Impacts of the Muskrat Falls Project on Ratepayers and Taxpayers

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- "the need to balance the interests of ratepayers and the interests of taxpayers in carrying out a large-scale publicly-funded project."

There is no perfect prescription to pay for the Muskrat Falls Project.

- But some policies make more sense than others.

Mitigating electricity rate increases is <u>not necessarily</u> a welfare maximizing objective.

- Objective should be to maximize overall benefits for the province's residents, given the need to pay for the MFP.
- Paying for Muskrat Falls – *and maintaining current electricity rates* – entails a foregone opportunity to allocate funds to other worthwhile endeavors.

Paying for the Muskrat Falls Project introduces a trade-off between efficiency and equity.

- This trade-off is typical of large-scale utility projects.

Economics of electricity pricing

Ideal electricity pricing

Economics provides clear guidance on optimal pricing: Volumetric rates should be set to maximize efficiency, the total value of electricity to the economy.

- "Retail price of a kWh should reflect society's full short-run marginal cost of supply" (Borenstein, 2016)

Main problem with marginal cost pricing

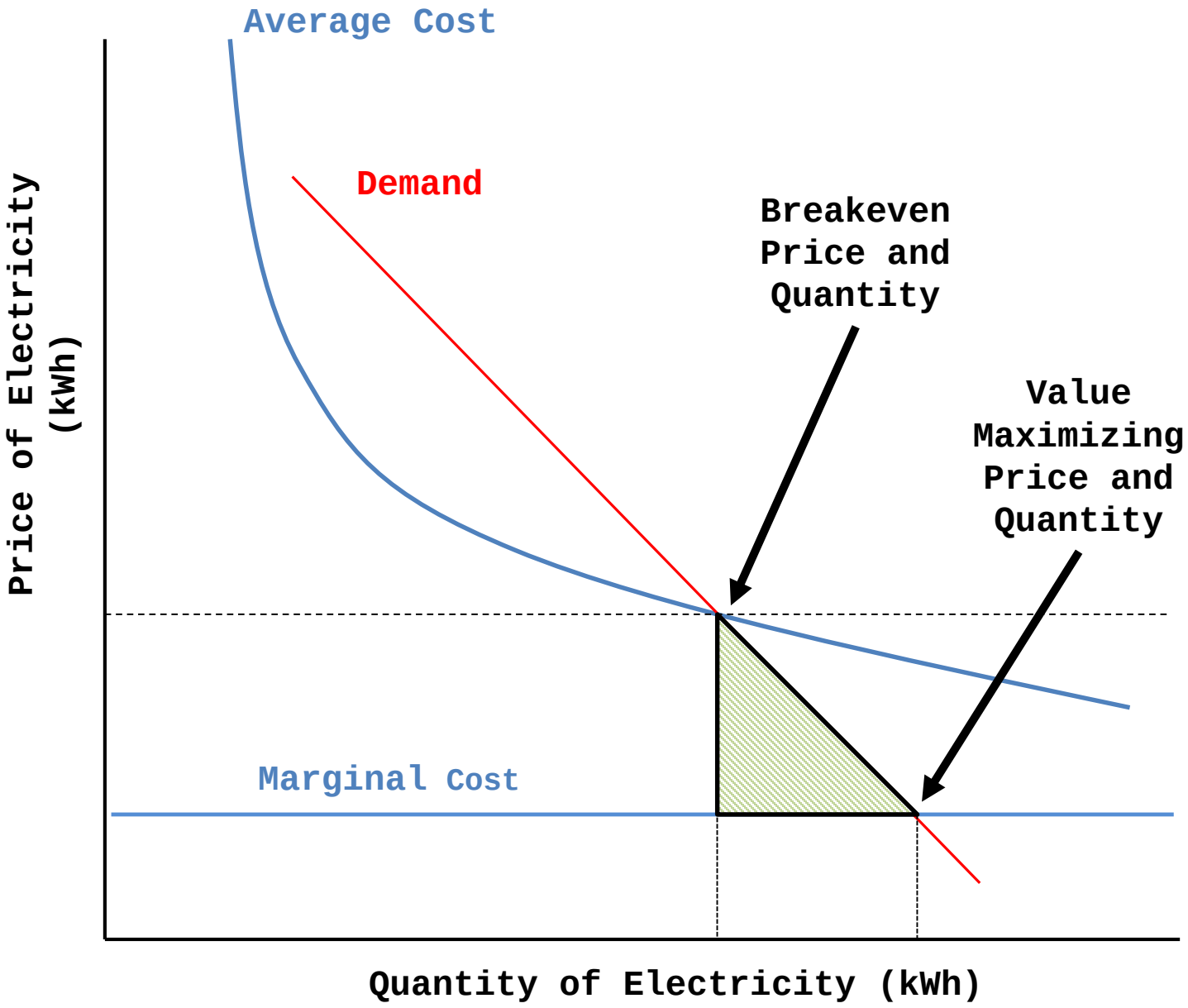
Setting the price of electricity equal to its full marginal cost won't raise sufficient revenue to cover fixed costs.

