BEFORE THE 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 the 2026 DSM Extension for Demand-Side Management Activities between EfficiencyOne and Nova Scotia Power Inc., and for Approval of the Amendment to the 2023-2025 Demand-Side Management Purchase Agreement between EfficiencyOne and Nova Scotia Power Inc.

(NSEB M12249)

Evidence of
Jennifer Kallay

On Behalf of
Counsel to Nova Scotia Energy Board

On the Topic of
2026 DSM Extension

July 17, 2025

Table of Contents

1. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, title, and employer.

A. My name is Jennifer Kallay. I am a Principal Associate at Synapse Energy Economics, Inc. ("Synapse"), located at 485 Massachusetts Avenue, Suite 3, Cambridge, MA 02139, USA.

Q. Please describe Synapse Energy Economics.

A. Synapse is a research and consulting firm specializing in electricity and gas industry regulation, planning, and analysis. Synapse's staff includes over 35 professionals with extensive experience in economic and technical assessments of demand-side and supply-side energy resources; energy efficiency and demand response policies and programs; benefit-cost analysis, avoided cost analyses, integrated resource planning; electricity dispatch and economic modeling and assessment; renewable energy and energy storage technologies and policies; transportation and building sector electrification; and climate change strategies. Synapse works for a wide range of clients, including attorney generals, offices of consumer advocates, public utility commissions, environmental advocates, the U.S. Environmental Protection Agency, U.S. Department of Energy, U.S. Department of Justice, the Federal Trade Commission, and the National Association of Regulatory Utility Commissioners.

Q. Please summarize your professional and educational experience.

A. I have 18 years of professional experience analyzing the costs and benefits of demand-side management ("DSM") resources for jurisdictions in the United States and Canada. My work entails reviewing different regulatory approaches, assessing the ability of utility plans to tap into cost-effective potential, researching best practice program designs and policies, analyzing DSM resources as an alternative to new power plants, understanding and accounting for the full benefits of DSM resources, and conducting cost-effectiveness and rate and bill impact analyses. Since 2012, I have supported the Rhode Island Division of Ratepayer Advocate in assessing the impacts of utility energy efficiency plans and delivery

strategies on customers. I have also evaluated DSM program efforts in New Brunswick, New Mexico, Prince Edward's Island, Ontario, Vermont, Hawaii, New Jersey, Arkansas, Minnesota, Virginia, and Massachusetts. I have sponsored testimony on DSM before the New Brunswick Energy and Utilities Board, the Rhode Island Public Utilities Commission, and the New Mexico Public Regulation Commission. I hold a Master of Arts in Energy and Environmental Analysis from Boston University. My resume is attached as Appendix A.

Q. Have you previously testified before the Nova Scotia Energy Board?

A. No. I have not previously testified before the Nova Scotia Energy Board ("NSEB") or the Nova Scotia Utility and Review Board ("NSUARB").[1]

Q. On whose behalf are you providing evidence in this case?

A. I am providing evidence on behalf of Counsel to the NSEB.

Q. What is the purpose of this evidence?

A. The purpose of my evidence is to assess EfficiencyOne's ("E1") proposed 2026 DSM Extension and provide my conclusions and recommendations.

2. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please describe your conclusions and recommendations regarding the 2026 DSM Extension.

A. My conclusions are as follows:

- Investment, first-year energy savings, and lifetime benefits reached their highest levels in 2024 and have declined since then. As energy savings and benefits are declining to a greater degree than costs, the cost-effectiveness of energy efficiency is declining over time. This is due to changes in measure offerings (such as the phase out of lighting and the end of the Green Heat and Appliance Retirement program components), updates to measure characterizations, increases in measure costs, and decreases in avoided costs.

[1] References to NSEB include NSEB and NSUARB.

Despite decreases in cost-effectiveness over the plan period, the proposed 2026 energy efficiency portfolio remains cost-effective with a Program Administrator Cost ("PAC") of 2.4 and a Total Resource Cost ("TRC") of 1.6. The first-year cost of saved energy falls in the middle of the Canadian and leading U.S. jurisdictions.

- Cost effectiveness is increasing from 2023 to 2026 for investments in demand response, though the demand response portfolio is not cost-effective in 2026 with a PAC of 0.5 and a TRC of 0.7.
- NSPI has not responded to E1 questions and recommendations regarding the August 2024 avoided costs.
- NSPI calculated avoided transmission and distribution costs for constrained areas, but E1 made no mention of targeting constrained areas with its DSM efforts in 2026 and did not apply these avoided cost values in the 2026 DSM Extension.

I recommend that the NSEB take the following actions:

- Approve the energy efficiency portion of the 2026 DSM Extension as filed.
- Approve the demand response portion of the 2026 DSM Extension as filed, and:
    - Direct E1 to include a demand response offering in the 2027-2031 DSM Plan that has a PAC of 1.0 or greater.
    - Direct E1 to conduct its own benchmarking study to develop its cost-effective demand response offering for the 2027-2031 DSM Plan and to leverage Efficiency Canada's forthcoming benchmarking research for that study.
- Direct NSPI to respond to E1's questions and recommendations on the August 2024 avoided cost updates and direct E1 to include any updates to the avoided cost values in the 2027-2031 DSM Plan.
- Direct E1 to include energy efficiency and demand response strategies to target constrained areas in the 2027-2031 DSM Plan or provide a clear rationale for not proposing these strategies and incorporate the avoided

transmission and distribution costs for constrained areas in its benefit-cost analysis of the 2027-2031 DSM Plan.

- Direct E1 to reconvene the DSMAG to develop updates to the Standardized Filing Framework and implement the updates for the 2027-2031 DSM plan.
- Direct E1 to provide calculations of actual PACs and TRCs for 2023, 2024, 2025, and 2026 in its annual reports.

3. ANALYSIS

Q. Please summarize the 2026 DSM Extension.

A. The 2026 DSM Extension is a DSM Plan for 2026. It is essentially a continuation of the 2023-2025 DSM Plan. The 2026 DSM Extension focuses on energy efficiency and demand response programs. E1 applies the existing NSEB-approved TRC and PAC tests to screen the portfolio for cost-effectiveness. E1 did not update the Standardized Filing Framework[2] and most of the performance metrics, targets, and indicators are the same as for the 2023-2025 DSM Plan.[3]

There are some changes as compared to the 2023-2025 DSM Plan. E1 updated the avoided cost assumptions in the 2026 DSM Extension to reflect the August 2024 results from the 2022 Evergreen IRP Update. E1 also phased out Residential lighting measures and terminated the Green Heat and Appliance Retirement program components. E1 updated measure costs and incorporated evaluation results which changed some savings values.

Q. What tests does E1 use to present cost-effectiveness in the 2026 DSM Extension and how are these tests constructed?

A. E1 provides the TRC as the primary test. As currently constructed, the TRC includes the utility costs and benefits and participant costs, but not the participant benefits. E1 also provides the PAC as a secondary test. The PAC includes the utility costs and benefits.

