Ontario Energy Board | Commission de l'énergie de l'Ontario

BY EMAIL

December 1, 2021

Ms. Christine E. Long
Registrar
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4
Registrar@oeb.ca

Dear Ms. Long:

Re: Ontario Energy Board (OEB) Staff Evidence
Enbridge Gas Inc. – 2022-2027 Natural Gas Demand Side Management Plan and Framework
OEB File Number: EB-2021-0002

In accordance with Procedural Order No. 5, please find attached two reports produced by Optimal Energy Inc., which OEB staff are filing as expert evidence in this proceeding:

- "Review and Assessment of Cost Recovery and Performance Incentive Options for Natural Gas Demand Side Management Programs" (the Cost Recovery and Performance Incentive Report), and
- "Review and Comparison of Enbridge Gas Inc.'s Proposed 2023-2027 Natural Gas Demand Side Management Programs" (Program Review Report)

The reports are accompanied by a signed Form A, acknowledging the expert's duty to the OEB.

In line with OEB staff's description of its evidence filed on September 15, 2021, the Cost Recovery and Performance Incentive Report provides expert analysis of amortization approaches and performance incentives in other jurisdictions. The Program Review Report provides expert analysis on natural gas conservation program design and delivery strategies and concepts in other jurisdictions, including a review of program costs and natural gas savings and a comparison with Enbridge Gas Inc.'s proposed programs.

The reports take into account Enbridge Gas Inc.'s September 29, 2021, update to its proposed DSM framework and plan application.

OEB staff also notes that the OEB received an updated Mandate Letter from the Minister of Energy on November 15, 2021. The reports address a number of priorities that were highlighted, including providing analysis and recommendations aimed at improving future natural gas conservation programs, increasing natural gas savings and reducing greenhouse gas emissions, providing greater opportunities for customers to access real, cost-effective savings, and fostering integration and alignment with electricity conservation programs.

The attached documents have been forwarded to Enbridge Gas Inc. and to all other parties to this proceeding.

Yours truly,

Josh Wasylyk

Digitally signed by Josh Wasylyk
Date: 2021.12.01 10:36:35 -05'00'

Josh Wasylyk
Project Advisor, Application Policy & Conservation

Encl.

FORM A

Proceeding: EB-2021-0002

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Phil Mosenthal (*name)*. I live at Bristol (*city)*, in the Vermont (*province/state*) of United States .

2. I have been engaged by or on behalf of OEB Staff (*name of party/parties)* to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
   (a) to provide opinion evidence that is fair, objective and non-partisan;
   (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and
   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date December 1, 2021

Philip Mosenthal
Philip Mosenthal (Nov 30, 2021 13:25 EST)

Signature

FORM A

Proceeding: EB-2021-0002

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is Cliff McDonald (*name)*. I live at Brooklyn (*city)*, in the New York (*province/state*) of United States .

2. I have been engaged by or on behalf of OEB Staff (*name of party/parties)* to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:
   (a) to provide opinion evidence that is fair, objective and non-partisan;
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   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date December 1, 2021

Clifford McDonald

_____

Signature

Optimal ENERGY *Integrated Energy Resources*

Review and Assessment of Cost Recovery and Performance Incentive Options for Natural Gas Demand Side Management Programs

Prepared for

Ontario Energy Board Staff

by:

Optimal Energy, Inc.

December 1, 2021

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Optimal ENERGY Integrated Energy Resources

EXECUTIVE SUMMARY

Overview

This report looks at the North American landscape of cost recovery and performance incentives for energy efficiency plans, in support of future ratepayer funded natural gas demand side management (DSM) plans approved by the Ontario Energy Board (OEB). The first section is on cost recovery models, namely full annual cost recovery, in which program costs are recovered in full every year, and amortization, in which costs are financed and recovered over several years. It looks at the pros and cons of both approaches and examines the implementation details of a possible amortization approach. Finally, it makes recommendations for the OEB and stakeholders to consider when developing policy and reviewing proposals for future ratepayer funded DSM plans in Ontario.

The second section focuses on performance incentive approaches. It begins with a detailed discussion of good performance incentive design, and how to design them to best align utility interests with those of ratepayers and policy makers. It then examines the specific performance incentive design for several leading North American jurisdictions. Finally, it takes a detailed look at the OEB's most recently approved performance incentive design for natural gas DSM plans and Enbridge Gas Inc.'s (Enbridge Gas) proposed performance incentives for its next multi-year DSM plan and gives recommendations on how to improve it for the future.