- Departures from marginal cost pricing create **deadweight losses**.
- Critical question: what is the most **efficient** and **equitable** way to raise additional revenue given that ideal pricing is infeasible?

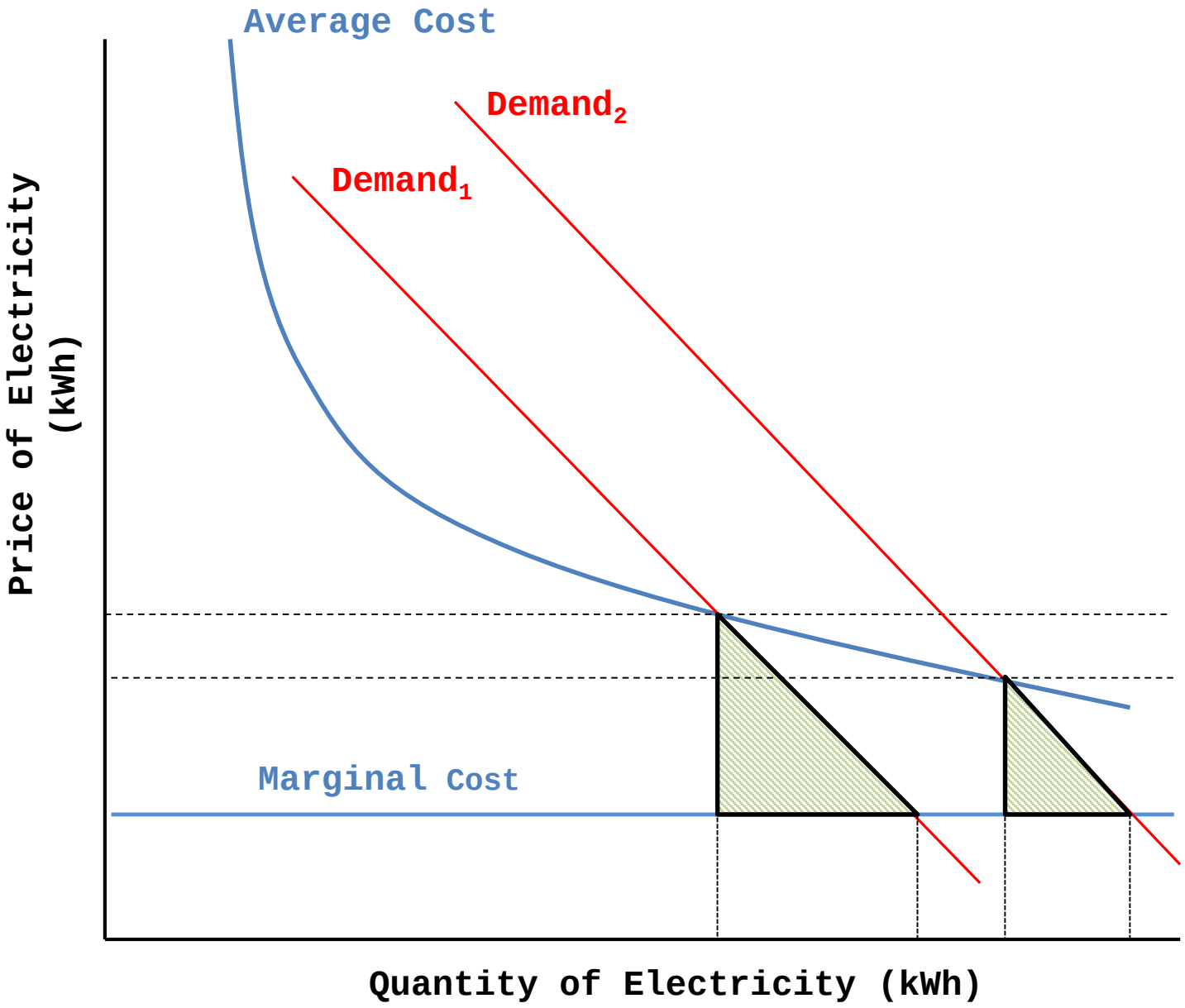
Main approaches to cover revenue shortfall

