NOVA SCOTIA ENERGY BOARD

IN THE MATTER OF: **The *Public Utilities Act, RSNS* 1989, c. 380 as amended**

- and -

IN THE MATTER OF: **An Application by EfficiencyOne for Approval of a New Benefit-Cost Analysis Test for Evaluating Demand Side Management (DSM) Plans – Matter M12282**

EVIDENCE OF POSTERITY GROUP CONSULTING INC.

July 17, 2025

Introduction

Posterity Group was retained by Eastward Energy to review EfficiencyOne's (E1) Application for Approval of a New Benefit-Cost Analysis (BCA) Test for Evaluating Demand Side Management (DSM) Plans and make potential recommendations.

Posterity Group Consulting Inc. (Posterity Group) works with governments, utilities, and private clients to help them understand risks and opportunities associated with energy use, climate change, and technology innovation. Posterity Group's mission is to provide clients with the data they need to make evidence-based decisions that will influence tomorrow's low-carbon energy landscape. Posterity Group has earned a reputation for providing exceptional analysis and advice related to energy use and the decarbonization of the built environment.

Benefits of Hybrid Heating

Posterity Group recommends that E1 specifically recognize the benefits of hybrid heating to reduce peak load impacts as part of the 2027-2031 DSM Plan. The benefits of hybrid heating in Nova Scotia are recognized by Nova Scotia Power and E3. For example, Nova Scotia Power's 2022 IRP states that the NVPRR is $2.3 billion less for hybrid heating compared to the current policy and trends scenario.[1] In addition, E3 recognized the reduction in peak load impacts when dual-fuel heat pumps are deployed in its October 2023 report, "The Economics of Electrification in Nova Scotia":

- "When electrification occurs at scale, the marginal cost to serve load from new heat pumps could trigger significant new investments in generation, transmission and distribution as heat pumps add new load to existing winter peaks when adopted in buildings currently using fossil fuels for heating; this in turn would reduce ratepayer benefits of current performance heat pumps, adding urgency to the need to incentivize best-in-class heat pumps and dual-fuel heat pumps to reduce the peak load impact."[2] (emphasis added)

[1] Evergreen IRP Final Modelling Results (May 29, 2023), page 62

[2] The Economics of Electrification in Nova Scotia, page 81

- "Encouraging adoption of advanced building technology such as high performance all-electric heat pumps and dual-fuel heat pumps will be essential to mitigate peak load impacts."[3] (emphasis added)

Other jurisdictions also recognize the importance of hybrid heating:

- The Quebec Government recognized the importance of hybrid heating in its 2030 Plan for a Green Economy: "Fully electrifying heating would not be ideal for Québec. **It would create a significant peak demand issue at certain times during the winter, when electricity consumption is greatest. It would also increase costs for all customers.** Furthermore, it is worth noting that electricity cannot be the only option for all commercial and institutional buildings because of certain constraints. For example, in the event of a widespread or major power outage, hospitals must be able to rely on an alternative energy source. In some areas, the electrical grid also struggles to handle increased demand."[4] (emphasis added)

- In June 2025, Ontario released a comprehensive Integrated Energy Plan.[5] The Plan states that natural gas is a critical component of Ontario's future energy mix. The Ontario Government has directed the OEB and IESO to develop a formal process to engage natural gas distributors in regional electricity planning activities. The intent is to start sharing information necessary to more carefully monitor electricity load growth and the timing of system needs – helping both systems work together to ensure reliable, cost-effective service.

- FortisBC illustrated the challenges with meeting winter heating demand through one energy system in its 2023 Kelowna Electrification Case Study.[6] FortisBC delivers natural gas and electricity within the City of Kelowna as part of its shared service territory. Results from the Study show "at 100 percent electrification of gas load and a mean daily temperature of -26 Celsius, peak demand in 2040 would more than triple, from 472 megawatts (MW) to 1,429 MW, resulting in a high-level estimate of between approximately $2.6 and $3.4 billion in capital expenditures on the electric distribution and transmission system which would be needed in less than 20 years. Even at 25 percent electrification of gas load, peak demand would increase to 711 MW and result in an

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[3] The Economics of Electrification in Nova Scotia, page 80

[4] Electrification and Climate Change Policy Framework, 2030 Plan for a Green Economy , page 53

[5] Energy for Generations | ontario.ca

[6] 2023 Kelowna Electrification Case Study, page 1

estimated range of $1.3 to $1.7 billion in capital expenditures over this same timeframe." The Study concludes that "there are opportunities for solutions to managing the energy transition through the operation of an integrated gas and electric system."[6]