[2] E1 response to Synapse IR-16.
[3] The design objectives for investment in low-income and equity efforts decreased to 15% to 20% of total energy efficiency portfolio investment from 17% to 22% in the 2023-2025 Plan.

Q. Do you have any concerns about the construction of the PAC or TRC tests?

A. Yes. I have a concern about the current construction of the TRC test. The TRC test is imbalanced in that it includes all the costs and only a portion of the benefits. The participant benefits are missing from the TRC test.[4] I do not have any concerns about the construction of the PAC test.

Q. What approach did you take with regard to the use of the PAC or TRC test to assess cost-effectiveness for the 2026 DSM Extension?

A. As the TRC test is likely to be skewed and misleading, I focus more on the PAC test ratios in my analysis. However, I also review and comment on the TRC test ratios.

Q. Do you have any other concerns regarding 2026 DSM Extension cost-effectiveness more generally?

A. Yes, I have two additional concerns.

Q. Please describe your first concern.

A. E1 provided NSPI with many questions and recommendations on the August 2024 avoided costs, some of which could be material and result in changes to the avoided costs. According to E1, NSPI has not responded to these inquiries yet.

Q. What do you recommend?

A. I recommend that NSPI respond to E1's questions and recommendations regarding the August 2024 avoided costs. A timely response is necessary to allow sufficient time for NSPI to develop updates to avoided costs (if needed) and for E1 to apply any updates to the 2027-2031 DSM Plan filing.

Q. Please describe your second concern.

A. I asked E1 to provide calculations of actual PACs and TRCs for 2023 and 2024 so I could examine the most up-to-date data on cost-effectiveness trends. However, E1 was not completely responsive to my request. E1 provided actual lifetime

[4] I do not make recommendations regarding improvements to BCA tests in this testimony as this issue is the subject of a separate, ongoing proceeding (M12282).

benefits for energy efficiency, demand response, and energy efficiency and demand response in total.[5] Using these values, I calculated actual PACs for 2023 and 2024. However, I was not able to calculate actual TRCs for 2023 and 2024 as I do not have the actual costs in these years that include participant costs.[6] Additionally, E1 did not provide lifetime benefits, PACs, or TRCs for program components within the energy efficiency and demand response portfolios.

Q. Why wasn't E1 completely responsive to your request for actual cost-effectiveness results for 2023 and 2024?

A. Footnote b on the 2023 Actuals and 2024 Actuals tabs of E1's response to Synapse IR-08 states, "EfficiencyOne (E1) is unable to retroactively perform cost-effectiveness testing. E1 does not have verified customer costs or verified utility avoided costs, both of which are required to retroactively perform cost-effectiveness screening with actual results."

Q. Is E1's rationale for not providing a complete set of actual cost-effectiveness results for 2023 and 2024 reasonable?

No. DSM program administrators in many other jurisdictions provide retroactive cost-effectiveness calculations. For example, Ontario[7], Massachusetts[8], and Rhode Island[9] include actual benefit-cost ratios in their annual reports. These calculations typically account for actual quantities by measure and savings adjustments from evaluation studies. In my experience, these calculations tend to hold avoided cost assumptions constant from the plans and may hold some participant cost assumptions constant as well. In fact, some jurisdictions hold variables constant that are outside the direct control of the DSM program administrator, to better isolate for the variables that indicate DSM program

[5] E1 response to Synapse IR-08.
[6] As currently constructed, the TRC has the same lifetime benefits as the PAC.
[7] Ontario Independent Energy System Operator (IESO). *Making a Difference Energy Efficiency in Ontario 2023 Conservation and Demand Management Results.* October 2024. Available at: https://www.ieso.ca/-/media/Files/SaveOnEnergy/CDM/2023-Energy-Efficiency-Annual-Report.pdf.
[8] Massachusetts Energy Efficiency Advisory Council (EEAC). *Annual Reports: Individual Utility Annual Reports*. Available at: https://ma-eeac.org/results-reporting/annual-reports/
[9] Rhode Island Energy Efficiency Council (EEC). *Data and Publications, Legislation and Plans, Energy Efficiency & System Reliability Program Results.* Available at: https://eec.ri.gov/data-and-publications/.

administrator performance. For example, in Massachusetts, "Program benefits are calculated as the product of (1) program savings, and (2) avoided costs factors, as identified in avoided energy supply cost studies commissioned by the Program Administrators. The avoided costs factors remain constant throughout the planned, preliminary year-end, and evaluated stages of a particular program year."[10]

Also, E1 provided some data on actual lifetime benefits which enabled me to calculate some PAC ratios for 2023 and 2024. So, E1 can make these calculations and document its assumptions about participant costs and avoided costs when doing so.

Q. What do you recommend?

A. I recommend that E1 provide actual PAC and TRC results in its annual reporting, which can then be referenced in DSM Plans. E1 should document its assumptions about participant costs and avoided costs in presenting these calculations.

Energy Efficiency Program Cost-Effectiveness

Q. Have costs, energy savings, and benefits associated with energy efficiency changed from 2023 to 2026?

A. Table 1, below, provides the most up-to-date data on investments, first-year energy savings, first-year unit costs, lifetime benefits, PACs, and TRCs for energy efficiency in 2023, 2024, 2025, 2026 and in total for 2023 to 2026. I am focused on the 2023-2026 time period as E1 presents 2026 as part of an extended 2023-2026 DSM Plan.[11] Investment, first-year energy savings, and lifetime benefits reached their highest levels in 2024 and have declined since then. Since 2024, energy savings and benefits are declining to a greater degree than costs. As a

[10] D.P.U. 08-50-C. Investigation by the Department of Public Utilities on its own Motion into Updating its Energy Efficiency Guidelines Consistent with An Act Relative to Green Communities. *Order Adopting Energy Efficiency Annual Report Template.* May 5, 2011. Footnote 11 on Page 18.

[11] E1 response to NSEB IR-07.

result, the cost-effectiveness of the energy efficiency portion of the portfolio is declining over time.

Table 1. Energy Efficiency Cost, Energy Savings, Benefits, and Cost-Effectiveness from 2023 to 2026

	2023 Actuals	2024 Actuals	2025 Forecast	2026 DSM Extension	2023-2026 Total
Investment ($ million)	43.4	62.4	56.6	57.2	219.7
First-Year Energy Savings (GWh)	131.6	172.8	128.7	116.0	549.0
First-Year Unit Cost ($/kWh)	0.33	0.36	0.44	0.49	0.40
Lifetime Benefits ($ million)	211.0	243.0	168.0	134.7	756.7
PAC	4.9	3.9	3.0	2.4	3.4
TRC	n/a	n/a	n/a	1.6	n/a

Sources:

- *All data except PAC for 2023 Actuals, 2024 Actuals, 2025 Forecast, and 2023-2026 Total from E1 response to Synapse IR-08*
- *Synapse calculated the PAC for 2023 Actuals, 2024 Actuals, 2025 Forecast, and 2023-2026 Total by dividing the Lifetime Benefits ($ million) by Investment ($ million)*

Q. Why have energy savings decreased for energy efficiency measures from 2024 to 2026?

A. First-year energy savings decreased by 56.8 GWh from 2024 to 2026. There are several reasons for this decrease, including: 1) the phase out of Residential lighting measures, 2) the end of the Green Heat and Appliance Retirement program components, and 3) updates to measure characterizations.