1. Average cost pricing
2. Ramsey pricing

Basic average cost pricing



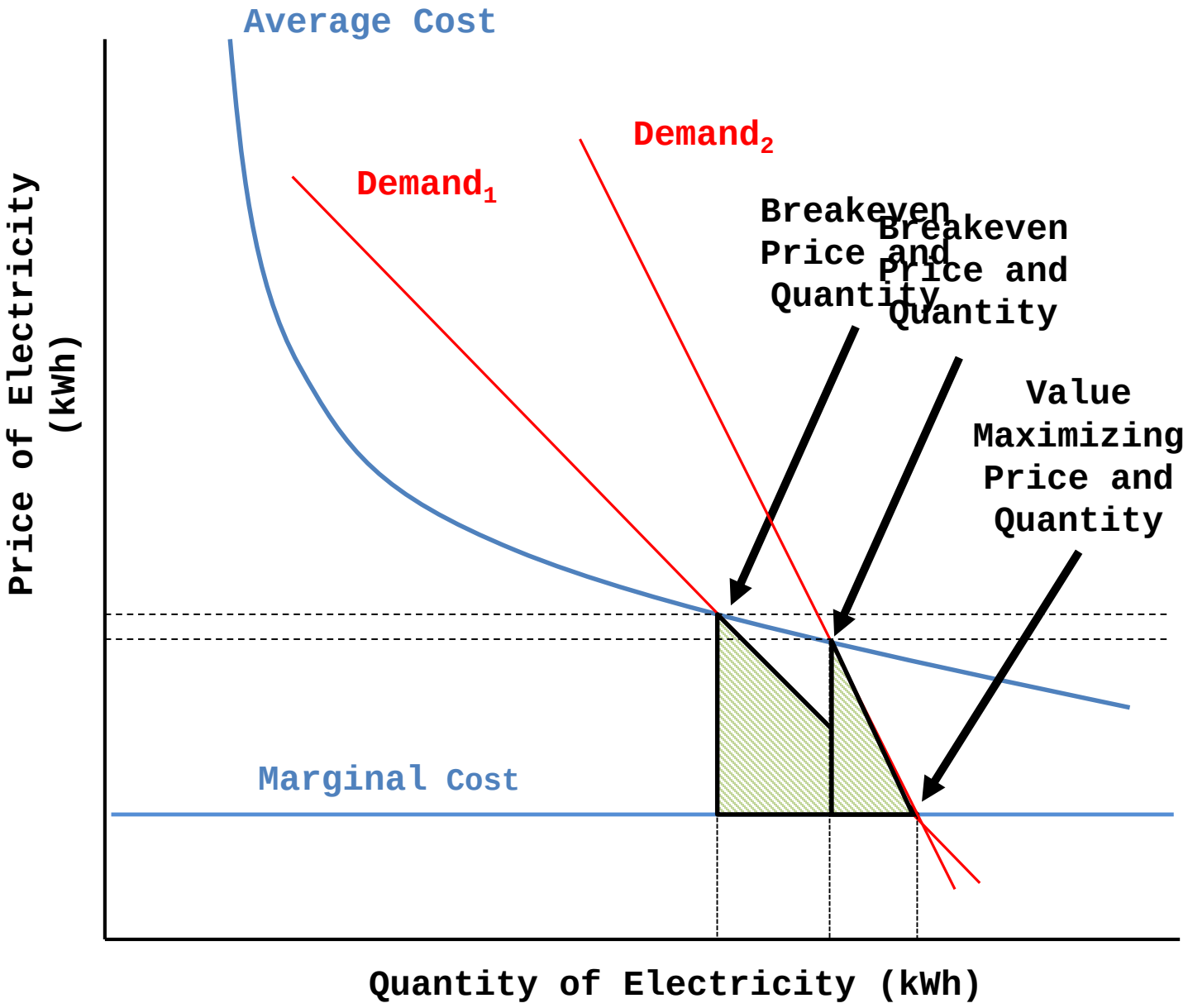
Electrification with declining average costs