Posterity Group has prepared two quantitative illustrative examples to show there is a net benefit for hybrid heating under the proposed BCA test:

- Table 1 provides the proposed BCA test structure and results for 1,000 hybrid systems (natural gas furnace and electric heat pump) replacing electric resistance baseboard heaters using avoided costs from NSEB IR-26 Attachment 1. Costs and benefits are calculated using measure cost estimates from two sources: NSEB IR-26 Attachment 1 from E1 and E3's report, "The Economics of Electrification for Nova Scotia."[7] In this quantitative illustrative example, the net benefits are 4.10 times the costs using E1 measure costs, and 4.53 times the costs using E3 measure costs. Switching from electric resistance to hybrid heating reduces electricity use and offsets the increased generation needed by those transitioning from heating oil to hybrid systems.
- Table 2 provides the proposed BCA test structure and results for 1,000 hybrid systems (natural gas furnace and electric heat pump) replacing fuel oil furnaces using avoided costs from NSEB IR-26 Attachment 1. Costs and benefits are calculated using measure cost estimates from two sources: NSEB IR-26 Attachment 1 from E1 and E3's report, "The Economics of Electrification for Nova Scotia."[7] In this quantitative illustrative example, the net benefits are 2.21 times the costs using E1 measure costs, and 2.27 times the costs using E3 measure costs.

The BCA test results for the illustrative examples for hybrid heating compare favourably with E1's "Electric Heat Pump – Fuel Oil" and "Electric Heat Pump – Fossil Gas" illustrative examples.

[7] The Economics of Electrification in Nova Scotia, page 111

Table 1: Illustrative Example - Hybrid System Replacing Electric Resistance Heating

Nova Scotia Test ($Million), 2% Social Discount Rate, Using 2023-2025 Avoided Costs:

Example based on 1,000 Hybrid Systems Replacing Electric Resistance Baseboard Heaters, Program Year 2026

	Category	Impact	Basis for Estimation	Hybrid Replacing Electric Resistance Baseboard Heaters (E1 Costs)	Hybrid Replacing Electric Resistance Baseboard Heaters (E3 Costs)	
Utility System Impacts	Generation	Energy Generation	Updated NSP Avoided Costs (time and seasonal dependent)	$15.58	$15.58	
		Capacity	Updated NSP Avoided Costs (time and seasonal dependent)	$17.41	$17.41	
		Environmental Compliance	Should be reflected in Avoided Costs	0	0	
		RPS/CES Compliance	Should be reflected in Avoided	0	0	
		Market Price Effects	NA	0	0	
		Ancillary Services	Should be reflected in Avoided	0	0	
	Transmission	Transmission Capacity	Updated NSP Avoided Costs, Example Split 50/50 T&D	$3.72	$3.72	
		Transmission System Losses	Should reflect marginal losses from generator			
	Distribution	Distribution Capacity	Updated NSP Avoided Costs, Not based on historic	$3.72	$3.72	
		Distribution System Losses	Should reflect marginal losses from generator			
		Distribution O&M	Should be reflected in Avoided	0	$0.00	
		Distribution Voltage	NM	NM	NM	
	General	Financial Incentives	EOne Incentives	($4.21)	($3.74)	
		Utility Direct Investments in DERs	NSP investment for enabling DERs	0	$0.00	
		Program Administration	EOne program Admin	($1.05)	($0.94)	
		Utility Performance Incentives	NA	0	$0.00	
		Credit and Collection	Need to be developed			
		Risk	Need to be developed			
		Reliability	Should be reflected in Avoided	0	$0.00	
		Resilience	NM	NM	NM	
			Sub Total Electric Impacts	**$35.16**	**$35.75**	
Non Utility Impacts	Other Fuels	Avoided Heating Oil	Fuel cost projection minus embedded carbon price	$0.00	$0.00	
	Other Fuels	Increased Natural Gas	Fuel cost projection minus embedded carbon price	($1.75)	($1.75)	
	Other Air Pollutants	Health Impacts from Increase/Decrease in Electric Generation	US EPA Benefit per kWh for New England	$1.42	$1.42	
	Greenhouse Gas Impacts	Avoided Social Costs for CO2	Social cost of carbon & electric and avoided fuel emission intensities	$12.30	$12.30	
Host Customer Impacts	Direct	Direct measure costs	Host customer measure costs net of incentives	($6.45)	($5.72)	
	Proxy	Proxy host customer benefits	Percent estimate for host customer non-energy net benefits	$1.07	$0.95	
			Sub Total Non Utility and Host Customer Impacts	**$6.59**	**$7.20**	

