

From: pharrington@nalcenergy.com
To: briancrawley@nalcenergy.com
Subject: Re: for NR
Date: Tuesday, August 7, 2012 12:30:51 PM
Attachments: [.png](#)
[DG3 Estimate Update 7 Aug 2012.pptx](#)

Brian

I have taken slide 12 out of the deck you sent me- I do not beleive we actually shared this with MHI

Paul



DG3 Estimate Update 7 Aug 2012.pptx



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Brian Crawley---08/07/2012 11:46:49 AM---Paul... are you ok with this going to Charles? It is what we provided to MHI. We should also bring G

From: Brian Crawley/NLHydro
To: Paul Harrington/NLHydro@NLHydro
Date: 08/07/2012 11:46 AM
Subject: for NR

Paul... are you ok with this going to Charles? It is what we provided to MHI. We should also bring Gilbert into the loop. Brian

Brian Crawley

Nalcor Energy - Lower Churchill Project

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----- Forwarded by Brian Crawley/NLHydro on 08/07/2012 11:43 AM -----

From: Jason Kean/NLHydro

To: Brian Crawley/NLHydro@NLHYDRO

Date: 06/19/2012 12:19 PM

Subject:

[attachment "DG3 Estimate Update to MHI 17-June-2012.pptx" deleted by Paul Harrington/NLHydro]



Jason R. Kean, P. Eng., MBA,
PMP

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You owe it to yourself, and your family, to make it home safely every day. What have you done today so that nobody gets hurt?