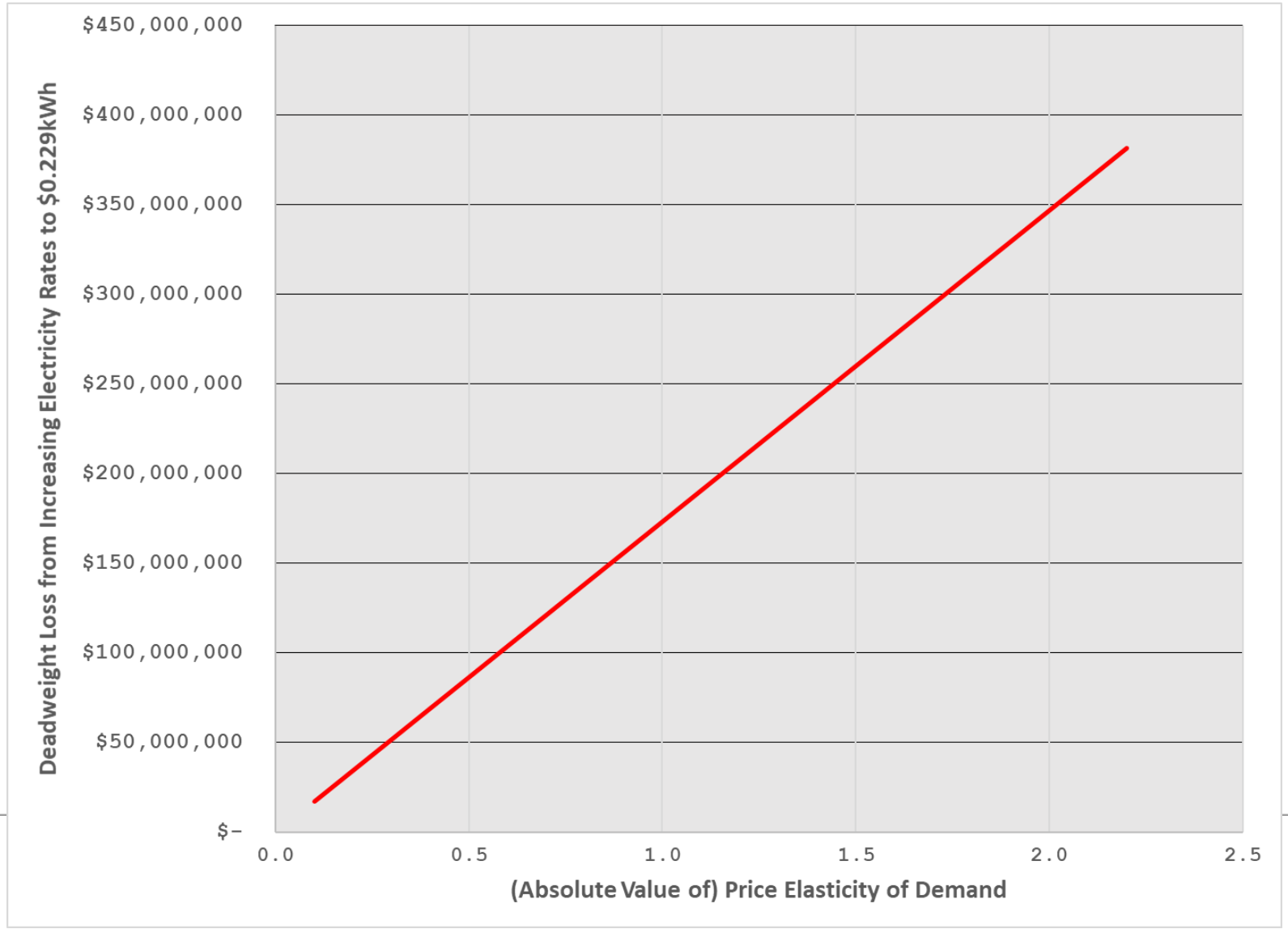
Average cost pricing has implications for equity and efficiency