	PV of Costs	PV of Benefits	Benefit Cost Ratio
Hybrid Replacing Electric Resistance Heating (E1 Costs)	$13.47	$55.22	4.10
Hybrid Replacing Electric Resistance Heating (E3 Costs)	$12.15	$55.10	4.53

Table 2: Illustrative Example - Hybrid System Replacing Fuel Oil Furnaces

Nova Scotia Test ($Million), 2% Social Discount Rate, Using 2023-2025 Avoided Costs:

Example based on 1,000 Hybrid Systems Replacing Fuel Oil Furnaces, Program Year 2026

	Category	Impact	Basis for Estimation	Hybrid Replacing Fuel Oil Furnace (E1 Costs)	Hybrid Replacing Fuel Oil Furnace (E3 Costs)	
Utility System Impacts	Generation	Energy Generation	Updated NSP Avoided Costs (time and seasonal dependent)	($5.82)	($5.82)	
		Capacity	Updated NSP Avoided Costs (time and seasonal dependent)	$0.00	$0.00	
		Environmental Compliance	Should be reflected in Avoided Costs	0	$0.00	
		RPS/CES Compliance	Should be reflected in Avoided Costs	0	$0.00	
		Market Price Effects	NA	0	$0.00	
		Ancillary Services	Should be reflected in Avoided Costs	0	$0.00	
	Transmission	Transmission Capacity	Updated NSP Avoided Costs, Example Split 50/50 T&D	$0.00	$0.00	
		Transmission System Losses	Should reflect marginal losses from generator			
	Distribution	Distribution Capacity	Updated NSP Avoided Costs, Not based on historic	$0.00	$0.00	
		Distribution System Losses	Should reflect marginal losses from generator			
		Distribution O&M	Should be reflected in Avoided Costs	0	$0.00	
		Distribution Voltage	NM	NM	NM	
	General	Financial Incentives	EOne Incentives	($6.25)	($5.99)	
		Utility Direct Investments in DERs	NSP investment for enabling DERs	0	$0.00	
		Program Administration	EOne program Admin	($1.56)	($1.50)	
		Utility Performance Incentives	NA	0	$0.00	
		Credit and Collection	Need to be developed			
		Risk	Need to be developed			
		Reliability	Should be reflected in Avoided Costs	0	$0.00	
		Resilience	NM	NM	NM	
			Sub Total Electric Impacts	**($13.64)**	**($13.30)**	
Non Utility Impacts	Other Fuels	Avoided Heating Oil	Fuel cost projection minus embedded carbon price	$42.44	$42.44	
	Other Fuels	Increased Natural Gas	Fuel cost projection minus embedded carbon price	($1.75)	($1.75)	
	Other Air Pollutants	Health Impacts from Increase/Decrease in Electric Generation	US EPA Benefit per kWh for New England	($0.53)	($0.53)	
	Greenhouse Gas Impacts	Avoided Social Costs for CO2	Social cost of carbon & electric and avoided fuel emission intensities	$12.18	$12.18	
Host Customer Impacts	Direct	Direct measure costs	Host customer measure costs net of incentives	($9.56)	($9.16)	
	Proxy	Proxy host customer benefits	Percent estimate for host customer non-energy net benefits	$1.59	$1.53	
			Sub Total Non Utility and Host Customer Impacts	**$44.36**	**$44.70**	

	PV of Costs	PV of Benefits	Benefit Cost Ratio
Hybrid Replacing Fuel Oil Furnace (E1 Costs)	$25.48	$56.21	2.21
Hybrid Replacing Fuel Oil Furnace (E3 Costs)	$24.74	$56.14	2.27

Conclusion

Posterity Group recommends that E1 specifically recognize the benefits of hybrid heating to reduce peak load impacts as part of the 2027-2031 DSM Plan. The benefits of hybrid heating are recognized in Nova Scotia by Nova Scotia Power, and by E3. The importance of hybrid heating is also recognized by the Quebec Government, the Ontario Government, and by FortisBC in British Columbia.

Posterity Group prepared two quantitative illustrative examples to show there is a net benefit for hybrid heating under the proposed BCA test. In the hybrid system replacing electric resistance heating example, the net benefits are 4.10 times the costs using E1 measure costs, and 4.53 times the costs using E3 measure costs. In the hybrid system replacing fuel oil furnace example, the net benefits are 2.21 times the costs using E1 measure costs, and 2.27 times the costs using E3 measure costs. The BCA test results for the illustrative examples for hybrid heating compare favourably with E1's "Electric Heat Pump – Fuel Oil" and "Electric Heat Pump – Fossil Gas" illustrative examples.