DG3 Estimate Overview

Presentation to MHI

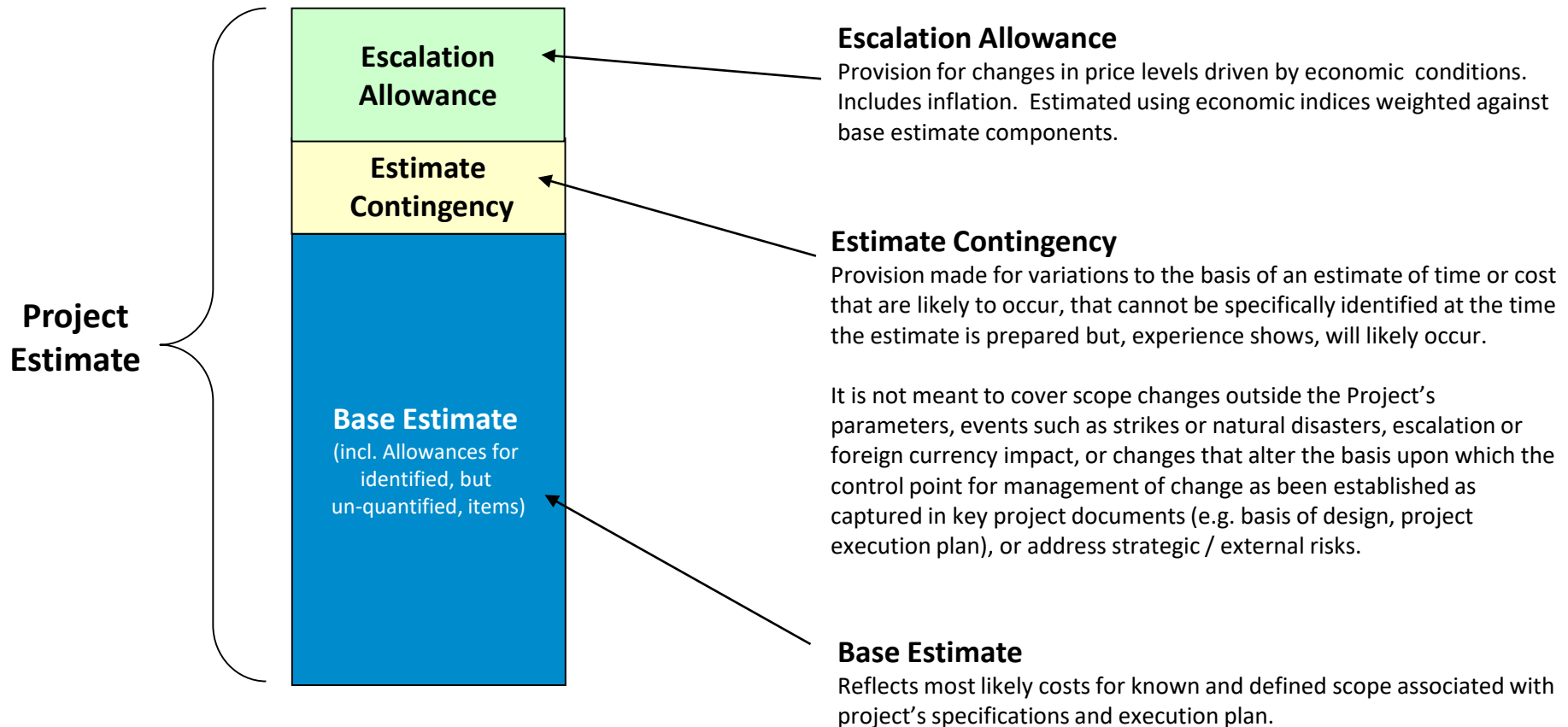
17-Jun-2012

Boundless Energy



Cost Estimate is comprised of 3 Primary Components