Q. Why have benefits associated with energy efficiency measures decreased from 2024 to 2026?

A. The decrease in benefits is due to lower savings and lower avoided costs.[12]

[12] In response to NSEB IR-14, E1 provided a comparison of the avoided costs used in the calculation of benefits and cost-effectiveness for the 2023-2025 Plan to the avoided costs used in the 2026 DSM Extension.

Q. Do you have any concerns about the decrease in the cost-effectiveness of the energy efficiency portfolio over time?

Not necessarily. The energy efficiency portfolio is cost-effective in 2026 from PAC and TRC perspectives, with benefit-cost ratios of 2.4 and 1.6 respectively. Table 2, below, provides a comparison of the first-year cost of saved energy for E1's energy efficiency programs to all Canadian jurisdictions and leading U.S. jurisdictions. Nova Scotia's first-year cost of saved energy falls in the middle of the Canadian and leading U.S. jurisdictions.

Table 2. Comparison of Nova Scotia Energy Efficiency First-Year Unit Costs to Canadian and Leading U.S. Jurisdictions

Jurisdiction	First-Year Unit Cost of Energy Efficiency ($2025 CDN/kWh)
Yukon	18.57
Massachusetts	2.86
Saskatchewan	2.59
Prince Edward Island	2.26
New Brunswick	1.84
British Columbia	1.30
Vermont	0.95
Maine	0.72
Alberta	0.72
Manitoba	0.71
Oregon	0.66
New York	0.64
Quebec	0.61
Nova Scotia – 2026 DSM Extension	0.49
New Jersey	0.47
Washington	0.43
Colorado	0.33
Maryland	0.31
Newfoundland and Labrador	0.30
California	0.27
Ontario	0.16

Sources:

- *Nippard, A., Maas, C., Wu, M., Gaede, J., Haley, B. 2024. The 2024 Canadian Energy Efficiency Scorecard: Provinces and Territories. Efficiency Canada, Carleton University, Ottawa, ON. Available at: https://scorecard.efficiencycanada.org/. Calculated by dividing total spending ($M) from "Table 15. Spending on efficiency programs and enabling/supporting activities, per capita (2023)" by savings (GWh) from "Table 9. Net Incremental Electricity Savings (2023)", converted into $2025 CDN/kWh using the GDP deflator from the Federal Reserve Bank of St. Louis (available at: https://fred.stlouisfed.org/).*
- *Kresowik, Mark, Sagarika Subramanian, Mike Specian, Forest Bradley-Wright, Daivie Ghosh, Paul Mooney, Archibald Fraser, Stephanie Sosa-Kalter, Brian Fadie, and Joanna Mauer. 2025. The 2025 State Energy Efficiency Scorecard. Washington, DC: ACEEE. https://www.aceee.org/research-report/u2502. Calculated by dividing electric efficiency spending ($M) from "Table 10. 2023 electric efficiency program spending by state" by net incremental energy savings (MWh) from "Table 7. 2023 net incremental electricity savings by state", converted into $2025 CDN/kWh using the GDP deflator from the Federal Reserve Bank of St. Louis (available at: https://fred.stlouisfed.org/).*
- *Nova Scotia from E1 response to Synapse IR-08.*

Q. How cost-effective is the energy efficiency portion of the 2026 DSM Extension at the program level?

A. Table 3 shows the cost effectiveness of the energy efficiency program components in the 2026 DSM Extension using the PAC and TRC. Two Residential energy efficiency program components, both of which serve low-income customers, are not cost-effective using the PAC or TRC test. The Residential energy efficiency program components that are not cost-effective include the following:

- Affordable Single-Family Homes
- Mi'kmaw Home Energy Efficiency Project

Table 3. Cost-Effectiveness by Energy Efficiency Program Component for 2026 DSM Extension

Sector	Program Component	PAC	TRC
Residential Energy Efficiency	Instant Savings	2.0	1.0
	Affordable Multi-Family Housing	1.1	0.6
	Affordable Single-Family Homes	0.8	0.8
	Efficient Product Installation	2.0	2.0
	Home Energy Assessment	1.7	0.6
	Mi'kmaw Home Energy Efficiency Project	0.8	0.8
	Residential Behaviour	1.1	1.1
Business, Non-Profit, and Institutional Energy Efficiency	Business Energy Rebates	5.5	3.4
	Custom	4.2	2.7
	Strategic Energy Management	3.0	5.4
	Small Business Energy Solutions	1.7	1.3
EE Portfolio Total (Energy Efficiency & Enabling Strategies)		**2.4**	**1.6**

Source: E1 response to Synapse IR-08.

Q. Were these energy efficiency program components cost-effective in prior years?

A. In its response to Synapse IR-08, E1 provided 2023 and 2024 actual lifetime benefits and 2025 forecasted lifetime benefits for the energy efficiency portfolio

as a whole. However, E1 did not break out actual and forecasted lifetime benefits by program component. As a result, I do not have the data to calculate actual and forecasted PACs by program component. The best comparison I can make is a comparison of the PACs by program component for the 2023, 2024, and 2025 Plans to the 2026 DSM Extension. Table 4 below provides this comparison. These two energy efficiency program components were not planned to be cost-effective in 2023, 2024, and 2025. The planned PACs for these two program components in 2023, 2024, and 2025 are similar to the proposed PACs for these two program components in the 2026 DSM Extension.

Table 4. Cost-Effectiveness by Energy Efficiency Program Component from 2023 to 2026

Sector	Program Component	2023 Plan PAC	2024 Plan PAC	2025 Plan PAC	2026 DSM Extension PAC
Residential Energy Efficiency	Appliance Retirement	0.6	0.6	0.6	n/a
	Instant Savings	2.9	2.7	2.4	2.0
	Affordable Multi-Family Housing	2.9	2.9	2.9	1.1
	Affordable Single-Family Homes	0.7	0.7	0.7	0.8
	Efficient Product Installation	2.2	2.3	2.4	2.0
	Green Heat	4.5	4.7	4.8	n/a
	Home Energy Assessment	5.6	5.7	5.8	1.7
	Mi'kmaw Home Energy Efficiency Project	0.9	0.9	0.9	0.8
	Residential Behaviour	0.9	1.9	1.8	1.1
Business, Non-Profit, and Institutional Energy Efficiency	Business Energy Rebates	7.5	7.6	7.4	5.5
	Custom	4.7	4.8	4.8	4.2
	Strategic Energy Management	0.7	0.8	0.7	3.0
	Small Business Energy Solutions	2.9	3.0	3.0	1.7
Energy Efficiency Portfolio Total (Energy Efficiency & Enabling Strategies)		**3.3**	**3.3**	**3.3**	**2.4**

Sources:

- *2023, 2024, and 2025 Plan PACs from Table 3: 2023 Resource Plan Investment and Savings, Table 4: 2024 Resource Plan Investment and Savings, and Table 5: 2025 Resource Plan Investment and Savings on pages 3-5 of the EfficiencyOne 2023-2025 DSM Resource Plan Compliance Filing, available at: https://www.efficiencyone.ca/2023-2025-demand-side-management-plan/. All values include carbon.*
- *2026 DSM Extension PACs from E1 response to Synapse IR-08.*

Q. Do you have any concerns that these energy efficiency program components are not cost-effective in the 2026 DSM Extension?

