

BARRIERS:

- Cost is the primary barrier to implementation

- Building rating systems like LEED include a lot of measures that don't help with energy efficiency

- Major lost opportunity if it is missed at the time of new construction

- Free ridrship is a potential issue

STRATEGIES/PARTNERS:

- Non-energy benefits help the business case

- Buildings can be rented at a premium

- Engineering consultants are key in terms of delivery

- Workshops to deal with administrative burden and/or best way to implement without a rating system



NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR

C7: PC Power Management

			COMMENTS
Focus Region	Island Interconnected		
Focus Sub-Sector	Large Office		
CCE (c/kWh)		N/A	
Simple Payback (years)		N/A	Behavioural measure
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		95%	
# Eligible Sites Per Year		270	
# Eligible Sites By 2029		270	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	10%	В	
Aggressive Marketing	50%	В	
ACHIEVABLE POTENTIAL			
BAU Marketing		27	
Aggressive Marketing		135	
RELATIVE PARTICIPATION RATES	H=Higher; L=Lower;	S=Same; N/A=Not Appl	icable)
Other Sub-Sectors:			
Small Offices	S	Healthcare	L
Non-Food Retail	L	Schools	S-H
Food Retail	L	Universities	S-H
Large Hotels/Motels	L	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:			
Labrador	S	Isolated	S
Related Measures:			-
ESTAR Computers	S	Task Lighting	L
ESTAR Office Equipment	S	Natural Ventilation	L
ESTAR Servers	S	Keep Doors Closed	L
OTHER PARAMETERS			
Sensitivity to Incentives (High, Med, Low)			Low
Primary Incentive Target (User, C	Channel Member, Both	ו)	User
Sensitivity to Direct Program Sup	port (High, Med, Low)	High Education and
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Certification, Technical Workshops, etc.)			marketing to IT departments and executive buy-in, lobby dashboards

GENERAL NOTES:

- Technology exists to implement power management settings % $\label{eq:constraint}$

BARRIERS:

 IT department may need to push through updates during off hours
 Individuals may override power management settings that have been pushed down on them
 Remote use of work computers limits the proportion of computers that can be shut down

STRATEGIES/PARTNERS:

- Most effective to convince an IT department to implement and push down

power management settings

- Education component is important to ensure persistence

- Competition (e.g. floor-by-floor) can be helpful

NL ACHIEVABLE POTENTIAL WORKSHOP - COMMERCIAL SECTOR

C8: Glazing

			COMMENTS
Focus Region	Island Interconnected		
Focus Sub-Sector	Larg	Large Office	
MEASURE INFORMATION			
CCE (¢/kWh)		2.9	
Simple Payback (years)		2.8	Incr. measure
ECONOMIC POTENTIAL			
Total Floor Space (Approx)		12,400,000	
Total Number of Sites		280	
% Eligible		85%	
# Eligible Sites Per Year		10	Incr. measure
# Eligible Sites By 2029		240	
PARTICIPATION RATES	% by 2029	Curve	
BAU Marketing	10%	В	
Aggressive Marketing	80%	С	
ACHIEVABLE POTENTIAL			
BAU Marketing		24	
Aggressive Marketing		192	
RELATIVE PARTICIPATION RATES	(H=Higher; L=Lower;	S=Same; N/A=Not App	licable)
Other Sub-Sectors:			
Small Offices	L	Healthcare	н
Non-Food Retail	L	Schools	н
Food Retail	L	Universities	н
Large Hotels/Motels	S	Warehouses	L
Small Hotels/Motels	L	Restaurants	L
Other Regions:			
Labrador	Н	Isolated	н
Related Measures:			
Wall Insulation	S	Recommissioning	н
Roof Insulation	S		
OTHER PARAMETERS			
Sensitivity to Incentives (High, Med, Low)			Med
Primary Incentive Target (User, Channel Member, Both)			User
Sensitivity to Direct Program Support (High, Med, Low) High			High
Most Critical Program Support Type(s) (e.g. Trade Ally Training, Educ			Education, contractor
ertification, Technical Workshops, etc.) training			

GENERAL NOTES:

BARRIERS:

- Argon gas may leak out of some low quality windows Awareness of low cost may be an issue Commercial customers are looking for lowest cost options Landlord-tenant issues (i.e. split incentive)
- Only currently covered by custom program, which has seen no uptake

STRATEGIES/PARTNERS:

- Architects and contractors would be important partners
- Need to ensure that high efficiency glazings are included in specs Promote non-energy benefits



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