Definitions as per AACE Recommended Practice No. 10S-90



DG2 Estimate Summary

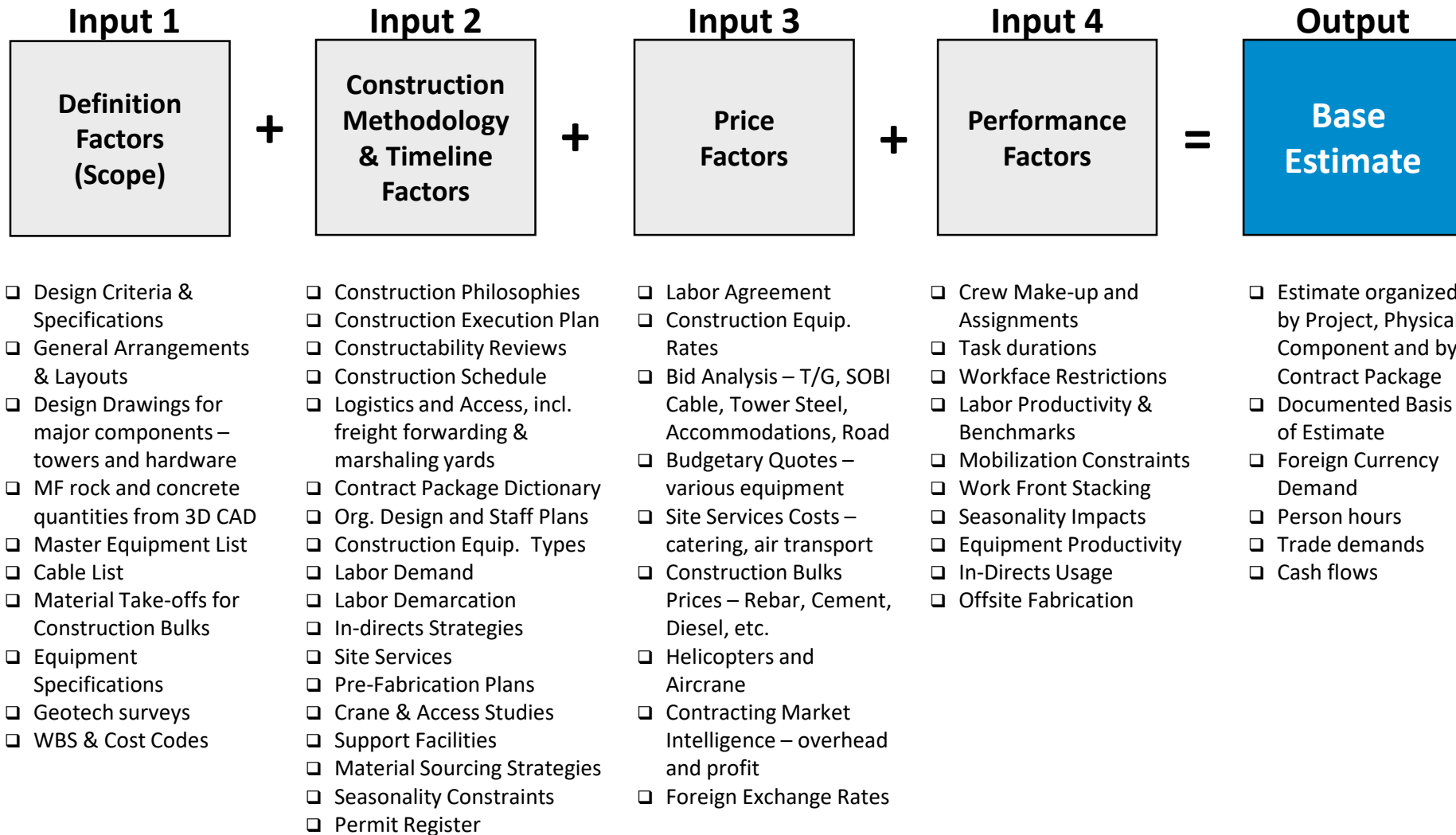
**LCP Phase 1 (Excluding Maritime Link)
DG2 Estimate Summary (millions Jan 2010 CDN \$)**