- Average cost pricing is attractive on equity grounds
  - Every customer pays the same price
  - High users have larger bills than low users
- Magnitude of the deadweight loss depends on the *elasticity of demand*

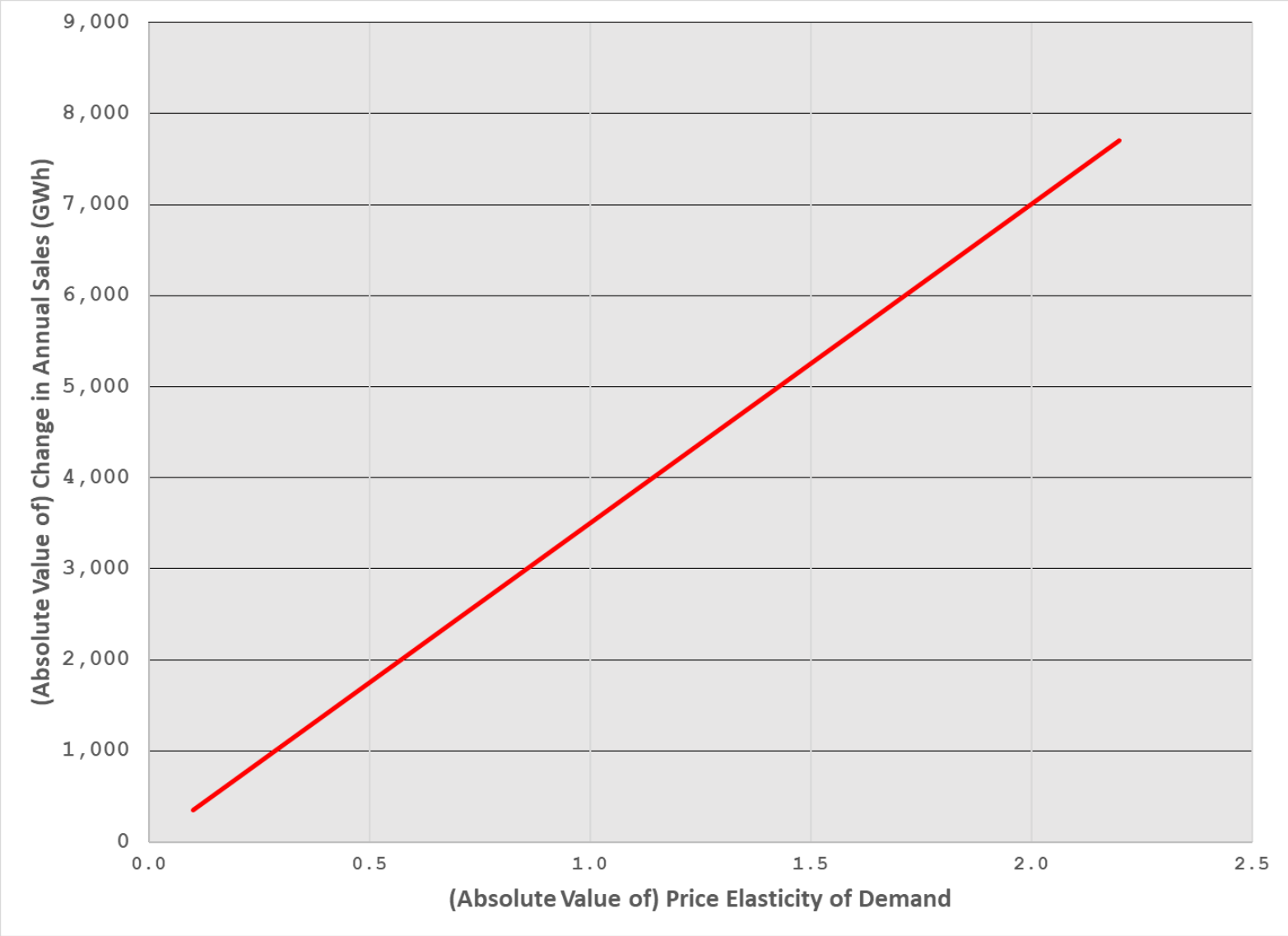
Elasticity of demand changes breakeven prices, quantities and deadweight losses



