



CO₂e Cap-and-Trade

Interactions with Electricity Markets

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Association of Power Producers of Ontario

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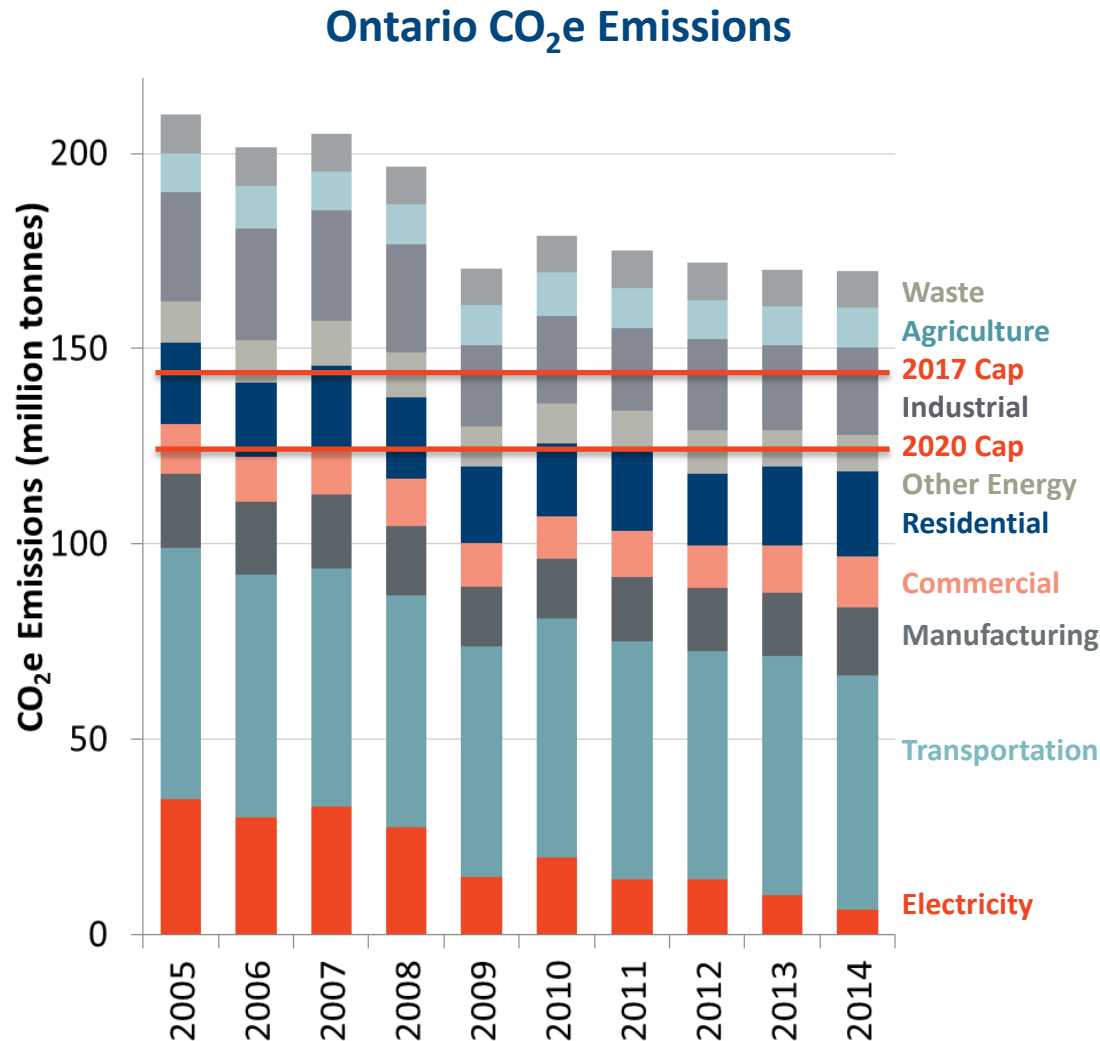
Kathleen Spees