	MF	LTA	LITL	Totals
Base Estimate	\$1,947.46	\$290.95	\$1,615.93	\$3,854.34
Contingency	\$284.33	\$43.64	\$236.12	\$564.09
Escalation Allowance	\$273.49	\$61.35	\$208.00	\$542.84
Totals	\$2,505.27	\$395.94	\$2,060.05	\$4,961.27

% of Total	50.5%	8.0%	41.5%	100.0%
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Base Estimate developed using 4 Main Inputs

Nalcor's follows principles of AACE Recommend Practice No. 36R-08



DG3 Estimate Attributes

Attribute	Key Characteristic
Intended Purpose	<ul style="list-style-type: none"> (i) Verify the Decision Gate 2 estimate (ii) Provides increased level of confidence in outcome. (iii) Seek Effective Project Approval or Sanction (iv) Establishes the Project Budget
Project Definition (i.e. level of engineering design complete)	<ul style="list-style-type: none"> (i) Completed design documents including drawings and outline specifications at the end of Gateway Phase 3. (ii) All project execution strategies in-place for execution. (iii) Complete working drawings for early construction packages being issued for tender. (iv) Expended engineering effort from 30% to 40% of total.
Preparation Methodology	<ul style="list-style-type: none"> (i) Deterministic based for both direct and indirect cost (ii) Majority of estimate prepared from measured and priced quantities obtained from the completed design drawings and outline specifications. (iii) Price and performance factors developed specifically for the Project (i.e. project labor agreement, commodity prices, productivity rates) and benchmarked against historical projects. (iv) Production rates and timeline durations aligned with detailed construction schedule. (v) A very minor proportion of the estimate may be in the form of allowances.
Level of Precision	Medium to High
Cost Flow	<ul style="list-style-type: none"> (i) Aligned with Project Control Schedule (ii) Monthly cost flow available for each major commodity and for each currency and for each WBS Physical Component.