Foregone economic value from funding Muskrat Falls via electricity rates



Approximate change in Annual GWh at $0.229 for different elasticities



Comments on price elasticity of demand

- Determining the appropriate price elasticity of demand for NL is challenging
  - Wide range of estimates from other jurisdictions
    - Industrial consumers are more sensitive to electricity prices
  - Magnitude of proposed MFP-induced price change is very large
- Need to consider both short-run and long-run implications

Ramsey pricing rule

- The Ramsey electricity pricing rule minimizes the deadweight loss, given a revenue requirement
  - Maximizes total economic value
- Charges different customers different rates according to their price elasticity of demand
  - Industrial and commercial pay less, while residential pay more
- Ramsey pricing tends to raise equity concerns

Economics of taxation

Provincial budgeting and taxation

- Governments seek to balance the overall level of taxation, the mix of taxes and the level of services
- Raising $1 through taxation imposes costs on society
  - *Marginal cost of public funds* measures the losses incurred from raising money from a particular base
  - Used to evaluate public expenditure programs
    - This includes the costs of allocating taxes and/or dividends towards the Muskrat Falls Project

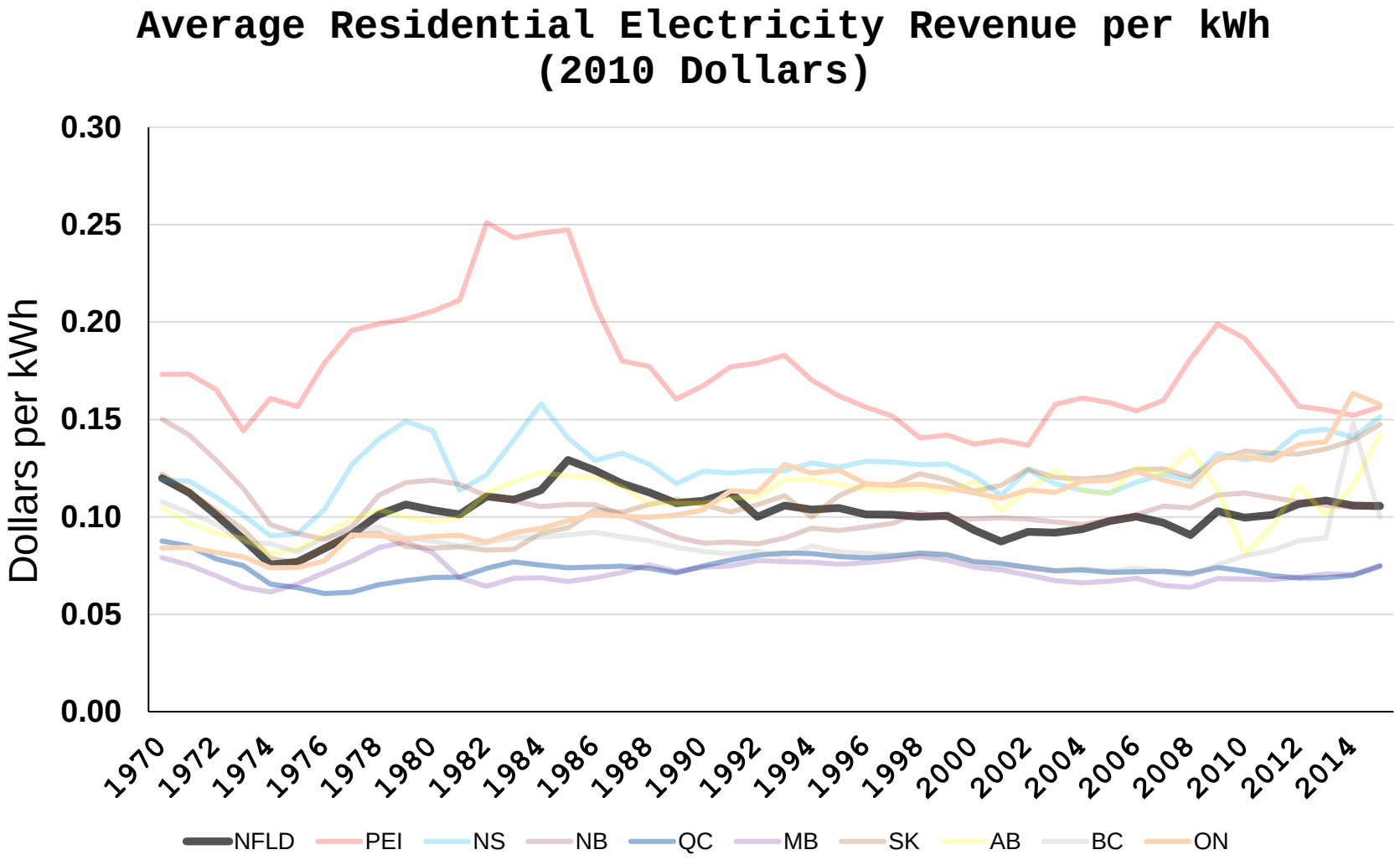
Estimates of NL's marginal cost of public funds