A. No. These two program components that are not cost-effective using the PAC serve low-income customers and programs that serve low-income customers are not typically cost-effective due to the need for higher incentives. Also, these program components had similar cost-effectiveness ratios in the 2023-2025 Plan and received approval from the NSEB. Lastly, cost effectiveness is assessed at the portfolio level.

Demand Response Program Cost-Effectiveness

Q. Have costs, available capacity, participation, and benefits associated with demand response changed from 2023 to 2026?

Yes. Table 5 below provides the most up-to-date data on investments, available capacity, unit cost, participants, cost per participant, lifetime benefits, PACs, and TRCs for demand response in 2023, 2024, 2025, 2026 and in total for 2023 to 2026. E1 launched its demand response offering in 2023. As it ramps up this effort, E1 is proposing to increase investment more than three-fold from 2023 to 2026. However, E1 is proposing to increase participation by a much larger factor over the 2023-2026 time period, with most of that increase in 2025 and 2026. As the demand response program ramps up, an increasing proportion of the participants are existing participants (acquired in a previous year with repeat activity in the current year) and a decreasing proportion of participants are newly acquired in that program year. It tends to be less costly to reengage existing participants than to engage new participants. As the number of participants increases, available capacity and benefits are growing to a greater degree than costs and the cost-effectiveness of the demand response portion of the portfolio is increasing.

Table 5. Demand Response Cost, Available Capacity, Participants, Benefits, and Cost-Effectiveness from 2023 to 2026

	2023 Actuals	2024 Actuals	2025 Forecast	2026 DSM Extension	2023-2026 Total
Investment ($ million)	1.9	3.3	5.4	6.5	17.1
Available Capacity (MW)	2.4	8.1	10.0	16.3	16.3
Unit Cost ($/kW-yr)	792	407	540	399	n/a
Participants	159	1,307	12,805	23,023	23,023
Cost per Participant ($/participant)	11,950	2,525	422	282	n/a
Lifetime Benefits ($ million)	0.2	0.7	1.0	3.2	5.1
PAC	0.1	0.2	0.2	0.5	0.3
TRC	n/a	n/a	n/a	0.7	n/a

Sources:

- *Unit Costs from E1 response to Synapse IR-12*
- *Participants from E1 response to Synapse IR-13 in Table 1: Summary of enrolled devices in the 2023-2025 DSM Plan, 2026 Extension, and 2023–2026 Actuals. 2025 represents YTD participants rather than the forecast.*
- *Synapse calculated the cost per participant by dividing Investment ($ million) by participants.*
- *Synapse calculated the PAC for 2023 Actuals, 2024 Actuals, 2025 Forecast, and 2023-2026 Total by dividing the Lifetime Benefits ($ million) by Investment ($ million)*
- *All other data from E1 response to Synapse IR-8*

Q. Is the demand response portion of the 2026 DSM Extension cost-effective?

A. No. As proposed, demand response is not cost-effective in 2026 with a PAC of 0.5 and a TRC of 0.7.

Q. Was the demand response portfolio cost-effective in prior years?

A. In its response to Synapse IR-08, E1 provided 2023 and 2024 actual lifetime benefits and 2025 forecasted lifetime benefits for the demand response portfolio as a whole. Using this data, I calculated the actual and forecasted PACs for prior years and include it in Table 5 above. Based on this analysis, the demand response portfolio was not cost-effective from a PAC perspective in prior years.

Q. Why isn't the demand response portion of the 2026 DSM Extension cost-effective?

A. Table 6, below, shows the cost effectiveness of the demand response program in total, by program component, and by demand response option within each program component. The Residential program component is not cost-effective from either perspective as none of the DR options within the program component are cost-effective. The Business, Non-Profit, and Institutional ("BNI") program component is not cost-effective from a PAC perspective and is cost-effective from a TRC perspective. Within the BNI program component, C&I Curtailment is the only DR Option that is cost-effective and only under the TRC.

Table 6. Cost-Effectiveness by Demand Response Program Component for the 2026 DSM Extension

Program Component	Demand Response Option	Investment ($ million)	2026 DSM Extension PAC	2026 DSM Extension TRC
Residential Demand Response	DLC-Water Heating	n/a	0.31	0.33
	EV Charging Control		0.05	0.06
	BTM Battery Control		0.18	0.24
	DLC-Thermostat		0.27	0.32
Residential Demand Response Total		4.0	0.26	0.30
Business, Non-Profit, and Institutional Demand Response	C&I Curtailment	n/a	0.94	1.70
	DLC-Water Heating		0.34	0.37
	EV Charging Control		0.06	0.07
	BTM Battery Control		0.16	0.20
	DLC-Thermostat		0.26	0.33
Business, Non-Profit, and Institutional Demand Response Total		2.6	0.94	1.70
Demand Response Program Total		**6.5**	**0.55**	**0.74**

Source:

- *Results by Demand Response Option from Appendix A Attachment 4 - Demand Response Technical Tables.xlsx, Tab 19c. BC Ratios by Year, Case = "2026 Extension", Peak Period = "Winter Evening", Cost Tests = "PAC or TRC", Customer Class = "Residential" or "BNI", Forecast Years = "2026"*
- *Program Component Totals and Demand Response Program Total from E1 response to Synapse IR-08*

Q. Are there any other factors affecting cost-effectiveness over time?

A. Yes. Table 7, below, shows the proportion of investment in the Residential and BNI program components from 2023 to 2026. In 2026, there is a greater emphasis

on Residential investment than BNI investment. This is a change from prior years when there was a greater emphasis on BNI investment. The BNI demand response program component is far more cost-effective than the Residential program component. So, changes to the allocation of investment to the Residential and BNI demand response program components will affect the cost-effectiveness of the portfolio.

Table 7. Percent of Investment by Demand Response Program Component from 2023 to 2026

Program Component	2023 Actuals	2024 Actuals	2025 Forecast	2026 DSM Extension
Residential Demand Response	40%	44%	42%	60%
Business, Non-Profit, and Institutional Demand Response	60%	56%	58%	40%

Source: E1 response to Synapse IR-08.