DG3 Estimate Summary

LCP Phase 1 (Excluding Maritime Link)
DG3 Estimate Summary (millions Jan 2012 CDN \$)

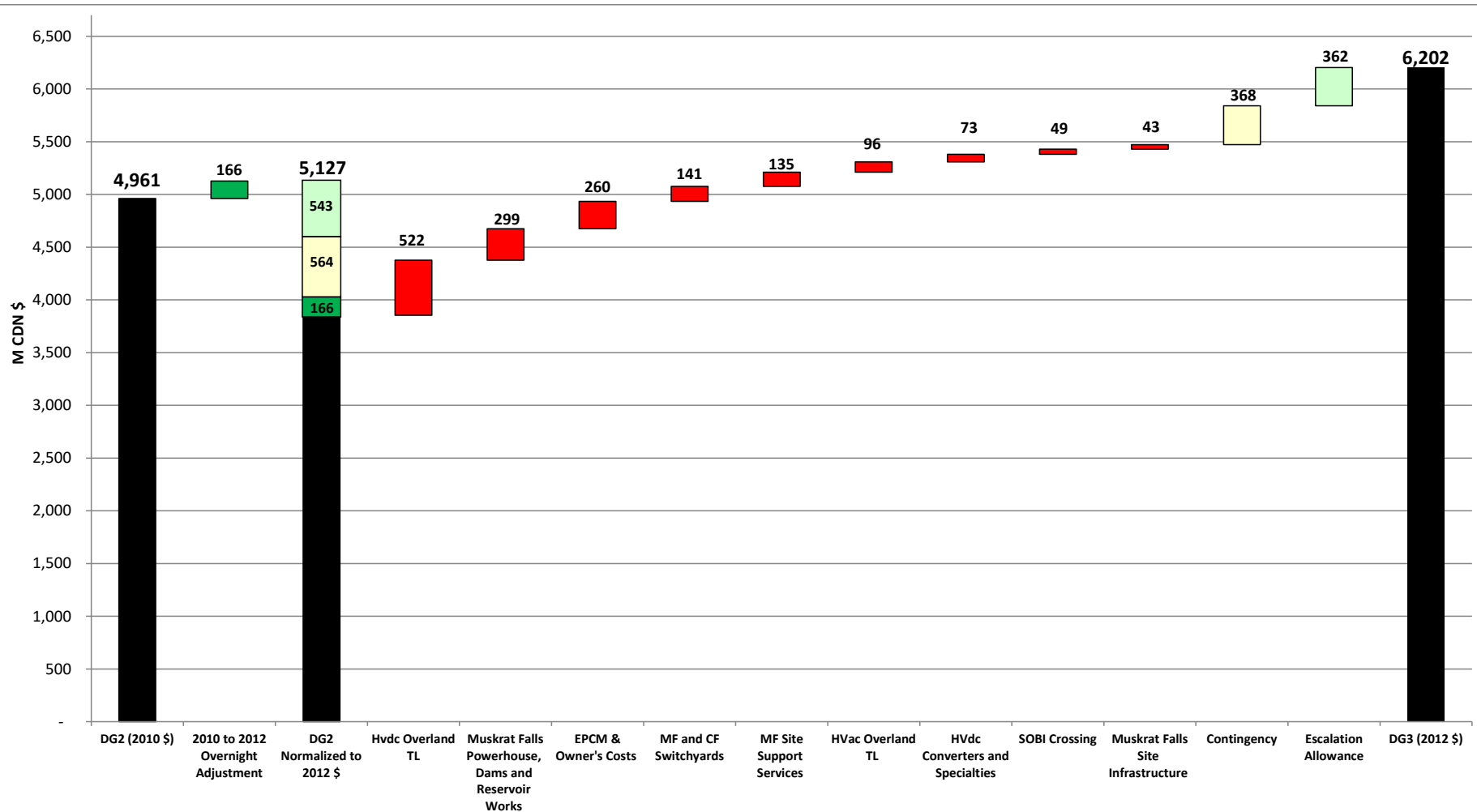
	MF	LTA	LITL	Totals
Base Estimate	\$2,511.92	\$601.31	\$2,359.61	\$5,472.84
Contingency	\$226.69	\$54.83	\$86.48	\$368.00
Escalation Allowance	\$162.54	\$35.44	\$163.66	\$361.64
Totals	\$2,901.15	\$691.58	\$2,609.75	\$6,202.48