	Marginal cost of public funds ($)
Corporate Income Tax	30.31
Personal Income Tax	2.54
Sales Tax	1.15

- Potential implications of tax-financing rate mitigation:
  - Economic cost of replacing $200M Nalcor dividend with
    - PIT increases: 2.54*$200M = **$508M**
    - Sales tax increases: 1.15*$200M = **$230M**

Source: Dahlby and Ferede (2011), CD Howe Institute.

NL rates compared with the rest of Canada



Source: Statistics Canada

Implication of maintaining low rates

- Rate mitigation is not free
  - Rates are below Atlantic average
- NL has relatively high marginal costs of taxation
  - Gov't should allow for higher rates to offset potential increases in taxation
  - Balance rate mitigation against the implications of reduced expenditures
    - Many public expenditures are targeted at low income households

Selected other factors to consider

- Relative to other provinces
  - NL has a declining and aging population
  - Gov't revenues and the provincial economy are more sensitive to oil prices

"In the end, there is no good answer to the question of how a utility should recover fixed costs, but there are less bad ones."

- Borenstein (2016)

MAJOR NORTH AMERICAN CITIES

AVERAGE PRICES FOR RESIDENTIAL CUSTOMERS[1] (IN ¢/kWh)[2]

CIMFP Exhibit P-04461

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1) For a monthly consumption of 1,000 kWh; rates in effect April 1, 2018.
2) In Canadian currency.

Abbreviations Used

AB	Alberta
BC	British Columbia
CA	California
FL	Florida
IL	Illinois
MA	Massachusetts
MB	Manitoba
MI	Michigan
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NY	New York
ON	Ontario
OR	Oregon
PE	Prince Edward Island
QC	Québec
SK	Saskatchewan
TN	Tennessee
TX	Texas
WA	Washington

Source: Hydro Quebec - Comparison of Electricity Prices in Major North American Cities (2018 Edition, page 4).

MAJOR NORTH AMERICAN CITIES

AVERAGE PRICES FOR LARGE-POWER CUSTOMERS[1] (IN ¢/kWh)[2]

CIMFP Exhibit P-04461

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1) For a monthly consumption of 3,060,000 kWh and a power demand of 5,000 kW; rates in effect April 1, 2018.
2) In Canadian currency.

Abbreviations Used

AB	Alberta
BC	British Columbia
CA	California
FL	Florida
IL	Illinois
MA	Massachusetts
MB	Manitoba
MI	Michigan
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NY	New York
ON	Ontario
OR	Oregon
PE	Prince Edward Island
QC	Québec
SK	Saskatchewan
TN	Tennessee
TX	Texas
WA	Washington

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Source: Hydro Quebec - Comparison of Electricity Prices in Major North American Cities (2018 Edition, page 5).