Q. Is demand response cost-effective in any other jurisdictions?

A. Yes. I examine demand response programs in Rhode Island as the utility there is implementing similar offerings. Earlier this year, Rhode Island Energy proposed ConnectedSolutions offerings for 2024 to 2026 for residential, small business, and commercial and industrial customers. Residential and small business programs include Bring Your Own Thermostat, Battery, and Electric Vehicle Demand Response. The pathways for commercial and industrial customers include Daily Dispatch and Targeted Dispatch. According to Rhode Island Energy's proposal, demand response is cost-effective from a PAC perspective in total and for Residential/small business and commercial/industrial individually.[13] More detailed tables show the cost-effectiveness broken out by program or pathway

[13] The Narragansett Electric Company d/b/a Rhode Island Energy. Docket No. 24-06-EE. 2024-2026 System Reliability Procurement Investment Proposal for Electric Demand Response. February 8, 2024. Appendix 1. Schedule 1. Tables 7-9: Rhode Island Energy Calculation of 2024, 2025, and 2026 Cost-Effectiveness (Avoided Electric Bill Costs) ($000) on Bates Pages 104 to 106. Available at: https://ripuc.ri.gov/sites/g/files/xkgbur841/files/2024-02/2406-RIE-SRPInvest2024-2026-bates_2-8-24.pdf

within each sector, and most programs and pathways are cost-effective from a PAC perspective.[14]

Q. Do you have any concerns with the fact that E1's demand response offerings are not cost-effective?

A. Yes. The PAC for the proposed 2026 demand response portfolio is 0.5, which means that the utility system benefits are half of the utility system costs. Since the purpose of demand response is to provide utility system benefits, the demand response program should have a PAC that is greater than 1.0.

Q. How does the scale of E1's proposed 2026 demand response effort compare to other jurisdictions?

A. E1's proposed demand response effort for 2026 is 16.3 MW or a 1 percent reduction to peak demand.[15] However, demand response efforts in Nova Scotia are a responsibility shared by E1 and NSPI, so it is important to account for NSPI's efforts in any comparison to other jurisdictions. NSPI's projected demand response contribution in 2026 is 12 MW, which I estimate to be an additional 0.7 percent reduction to peak demand.[16] In total, I estimate Nova Scotia's 2026 demand response offering at 28.3 MW or a 1.7 percent reduction in peak demand.

Table 8, below, shows demand response potential from enrolled customers and actual reductions in other Canadian and U.S. jurisdictions from a preliminary study by Efficiency Canada. The preliminary study concluded that Canadian utilities do not appear to be reaching the levels of peak demand reductions from demand response measures achieved by some U.S. utilities. Nova Scotia's 2026 demand response efforts are half of the actual reductions in two Canadian jurisdictions (IESO and Manitoba Hydro), indicating room for growth.

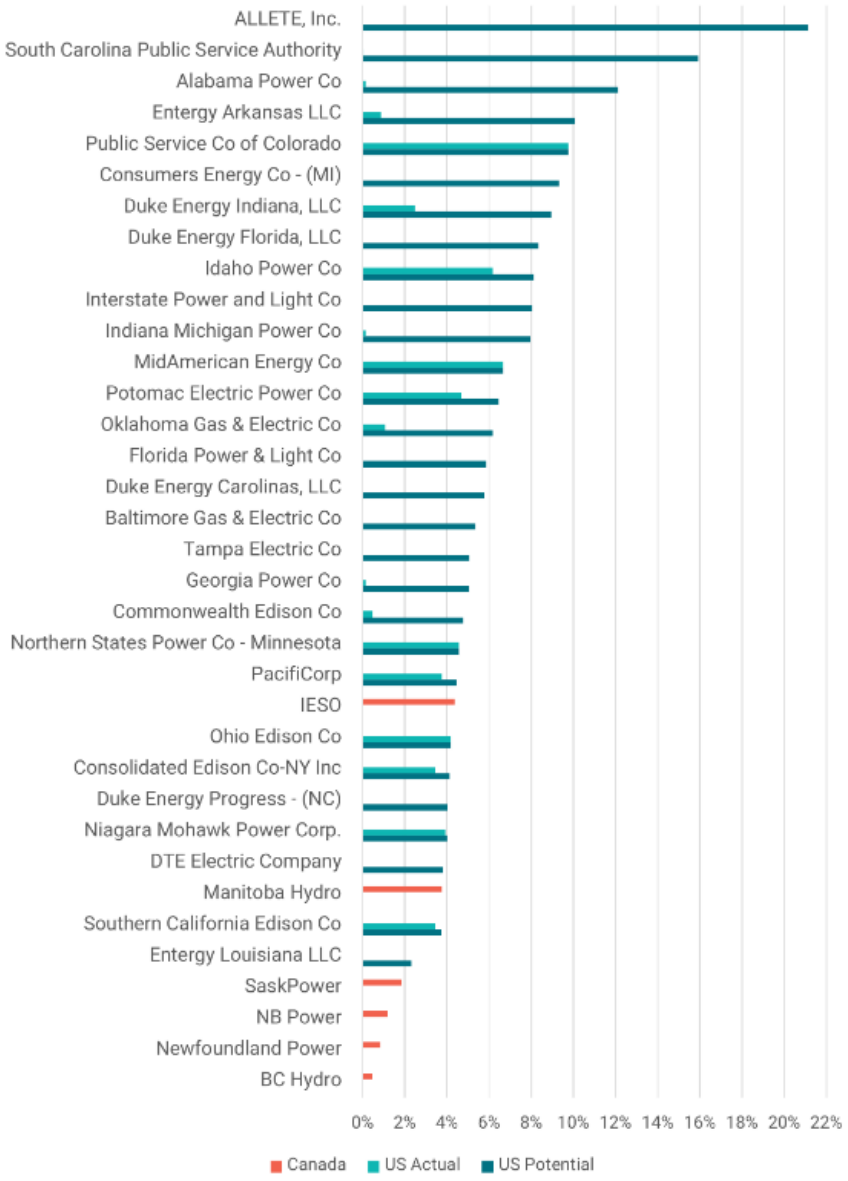
---

[14] The Narragansett Electric Company d/b/a Rhode Island Energy. Docket No. 24-06-EE. Responses to the Commission's Second Set of Data Requests. Issued on May 17, 2024. PUC 2-6. Tables 7a-9a: Rhode Island Energy Calculation of 2024, 2025, and 2026 Cost-Effectiveness (Avoided Electric Bill Costs) ($000). Available at: https://ripuc.ri.gov/sites/g/files/xkgbur841/files/2024-06/2406-RIE-DR-PUC2_6-5-2024.pdf

[15] E1 from E1 response to NSEB IR-10a.

[16] NSEB M12349. *NSPI 2025 Load Forecast Report + Appendices – Redacted*. June 27, 2025. Figure 60: Demand Response (2026 Total with ELCC MW).

