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EFG Phase 1 Evidence Summary

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Background: Chris Neme

- Expert witness in approximately 25 OEB cases
- On many OEB committees, often appointed by Board staff or elected by intervenors (e.g. DSM evaluation committees, gas IRP TWG, DSM SAG)
- Led or played major role in several gas decarbonization studies (e.g. Massachusetts, Vermont, etc.)
- Advised energy regulators, utilities, government agencies and other organizations in more than 30 states, 7 Canadian provinces and several European countries over 3 decades
- Defended expert witness testimony in approximately 70 cases before regulatory commissions in 13 different jurisdictions

Overview

- Major declines in peak and annual gas demand very likely result of decarbonization
- Implications of declining demand:
 - Increased risk of underutilized/stranded assets
 - Future ratepayers saddled with paying high rates for those assets
 - Inequities between customers today and those left on the system later
 - Esp. future customers paying for assets built to meet current customer needs
 - Esp. for low-income households who face barriers to leave the system
- EFG Report recommendation #6: reduce capital spending where possible
- Adding customers is inconsistent with a least-cost decarbonization pathway for buildings
 - The relative economics of electrification are most compelling in new construction and/or when gas system connection costs can be avoided

Major declines in demand very likely

- Gas combustion = major source of GHG emissions
 - 1/3rd of Ontario's emissions
- Electrification = cheapest way to decarbonize for society
 - Independent studies: most cost-effective pathway dominated by electrification
- No technical barriers to electrification
 - In contrast, there are many technical barriers, uncertainties and supply limitations for lower-carbon gaseous fuels
- Heat pumps → lower energy bills
 - Heat pumps result in lower residential energy bills – even today – vs. fossil fuel heating
 - Customer economics even more compelling relative to much higher cost RNG
- Even Enbridge's study would show that high levels of electrification would be lower cost once some basic analytical errors were corrected

Decarbonization pathways studies

- Independent studies find the most cost-effective pathways to decarbonize buildings are dominated by electrification
- Examples:
 - Quebec (Dunsky for QC Govt): gas demand essentially disappears by 2050
 - New York State (E3 for NY Govt): accelerated electrification is most cost-effective; RNG/H2 plays “a very limited role”
 - Massachusetts (E3 for gas utilities): ~80% decline in throughput; hybrid heating playing a role; full electrification for all new construction as a “safe bet” recommendation
- Canadian Climate Institute (2024)
 - Most cost-effective pathway for Ontario involves 96% decline in gas for buildings
 - “Continued growth of the gas network is inconsistent with cost-effectively reaching net zero”

No technical barriers to electrification

Electrification-dominated pathways	Gas-dominated pathways
<ul style="list-style-type: none">• Proven technologies<ul style="list-style-type: none">• Generation (e.g. wind, solar, batteries, etc.)• End-use (electric heat pumps)	<ul style="list-style-type: none">• Technological uncertainty (use of H2 in appliances, gas heat pumps, CCS, etc.)
<ul style="list-style-type: none">• No limit to clean electricity supply	<ul style="list-style-type: none">• RNG potential constrained by limited feed stocks and needed for other uses• H2 blending is limited
<ul style="list-style-type: none">• Electrification can proceed piecemeal over time	<ul style="list-style-type: none">• 100% H2 requires non-feasible simultaneous switchovers

Heat pumps lower energy bills

- Adoption of heat pumps is likely because they lower energy bills
 - This will lower gas demand and utility revenues
- Heat pumps lower average home energy bills compared to gas alternatives
 - Energy bill reductions from electrification are over \$500 annually
 - Also lower cost on a lifetime basis
 - Conclusions persist even in sensitivity analyses testing key assumptions
- Heat pumps lower energy bills even more versus low-carbon gases (e.g., RNG)
 - This is the more important comparison when considering a decarbonized future
 - EFG compared: (a) cost of heat pumps using more expensive clean electricity (per IESO decarbonization cost estimates) and (b) cost of a furnace burning RNG
 - Result: electrifying a home achieves three times the already substantial energy bill savings it provides today
 - Likely an underestimate because analysis disregards: (a) the savings from avoiding fixed monthly gas charges, (b) higher gas delivery rates due to customer declines, and (c) the cost to make-up for the fact that RNG is not carbon neutral.

Guidehouse shows electrification cheaper

- Guidehouse prepared a report for Enbridge in Phase 1
- It was highly flawed
- Correcting even one or a few errors showed its high-gas pathway to be more expensive for society as a whole
- See table 9 on page 41 of the EFG report

Customer growth capital is risky

- EFG report recommendation #6: reduce capital spending where possible
 - “The risk of underutilized and stranded assets calls for additional efforts to reduce capital spending, wherever that is possible, especially on long-lived infrastructure.”
 - “Utilities and regulators always should seek to avoid unnecessary capital spending, but even greater scrutiny is required in the current context.”
- Spending on customer connections is particularly risky
 - High cost of customer connections unlikely to be recouped from those customers
 - New capital has higher undepreciated balance
- Enbridge’s incentives should be aligned with this capital reduction imperative to the extent possible

Response to Enbridge re least-cost pathway

- EG says: Adding customers “is not in contradiction to an affordable energy transition at least cost to ratepayers (i.e. leveraging gas for peak days could be cheaper than the buildout of electric to meet peak demand).”
 - Adding customers is inconsistent with a least-cost decarbonization of buildings
 - Even Mass. pathways study recommended all new connections be electric
 - CCI report:
 - “Continued growth of the gas network is inconsistent with cost-effectively reaching net zero”
 - “low-carbon gases like hydrogen and biomethane will not serve as replacement fuels on a scale that can justify continued gas network expansion”
 - “these gases are either too scarce or too costly to heat more than a small fraction of Canada’s buildings, and are instead taken up by other sectors such as heavy industry. Even under lower-cost assumptions for these fuels, electrification of building heat still dominates.”
 - See also slide 1 re decarbonization pathways studies