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THE **Brattle** GROUP

Overview

- As perspective on cap and trade implications in electricity:
 - Electricity already 80% decarbonized over the past 10 years
 - Will be only 5% of GHG emissions cap (if there is no backsliding as nuclear plants retire/refurbish)
- But electricity sector implications are substantial:
 - Other sectors may decarbonize via electrification (requiring more clean energy to offset load growth & nukes)
 - Direct impact to increase energy prices (only in a portion of hours, but very important for economic efficiency!)
 - Implications for new investments in the electricity sector



Sources:

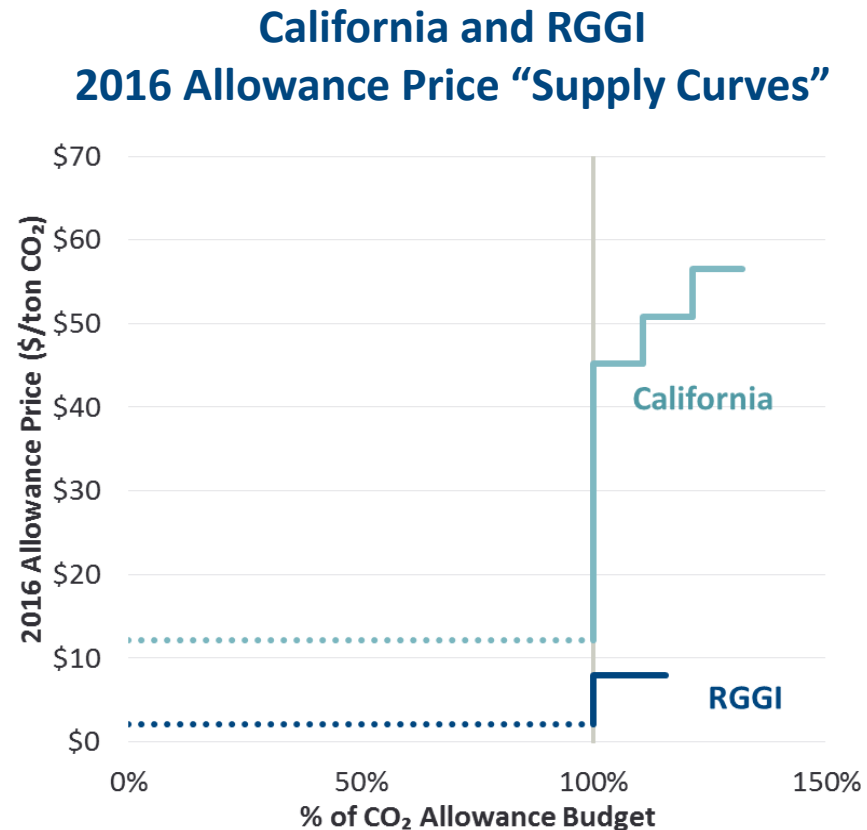
Statistics Canada, and <https://www.ontario.ca/laws/regulation/r16144>

Learning from Other Markets: What Drives Prices?



