



Decarbonisation and Tomorrow's Electricity Market

PRESENTED AT

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PRESENTED BY

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Decarbonisation and Market Reforms

- Ontario is far ahead of many other electricity markets in that it has already achieved 80% decarbonisation over the past decade
- However, the current market design is far behind
- Introduction of Cap and Trade and Market Renewal:
 - Represent a major shift away from planning/contracting approaches and toward best-in-class market design
 - Market Renewal is likely to achieve \$2,200–\$5,200 million in net efficiency benefits over the first decade
- But there is a significant outstanding question about the scope of market reforms:

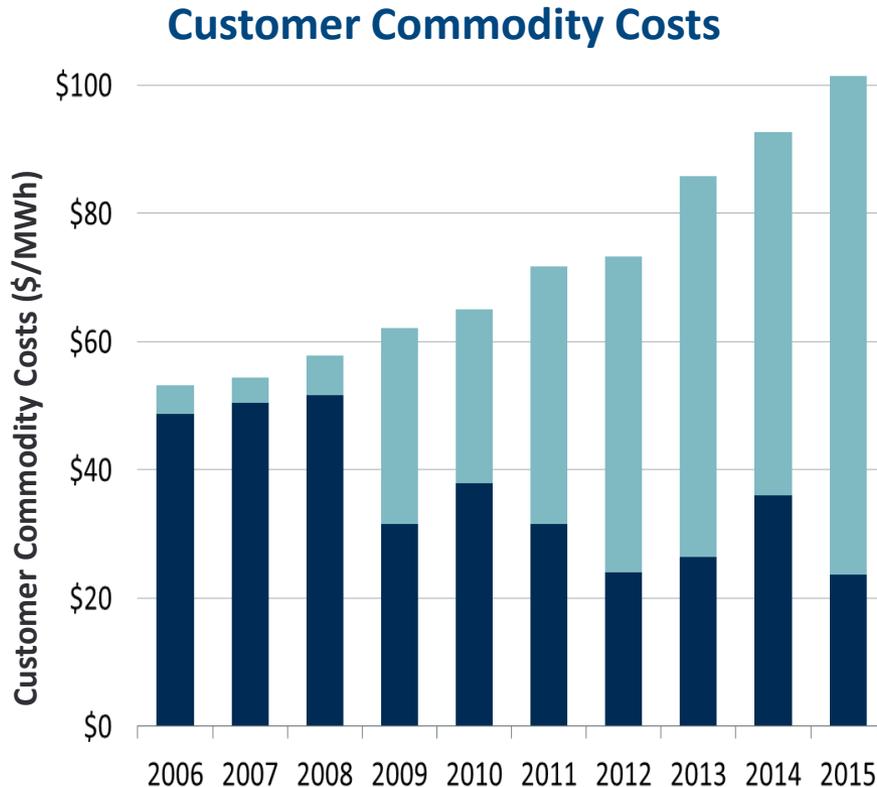
Does Ontario need any additional clean energy policies/markets in the electricity sector beyond Cap and Trade? If so, what?

Sources and Notes:

See Market Renewal Benefits Case Report: <http://www.brattle.com/system/publications/pdfs/000/005/427/original/Benefits-Case-Assessment-Market-Renewal-Project-Clean-20170420.pdf?1493049510>

Decarbonisation Means a Shift in Cost Drivers

The new decarbonised fleet has higher investment costs and lower variable costs than the fossil-based fleet from a decade ago. Drives the increasing share of customer costs and supplier revenues from Global Adjustment



Global Adjustment

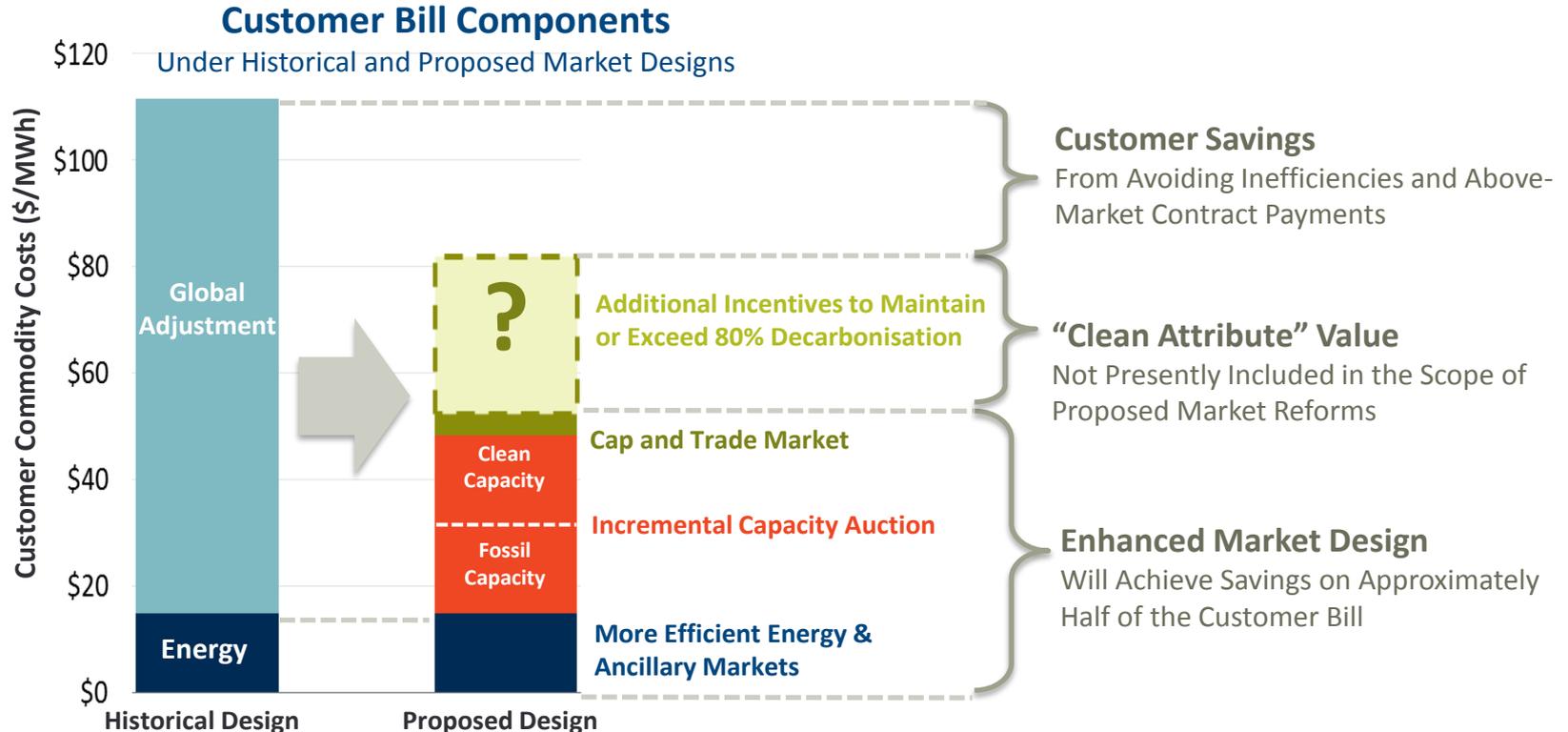
- Capacity value
- Investment costs of clean energy resources