% of Total	46.8%	11.2%	42.1%	100.0%
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Comparative Summary

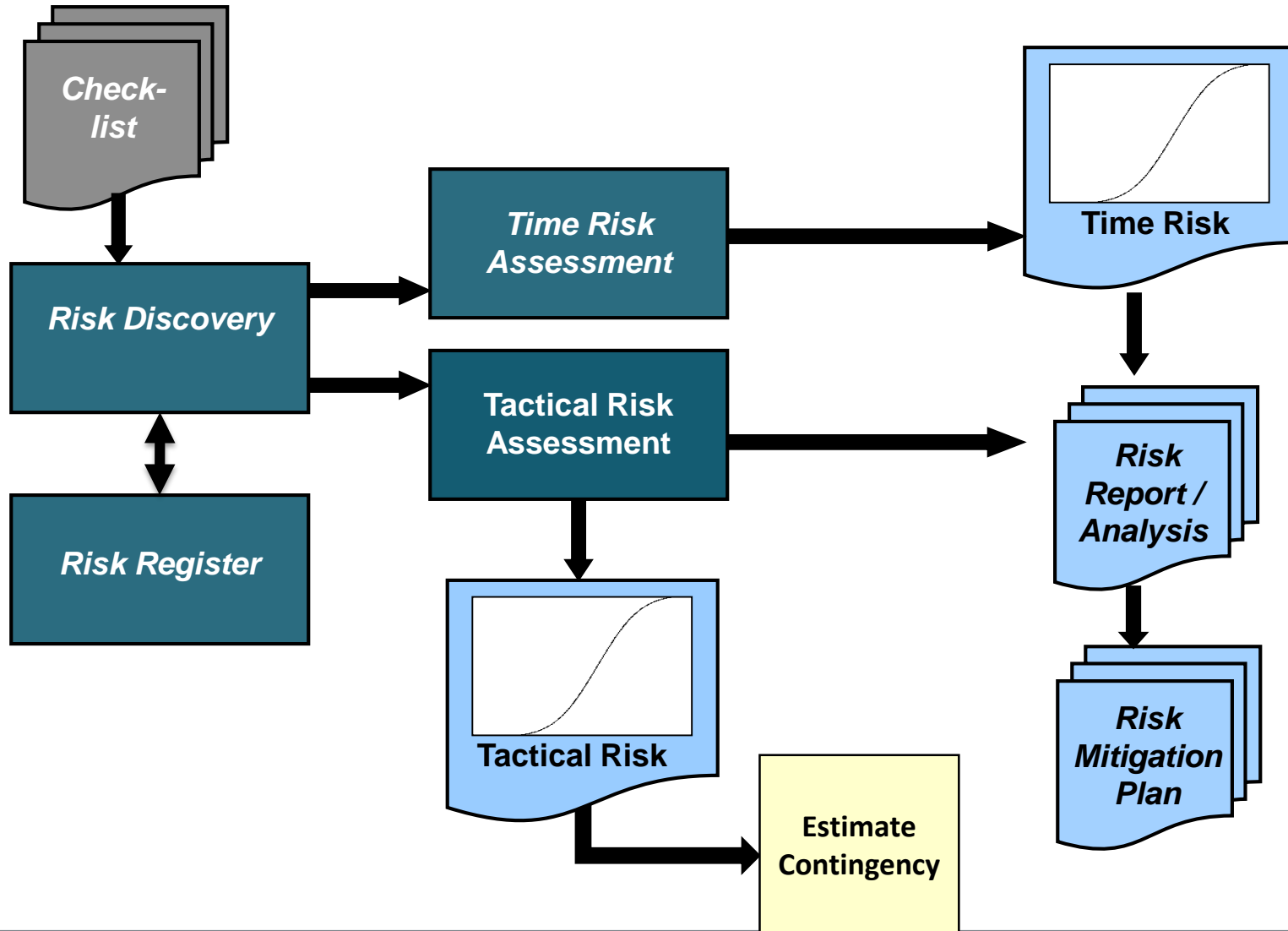
Component		DG2 Estimate	DG3 Estimate	Delta
Musktrat Falls Generation and Labrador Transmission Assets	Musktrat Falls Powerhouse, Dams and Reservoir Works	\$ 1,346,131,998	\$ 1,645,182,446	\$ 299,050,448
	Musktrat Falls Site Infrastructure	\$ 140,834,519	\$ 183,906,888	\$ 43,072,369
	MF Site Support Services	\$ 121,265,328	\$ 248,312,374	\$ 127,047,046
	MF and CF Switchyards and MF to CF Hvac Transmission Lines	\$ 261,446,000	\$ 498,769,539	\$ 237,323,539
	Sub-Total	\$ 1,869,677,845	\$ 2,576,171,247	\$ 706,493,402
Labrador - Island Transmission Link	Converter Stations, Cable Transition Compounds, and Electrodes	\$ 451,780,065	\$ 560,105,163	\$ 108,325,098
	SOBI Crossing	\$ 288,396,480	\$ 337,440,262	\$ 49,043,782
	HVdc Overland Transmission	\$ 435,630,000	\$ 957,203,750	\$ 521,573,750
	Island System Upgrades	\$ 193,733,200	\$ 157,313,680	\$ (36,419,520)
	Sub-Total	\$ 1,369,539,745	\$ 2,012,062,855	\$ 642,523,110
	Owner + EPCM + Incurred To-Date	\$ 624,358,482	\$ 884,612,150	\$ 260,253,668
	Total	\$ 3,863,576,072	\$ 5,472,846,252	\$ 1,609,270,180