Table 8. Comparison of Peak Demand Reductions from Demand Response to Other Jurisdictions (2023 Reduction as a percent of Annual Peak Demand)



Note: U.S. Potential is the resource available through enrolled customers. U.S. Actual is the actual resource called upon annually.
Source: Efficiency Canada. A preliminary look at demand flexibility and peak demand reductions in Canada. Available at: https://www.efficiencycanada.org/a-preliminary-look-at-demand-flexibility-and-peak-demand-reductions-in-canada/

Q. Did Efficiency Canada's preliminary study note any other challenges for Canadian jurisdictions in particular?

A. Yes. The preliminary study notes that the lack of publicly available data on demand flexibility in Canada makes analysis and benchmarking difficult. The study also indicates that Efficiency Canada is embarking on more comprehensive

jurisdictional scan of programs across provinces to better assess the state of demand flexibility in Canada.

Q. What do you recommend?

I recommend that NSEB approve the demand response offering. Participation in 2023 and 2024 was relatively low, but is projected to ramp up substantially in 2025 and 2026. It is necessary to have data on the performance of this offering in 2025 and 2026 to make decisions about how to move forward with demand response.

However, the demand response offering should be more formalized in the 2027-2031 DSM Plan. Therefore, E1 should include a demand response offering in the 2027-2031 DSM Plan that has a PAC of 1.0 or greater. I also recommend that NSEB direct E1 to conduct its own benchmarking study to inform the development of its cost-effective demand response offering for its 2027-2031 DSM Plan and to leverage Efficiency Canada's forthcoming benchmarking research for that study.

Application of Avoided Transmission and Distribution Costs for Constrained System

Q. When NSPI provided updated avoided costs in 2024, did NSPI provide an updated value for the avoided transmission and distribution ("T&D") costs for the constrained system?

A. Yes. NS Power provided updated system wide and constrained system avoided T&D costs to the DSMAG on August 23, 2024.[17] Table 9, below, shows the system-wide and constrained-system avoided T&D costs from the 2021 and 2024 analyses. In both analyses, the avoided T&D costs for the constrained system are roughly three times the value of the system-wide avoided T&D costs.

[17] E1 response to Synapse IR-05d.

Table 9. Avoided T&D Costs from the 2021 and 2024 Analyses

	2021 Analysis ($2023/kW-yr)	2024 Analysis ($2023/kW-yr)
Avoided T&D Costs – System-Wide	$46.03 (Applied to the 2023-2025 DSM Plan)	$58.77 (Applied to the 2026 DSM Extension)
Avoided T&D Costs – Constrained System	$142.04 (not applied)	$172.19 (not applied)

Source: 2024-06 Attachment 1 – Revised T&D Avoided Costs.xlsx

Q. Did E1 apply the updated avoided T&D costs for the constrained system in the 2026 DSM Extension?

A. No. E1 did not propose to target energy efficiency efforts to the constrained system in the 2026 DSM Extension. As a result, E1 used the system-wide avoided T&D cost in its calculation of benefits in the 2026 DSM Extension.

Q. Do you have any concerns that E1 did not propose targeting DSM to the constrained system?

A. Yes. Given the magnitude of the avoided T&D costs associated with the constrained system, it would be prudent for E1 to consider targeting DSM efforts to the constrained system.

Q. What do you recommend?

A. NSPI should provide E1 with sufficient detail about location of the constrained system as of the August 2024 avoided cost update to facilitate this targeting (if NSPI has not already provided this information). E1 should develop energy efficiency and demand response strategies for targeting these areas and include these strategies in its 2027-2031 DSM Plan. E1 should capture benefits associated with the constrained system as part of the benefit-cost analysis for the 2027-2031 DSM Plan.

Standardized Filing Framework Updates

Q. Should E1 update the Standardized Filing Framework?

A. Yes. E1 indicated that it may include solar and electrification measures in the 2027-2031 DSM Plan. It may make sense to update performance metrics, targets,

and indices to better align with the full suite of DSM activities included in the Plan. In addition, there may be a new BCA test by the time the 2027-2031 DSM Plan is filed.

Q. What do you recommend?

A. Given these developments, E1 should reconvene the DSMAG to develop updates to the Standardized Filing Framework. These updates should be included in the 2027-2031 DSM Plan.

4. CONCLUSIONS

Q. Please describe your conclusions regarding the 2026 DSM Extension.

A. My conclusions are as follows:

- Investment, first-year energy savings, and lifetime benefits reached their highest levels in 2024 and have declined since then. As energy savings and benefits are declining to a greater degree than costs, the cost-effectiveness of energy efficiency is declining over time. This is due to changes in measure offerings (such as the phase out of lighting and the end of the Green Heat and Appliance Retirement program components), updates to measure characterizations, increases in measure costs, and decreases in avoided costs. Despite decreases in cost-effectiveness over the plan period, the proposed 2026 energy efficiency portfolio remains cost-effective with a PAC of 2.4 and a TRC of 1.6. The first-year cost of saved energy falls in the middle of the Canadian and leading U.S. jurisdictions.
- Cost effectiveness is increasing from 2023 to 2026 for investments in demand response, though the demand response portfolio is not cost-effective in 2026 with a PAC of 0.5 and a TRC of 0.7.
- NSPI has not responded to E1's questions and recommendations regarding the August 2024 avoided costs.
- NSPI calculated avoided transmission and distribution costs for constrained areas, but E1 made no mention of targeting constrained areas with its DSM

efforts in 2026 and did not apply these avoided cost values in the 2026 DSM Extension.

5. RECOMMENDATIONS

Q. Please describe your recommendations regarding the 2026 DSM Extension.

A. I recommend that the NSEB take the following actions:

- Approve the energy efficiency portion of the 2026 DSM Extension as filed.
- Approve the demand response portion of the 2026 DSM Extension as filed, and:
    - Direct E1 to include a demand response offering in the 2027-2031 DSM Plan that has a PAC of 1.0 or greater.
    - Direct E1 to conduct its own benchmarking study to develop its cost-effective demand response offering for the 2027-2031 DSM Plan and to leverage Efficiency Canada's forthcoming benchmarking research for that study.
- Direct NSPI to respond to E1's questions and recommendations on the August 2024 avoided cost updates and direct E1 to include any updates to the avoided cost values in the 2027-2031 DSM Plan.
- Direct E1 to include energy efficiency and demand response strategies to target constrained areas in the 2027-2031 DSM Plan or provide clear rationale for not proposing these strategies and incorporate the avoided transmission and distribution costs for constrained areas in its benefit-cost analysis of the 2027-2031 DSM Plan.
- Direct E1 to reconvene the DSMAG to develop updates to the Standardized Filing Framework and implement the updates for the 2027-2031 DSM plan.
- Direct E1 to provide calculations of actual PACs and TRCs for 2023, 2024, 2025, and 2026 in its annual reports.

Q. Does this conclude your evidence at this time?

A. Yes, it does.

APPENDIX A: RESUME

Jennifer Kallay, Principal Associate

Synapse Energy Economics I 485 Massachusetts Avenue, Suite 3 I Cambridge, MA 02139 I 617-453-7034
jkallay@synapse-energy.com

PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Principal Associate*, April 2023 – Present; *Senior Associate*, June 2013 – April 2023; *Associate,* July 2008 – June 2013; *Research Associate*, January 2007 – July 2008.