Stabilizing Prices: Quantity Adjustment Mechanisms

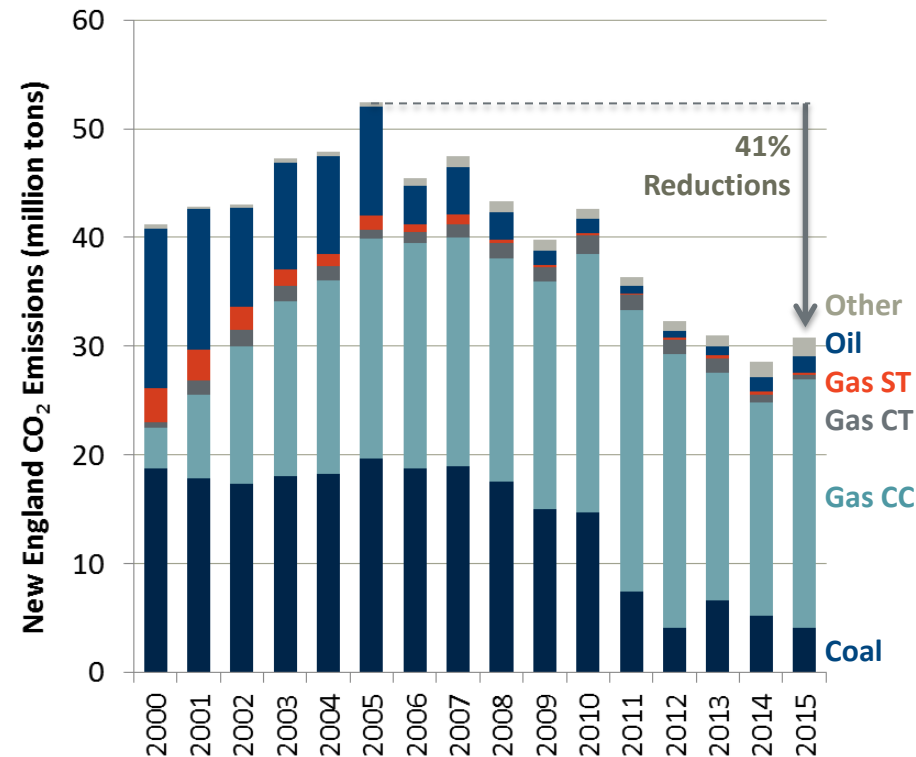
- Over-supply of allowances and growing “bank” of unused allowances have kept prices low in many CO₂e markets
 - Prices lower than many measures of societal cost
 - Susceptible to collapse and excess influence of unanticipated details (e.g. end-price effects, international linking)
- RGGI and California designs include some price stabilization mechanisms
 - Cost containment reserves (see right)
 - Price floor or “reservation price”
 - In RGGI, unsold allowances are retired. In California, some allowances can be re-offered if prices clear above the floor
- **Last auction: California and Québec only sold 35% of the offered allowances**



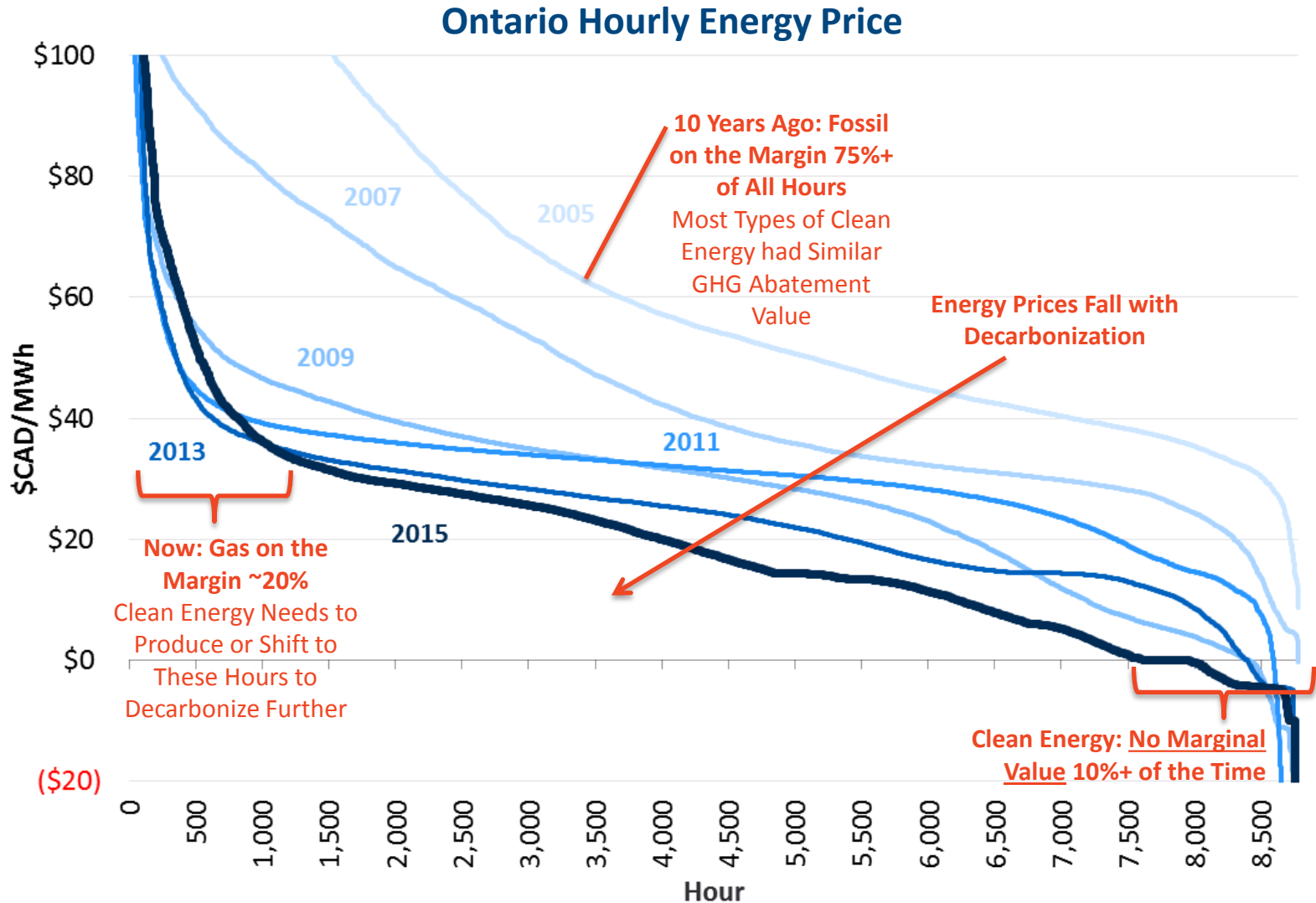
ISO-NE: Integrating Markets and Public Policy