Cost Growth Since DG2



Estimate Contingency Setting

Nalcor's follows principles of AACE Recommend Practice No. 42R-08



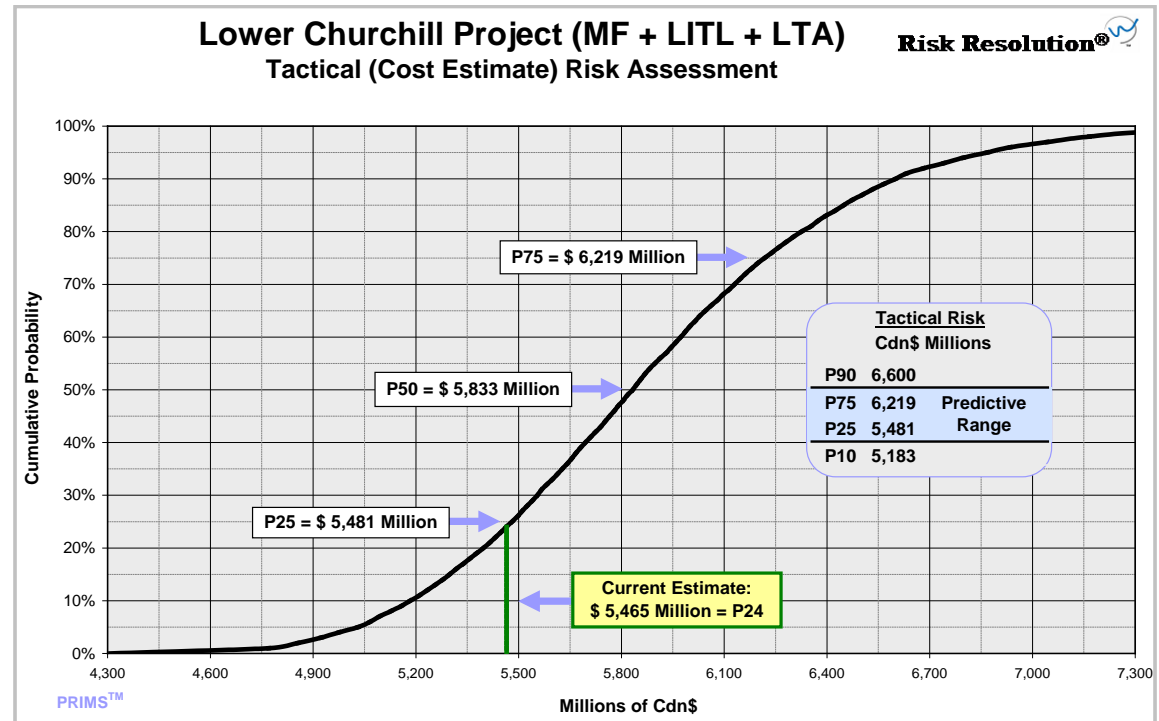
Contingency Recommendations

- Westney engaged to conduct risk assessment in late May / early June with Project Team. Key Findings:

1. *The scope for the project is well defined and represents design development consistent with project sanction. Considerations, such as likely geotechnical conditions and quantity variations due to further design development, were quantified based on the experience of the project team and used as a basis for assessing the possible outcomes.*
2. *The estimate and quantification are consistent with the requirements of project sanction. In many cases, pricing was based on actual bids and budgetary quotes. “Check” estimates were developed by industry experts for key areas, including the Muskrat Falls powerhouse and dam works. Other pricing was benchmarked against representative projects. The effects of weather, labour /skills availability, and supervision were also considered and/or benchmarked. Overall, this project’s degree of design development, definition, and methodology is consistent with an AACEI Class 2 estimate.*
3. *The estimate, plus an amount to reach the P50 on the results curve, should represent the cost at which the project can be executed according to the plan exclusive of external uncertainties.*
4. *A P50 contingency is \$368 million which equates to 7% of the estimate.*

Tactical Risk Analysis Results (Westney)

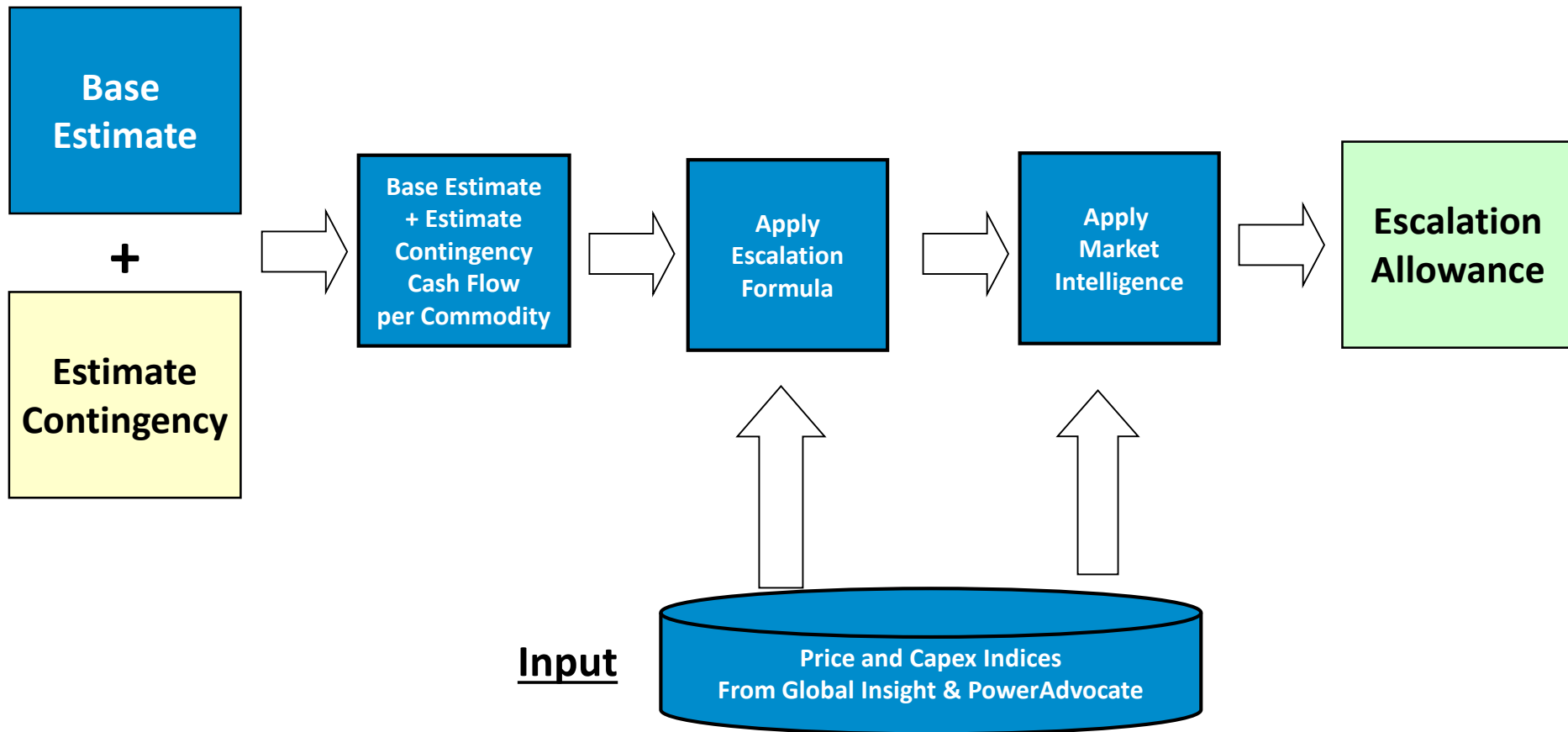
Risk Analysis for the overall Lower Churchill Project suggests, at a P50 value, the project contingency would be \$368 million (\$5,833 million minus \$5,465 million), which equates to 7% of the estimate.