Eighteen years of professional experience analyzing the costs and benefits of demand-side management (DSM) resources for jurisdictions in the United States and Canada. Her work entails reviewing different regulatory approaches; assessing the ability of utility plans to tap into cost-effective potential; researching best practice program designs and policies; analyzing DSM resources as an alternative to new power plants; understanding and accounting for the full benefits of DSM resources; and conducting cost-effectiveness and rate and bill impact analyses.

Since 2012, she has supported the Rhode Island Division of Ratepayer Advocate in assessing the impacts of utility energy efficiency plans and delivery strategies on customers. She has also evaluated DSM program efforts in New Brunswick, New Mexico, Prince Edward's Island, Ontario, Vermont, Hawaii, New Jersey, Arkansas, Minnesota, Virginia, and Massachusetts. Ms. Kallay provided testimony on DSM plans in New Brunswick, Rhode Island, and New Mexico.

Boston University's Center for Energy and Environmental Studies, Boston, MA. *Research Assistant for Professor Robert Kaufmann*, January 2006 – January 2007.

Modeled land-use change in the Amazon using spatial, economic, climatic, and physical variables, and GIS and regression techniques.

Digitas, Inc, Boston, MA. *Manager*, November 1999 – August 2005.

Researched, designed, and executed reporting solutions to assess the effectiveness of marketing strategies based on consumer behavior. Customized analyses to gain insight into environmental influences on marketing performance and designed and built models to predict sales/revenue and inform business economics using relational databases.

PROFESSIONAL ACTIVITIES

Gas and Light Commissioner. *Elected Public Official*. 2018-present. Serves on Wakefield Massachusetts' Municipal Gas and Light Department Board of Commissioners.

EDUCATION

Boston University, Boston, MA

Master of Arts in Energy and Environmental Analysis, Spring 2007. Graduate course work in multivariate statistical analysis, environmental economics, risk assessment, energy, GIS, climate change, and environmental policy.

University of Maryland, College Park, MD
Bachelor of Arts in Journalism, Spring 1999. Presidential Scholarship and Honors Program.

PUBLICATIONS

Synapse Energy Economics, Climable, Brown University Climate and Development Lab. 2023. *Power Play: Actions for New England's Equitable Energy Transition.* Full report. Climable.org.

Rickerson, W., E. Brousseau, A. Douglas, J. Kallay, S. Singh Walker, A. Hopkins, A. Napoleon, K. Takahashi. 2022. *Future Proofing the Texas Grid with Distributed Energy Resources*. Prepared by Converge Strategies and Synapse Energy Economics for the Texas Advanced Energy Business Alliance.

Kallay, J., S. Liburd, E. Camp, S. Singh, T. Woolf, J. Hall. 2022. *A Better New England Regulatory Framework for Mitigating Climate Change.* Synapse Energy Economics for Brown University.

Kallay, J., A. Napoleon, K. Takahashi, E. Sinclair, T. Woolf. 2021. *Opportunities for Evergy Kansas to Address Energy Equity Within its Integrated Resource Plan and Other Planning Processes*. Synapse Energy Economics for Union of Concerned Scientists.

Kallay, J., A.S. Hopkins, C. Odom, J. Ramey, J. Stevenson. R. Broderick, R. Jeffers, B. Garcia. 2021. *The Quest for Public Purpose Microgrids for Resilience: Considerations for Regulatory Approval.* Synapse Energy Economics for Sandia National Labs.

Kallay, J., A. Napoleon, J. Hall, B. Havumaki, A. Hopkins, M. Whited, T. Woolf, J. Stevenson, R. Broderick, R. Jeffers, B. Garcia. 2021. *Regulatory Mechanisms to Enable Investments in Electric Utility Resilience.* Synapse Energy Economics for Sandia National Laboratories.

Kallay, J., S. Letendre, T. Woolf, B. Havumaki, S. Kwok, A. Hopkins, R. Broderick, R. Jeffers, K. Jones, M. DeMenno. 2021. *Application of a Standard Approach to Benefit-Cost Analysis for Electric Grid Resilience Investments.* Synapse Energy Economics for Sandia National Laboratories.

Kallay, J., A. Napoleon, B. Havumaki, J. Hall, C. Odom, A. Hopkins, M. Whited, T. Woolf, M. Chang, R. Broderick, R. Jeffers, B. Garcia. 2021. *Performance Metrics to Evaluate Utility Resilience Investments*. Synapse Energy Economics for Sandia National Laboratories.

Kallay, J., A. Hopkins, A. Napoleon, B. Havumaki, J. Hall, M. Whited, M. Chang., R. Broderick, R. Jeffers, K. Jones, M. DeMenno. 2021. *The Resilience Planning Landscape for Communities and Electric Utilities.* Synapse Energy Economics for Sandia National Laboratories.

Napoleon, A., J. Hall, J. Kallay, M. Chang, P. Eash-Gates, N. L. Seidman, C. James, D. Torre, D. Brutkoski, J. Migden-Ostrander, K. Colburn, K. Maddux, D. Harlow, M. Power. 2020. *Energy Infrastructure: Sources of*

Inequities and Policy Solutions for Improving Community Health and Wellbeing. Synapse Energy Economics, Regulatory Assistance Project, and Community Action Partnership for the Robert Wood Johnson Foundation.

Knight, P. J. Frost, J. Kallay. S. Letendre. J. Hall. 2020. *Assessing the Impacts Climate Change May Have on Maine's Economy, Revenues, and Investment Decisions*. Synapse Energy Economics and Eastern Research Group for the State of Maine's Department of the Governor's Office of Policy Innovation and the Future.

Napoleon, A., J. Kallay, K. Takahashi. 2020*. Utility Energy Efficiency and Building Electrification Portfolios Through 2025: A Brief on the New York Public Service Commission's Recent Order.* Synapse Energy Economics for the Natural Resources Defense Council.

Kallay, J., A. Hopkins, J. Frost, A. Napoleon, K. Takahashi, J. Slason, G. Freeman, D. Grover, B. Swanson. 2019. *Net Zero Energy Roadmap for the City of Burlington, Vermont*. Synapse Energy Economics and Resource Systems Group for Burlington Electric Department.

Napoleon, A., T. Woolf, K. Takahashi, J. Kallay, B. Havumaki. 2019. *Comments in the New York Public Service Commission Case 18-M-0084: In the Matter of a Comprehensive Energy Efficiency Initiative.* Comments related to NY Utilities report regarding energy efficiency budgets and targets, collaboration, heat pump technology, and low- and moderate-income customers and requests for approval. Prepared by Synapse Energy Economics on behalf of Natural Resources Defense Council.

Allison, A., A. Napoleon, J. Kallay. 2019. *Maine Low-Income Home Energy Burden Study.* Synapse Energy Economics for the Maine Office of the Public Advocate.

Havumaki, B., J. Kallay, K. Takahashi, T. Woolf. 2019. *All-Electric Solid Oxide Fuel Cells as an Energy Efficiency Measure.* Synapse Energy Economics for Bloom Energy.