- ISO-NE has been decarbonizing quickly (41% reductions in 10 years, compared to 18% US nation-wide)
- Growing recognition that technology-specific contract procurements are becoming less effective:
 - Growing out-of-market contract costs
 - Market can work against policy objectives if CO₂ pricing is insufficient
 - Example: clean energy drives down energy prices, puts existing clean nukes and hydro at risk of retiring (unwinding CO₂ abatement)
- Stakeholders now trying to redesign the market to work for policy objectives, proposals include:
 - Higher administrative CO₂ price (US \$30-\$60/ton)
 - New integrated capacity and clean energy procurement market
 - Energy/ancillary service market enhancements

CO₂ Emissions from New England Electricity Sector



Ontario: The Last 20% GHG in Electricity Sector



Takeaways for Ontario

Cap-and-Trade

- Uniform CO₂e pricing across the fleet, across sectors, and across time (to the extent feasible) will help prioritize expenditures with the greatest potential to avoid emissions
- Quantity adjustment mechanisms can help stabilize incentives (experience from other markets suggests that more can be done at modest cost)

Electricity Sector

- Non-emitting electricity sector may enable other sectors to decarbonize
- With decarbonization, the energy portion of the bill is going down, capital portion (i.e. Global Adjustment or capacity payments) must go up. Reflective of a fleet with low variable and high capital costs
- Growing importance of recognizing that all clean energy is not equal; value of energy shifting and profiling can be rewarded via CO₂e pricing
- Market-based mechanisms for both variable and capital portion of system costs will help mitigate the costs of decarbonizing. Cap-and-trade or CO₂e pricing is first and foremost, but many other elements to be harmonized in the electricity markets

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 RTOs including PJM, ISO-NE, ERCOT, MISO, AESO, IESO, NYISO and others in the U.S. and internationally 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, FTRs, ancillary services, coal 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.

The views expressed in this presentation are strictly those of the presenter and do not necessarily state or reflect the views of The Brattle Group.

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The Brattle Group provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governmental agencies worldwide.

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
- Demand Forecasting Methodology
- Demand Response and Energy Efficiency
- Electricity Market Modeling
- Energy Asset Valuation
- Energy Contract Litigation
- Environmental Compliance
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