Escalation Estimating Process

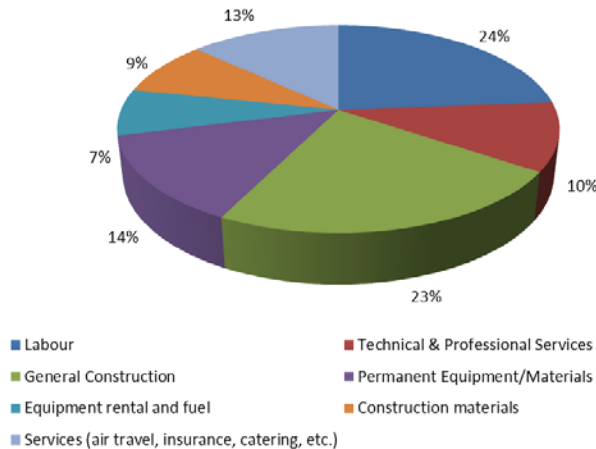
Nalcor's follows principles of AACE Recommend Practice No. 58R-10

Inputs

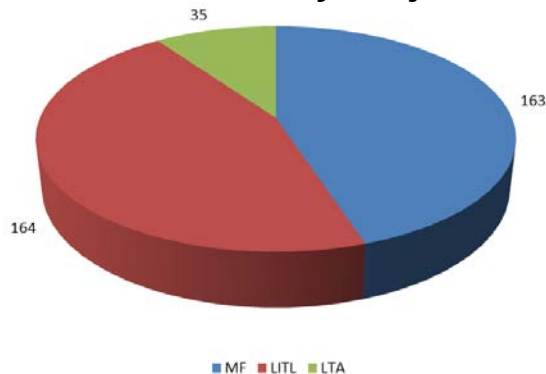


Escalation Allowance

Escalation by Cost Type



Escalation by Project



- \$360 million in total escalation
- Custom project-specific model developed
- Used a combination of Global Insight, Power Advocate and LCP market intelligence
- Costs broken down into 30 bins
- Contract pricing provides greater certainty for some project components

Back-up Material



Questions