Takahashi, K., B. Havumaki, J. Kallay, T. Woolf. 2019. *Bloom Fuel Cells: A Cost-Effectiveness Brief.* Synapse Energy Economics for Bloom Energy.

Kallay, J., A. Napoleon. 2019. Comments and Revised Comments on EfficiencyOne's Proposed Enhancements to its Rate and Bill Impact Model. Synapse Energy Economics for the Nova Scotia Utility and Review Board.

Hall, J., R. Wilson, J. Kallay. 2018. *Effects of the Draft CAFE Standard Rule on Vehicle Safety*. Prepared by Synapse Energy Economics on behalf of Consumers Union.

Whited, M., J. Kallay, D. Bhandari, B. Havumaki. 2018. *Driving Transportation Electrification Forward in Pennsylvania: Considerations for Effective Transportation Electrification Ratemaking*. Synapse Energy Economics for Natural Resources Defense Council.

Synapse Energy Economics, 2017. *Massachusetts Green Communities Program: 2016 Progress Report.* Prepared for Massachusetts Department of Energy Resources. Available at: https://www.mass.gov/files/documents/2018/03/12/gc-2016-progress-report.pdf.

Kallay, J., A. Napoleon, M. Chang. 2016. *Opportunities to Ramp Up Low-Income Energy Efficiency to Meet States and National Climate Policy Goals*. Synapse Energy Economics.

Napoleon, A., K. Takahashi, J. Kallay, T. Woolf. 2016. "Evaluation, Measurement, and Verification in Virginia." Memorandum prepared by Synapse Energy Economics for Clean Energy Solutions Inc., Virginia Energy Efficiency Council, and Virginia Department of Mines, Minerals and Energy.

Kallay, J., K. Takahashi, A. Napoleon, T. Woolf. 2015. *Fair, Abundant, and Low-Cost: A Handbook for Using Energy Efficiency in Clean Power Plan Compliance.* Synapse Energy Economics for the Energy Foundation.

Woolf, T., K. Takahashi, E. Malone, A. Napoleon, J. Kallay. 2015. *Ontario Gas Demand-Side Management 2016-2020 Plan Review.* Synapse Energy Economics for the Ontario Energy Board.

Stanton, E. A., P. Knight, J. Daniel, B. Fagan, D. Hurley, J. Kallay, E. Karaca, G. Keith, E. Malone, W. Ong, P. Peterson, L. Silvestrini, K. Takahashi, R. Wilson. 2015. *Massachusetts Low Gas Demand Analysis: Final Report.* Synapse Energy Economics for the Massachusetts Department of Energy Resources.

IEA. 2014. *Capturing the Multiple Benefits of Energy Efficiency*. Expert advisor on Chapter 6. Energy Delivery.

Brockway, N., J. Kallay, E. Malone. 2014. *Low-Income Assistance Strategy Review*. Synapse Energy Economics for the Ontario Energy Board.

Woolf, T., E. Malone, J. Kallay. 2014. *Rate and Bill Impacts of Vermont Energy Efficiency Programs.* Synapse Energy Economics for the Vermont Public Service Department.

Woolf T., E. Malone, J. Kallay, K. Takahashi. 2013. *Energy Efficiency Cost-Effectiveness Screening in the Northeast and Mid-Atlantic States.* Synapse Energy Economics for Northeast Energy Efficiency Partnerships, Inc. (NEEP).

Woolf T., J. Kallay, E. Malone, T. Comings, M. Schultz, J. Conyers. 2012. *Commercial & Industrial Customer Perspectives on Massachusetts Energy Efficiency Program.* Synapse Energy Economics for Massachusetts Energy Efficiency Advisory Council.

Fisher J., J. Levy, Y. Nishoka, P. Kirshen, R. Wilson, M. Chang, J. Kallay, C. James. 2010. *Co-Benefits of Energy Efficiency and Renewable Energy in Utah*. Synapse Energy Economics for State of Utah Energy Office.

Hurley D., K. Takahashi, B. Biewald, J. Kallay, R. Maslowski. 2008. *Cost and Benefits of Electric Utility Energy Efficiency in Massachusetts*. Synapse Energy Economics for Northeast Energy Efficiency Council.

Schlissel D., L. Johnston, J. Kallay, C. James, A. Sommer, B. Biewald, E. Hausman, A. Smith. 2008. *Don't Get Burned: The Risks of Investing in New Coal-Fired Generating Facilities*. Synapse Energy Economics for Interfaith Center on Corporate Responsibility.

Swanson C., R. Hornby, J. Kallay. 2007. *Avoided Gas Supply Costs in New York*. Synapse Energy Economics for Keyspan Energy.

Hornby R., C. Swanson, M. Drunsic, D. White, P. Chernick, B. Biewald, J. Kallay. 2007. *Avoided Energy Supply Costs in New England: 2007 Report*. Synapse Energy Economics for Avoided-Energy-Supply-Component (AESC) Study Group.

Takahashi K., B. Biewald, L. Johnson, J. Kallay. 2007. *Greenhouse Gas Reduction Strategies of Electric and Gas Companies in North America*. Synapse Energy Economics for Tokyo Gas.

TESTIMONY

New Brunswick Energy and Utilities Board (Matter No. 552). Evidence regarding review of New Brunswick Power's 2024/25 to 2026/27 DSM Program Initiatives Update. On behalf of the New Brunswick Energy and Utilities Board Staff. March 28, 2024.

Rhode Island Public Utilities Commission (Docket 23-35-EE): Direct Testimony regarding the Narragansett Electric Co. d/b/a Rhode Island Energy's 2024-2026 Energy Efficiency Three-Year Plan and Annual Energy Efficiency Plan for 2024. On behalf of the Division of Public Utilities and Carriers, November 10, 2023.

New Mexico Public Regulation Commission (Case No. 22-00232-UT): Direct Testimony regarding New Mexico Gas Company's application for approval of its 2023-2025 Energy Efficiency Program. On behalf of the Office of the Attorney General, November 2022.

Rhode Island Public Utilities Commission (Docket 22-33-EE): Direct Testimony regarding the Narragansett Electric Co. d/b/a Rhode Island Energy's Annual Energy Efficiency Plan for 2023. On behalf of the Division of Public Utilities and Carriers, November 4, 2022.

Rhode Island Public Utilities Commission (Docket 5189): Direct Testimony regarding the Narragansett Electric d/b/a National Grid's 2022 Energy Efficiency Plan (EEP). On behalf of the Division of Public Utilities and Carriers, November 17, 2021.

Rhode Island Public Utilities Commission (Docket 5076): Direct Testimony regarding the Narragansett Electric d/b/a National Grid's 2021-2023 Energy Efficiency Program Plan (Three-Year Plan) & 2021 Annual Energy Efficiency Program (EEP) Plan. On behalf of the Division of Public Utilities and Carriers, November 12, 2020.

Resume updated July 2025