Energy Prices

- Lower natural gas prices
- Impact of clean energy with low or no variable cost

How Costs Map into the Proposed Market Design

Ontario stands to achieve large efficiency benefits and customer savings through ongoing market reforms. But a significant share of system/customer costs are associated with “clean” value not covered in proposed market scope



Sources and Notes: Left: 2016 realized Global Adjustment and HOEP. Right: Indicative calculation at \$18/tonne CO₂e price, and assuming capacity prices at approximate CT Net CONE paid to all capacity resources.

Options for Expressing Electricity Sector CO₂e Objectives

Ontario could choose one of three primary “paths” forward for expressing CO₂e objectives in the electricity sector:



Rely Solely on Economy-Wide Cap and Trade

- Rely only on new Cap and Trade market to achieve economy-wide least-cost CO₂e reductions
- Phase out sector-specific incentives & contracts
- Expect that electricity sector CO₂e emissions will increase (*e.g.*, during nuclear refurbishments)



Future Supply Contracts for Clean Energy

In Addition to Cap and Trade

- Continue prior contracting approaches for clean energy
- Maintain associated inefficiencies
- Attempt to manage regulatory risks and impacts on energy & capacity markets



Market-Based Solution for the Electricity Sector

In Addition to Cap and Trade

- Define sector-specific CO₂e (or clean MWh) objectives
- Design a market solution such as: (1) enhanced CO₂e pricing (above economy-wide prices), or (2) clean attribute market

Possible Next Steps

- The Ministry and the IESO have expressed the intent to adopt resource-neutral, market based approaches to achieve efficiency and customer benefits
- For decarbonization, a market-based approach would mean:
 - Phasing out supply contracts (for both fossil and clean)
 - Deciding whether the economy-wide Cap and Trade market is sufficient to meet policy objectives (*i.e.*, that it will achieve least cost reductions in Ontario, though electricity sector emissions may increase)
 - If there is a need to stay decarbonized or achieve additional reductions in the electricity sector, than do so using a made-in-Ontario, market-based approach (in addition to economy-wide Cap and Trade)
- If Ontario chooses to adopt a sector-specific CO₂e pricing or clean energy market, it would need to be a made-in-Ontario approach that reflects the province's unique circumstances and needs

Presenter Information



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Dr. Kathleen Spees is a Principal at The Brattle Group with expertise in designing and analyzing wholesale electric markets and carbon policies. Dr. Spees has worked with market operators, transmission system operators, and regulators in more than a dozen jurisdictions globally to improve their market designs for capacity investments, scarcity and surplus event pricing, ancillary services, wind integration, and market seams. She has worked with U.S. and international regulators to design and evaluate policy alternatives for achieving resource adequacy, storage integration, carbon reduction, and other policy goals. For private clients, Dr. Spees provides strategic guidance, expert testimony, and analytical support in the context of regulatory proceedings, business decisions, investment due diligence, and litigation. Her work spans matters of carbon policy, environmental regulations, demand response, virtual trading, transmission rights, ancillary services, plant retirements, merchant transmission, renewables integration, hedging, and storage.

Kathleen earned a B.S. in Mechanical Engineering and Physics from Iowa State University. She earned an M.S. in Electrical and Computer Engineering and a Ph.D. in Engineering and Public Policy from Carnegie Mellon University.

About The Brattle Group

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We combine in-depth industry experience and rigorous analyses to help clients answer complex economic and financial questions in litigation and regulation, develop strategies for changing markets, and make critical business decisions.

Our services to the electric power industry include:

- Climate Change Policy and Planning
- Cost of Capital
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- Demand Response and Energy Efficiency
- Electricity Market Modeling
- Energy Asset Valuation
- Energy Contract Litigation
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