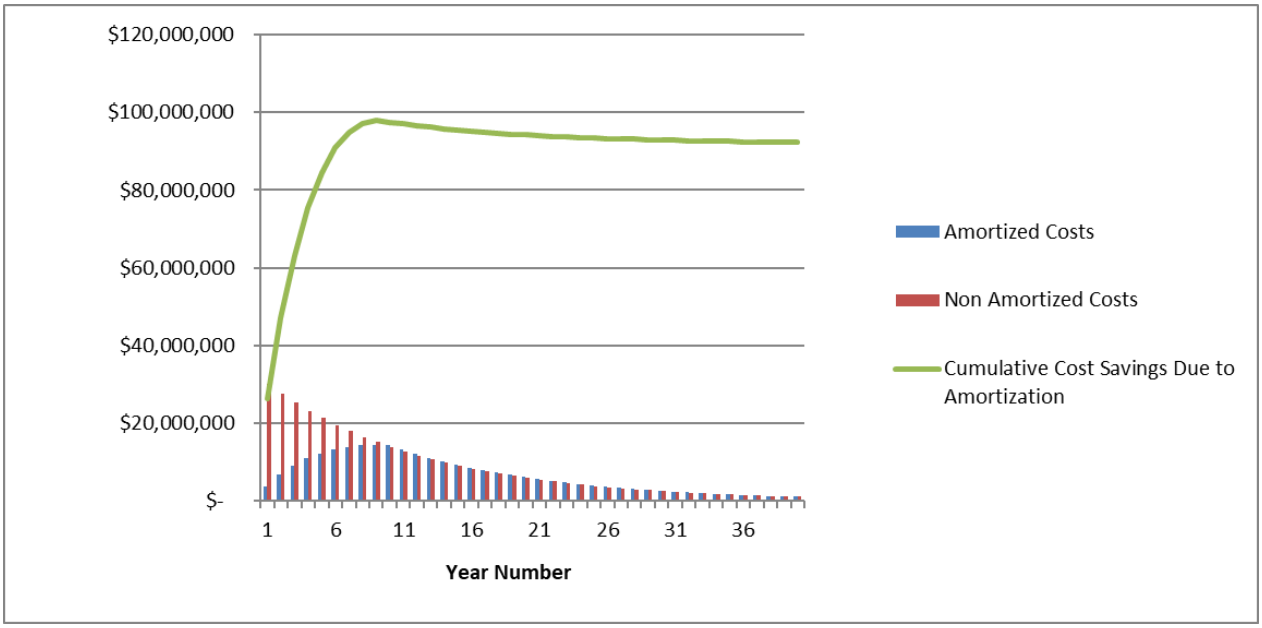
Cost Recovery

There are two main ways to recover efficiency program costs:

- Under **full contemporaneous cost recovery**, efficiency program costs are fully recovered in rates each year.
- Under **amortization**, program costs are treated more akin to capital costs, and financed over a fixed loan term.

While full contemporaneous cost recovery is the more common approach and is currently used in Ontario, advantages of amortization include minimizing near-term rate impacts, better aligning the costs of the efficiency program with the benefits and treating efficiency expenditures more similarly to supply side expenditures. Further, we find that, under many assumptions for discount rate, interest rate, and loan term, cumulative costs under amortization are effectively always lower than cumulative costs under full contemporaneous recovery. For example, Table E1 below compares the two approaches assuming a 10% discount rate and a 4% interest rate. As seen, even though costs in later years are slightly higher under the amortized approach, there are significant savings from amortization, due to significantly lower costs in early years.

Table E1: Cumulative Cost Savings from Amortization – 10% Discount Rate, 4% Interest Rate



We also examine cost recovery approaches in Maryland, Illinois, New Jersey, New York, Utah, Delaware and Missouri and discuss the approach to amortizing energy efficiency expenses, highlighting varying amortization periods and interest rates.

In Enbridge's interrogatory responses, they indicate that based on their interpretation of the OEB's December 1, 2020 guidance that indicated "the OEB anticipates modest budget increases to be proposed by Enbridge in the near-term…", that amortization is likely not necessary. While this position seems reasonable if budgets are staying relatively flat, amortization could be appropriate for Ontario in the future as a way to fund an expansion in efficiency efforts while minimizing rate impacts.

When considering what cost recovery model to use, it is important to properly value the costs in the near and long-term. This is why it is important to use a net present value approach that applies a reasonable discount rate to efficiency costs so that they are appropriately valued in the analysis informing the decision of what cost recovery model is most appropriate. Based on the OEB's findings regarding what cost recovery model to use, we recommend that a single cost recovery approach (amortization or full annual cost recovery) should be used for all programs and sectors to avoid the complexity involved in using different approaches for different programs.

Optimal recommends considering the following factors should amortization of natural gas conservation costs be implemented in Ontario:

- **Amortization Consideration 1: Interest rate** – the selected interest rate can have a large impact on the success of amortization and should be set at a low rate, such as the utility's cost of debt. Interest rates used in jurisdictions with amortization range from the utility rate of return in Maryland, to the short-term carrying cost of debt, used in Missouri. While using the rate of return will align demand side spending most closely with supply

side spending, it also rewards utility spending, as opposed to the performance of the programs, which does not provide the proper incentives. Further, the average rate of return for US utilities is over 10%,[1] which is significantly greater than what is shown necessary to incent utilities for efficiency spending. We therefore recommend that the interest rate be set at the utility cost for borrowing money, or the short-term carrying cost of debt.

- **Amortization Consideration 2: Loan term** – the loan term should be set in a straightforward manner and ideally align program costs with program benefits. We suggest using the same loan term for all programs and sectors and basing it on a fixed number of years, approximately representing the average measure life of a typical efficiency portfolio. However, a shorter loan term could function as a good compromise between those stakeholders who want amortization and those that worry about increased interest payments and the optics of nominal SBC rates that are higher with continuous program investment that has occurred for longer than the loan term. Missouri, for example, uses a loan term of five (5) years.
- **Amortization Consideration 3: Performance Incentive** – as discussed in greater detail below amortization approaches can combine cost recovery and performance incentives. However, we do not recommend this approach. Rather, we suggest approaching the performance incentive separately from the cost recovery approach, as is currently done in Ontario. This eliminates compounding performance earnings and higher costs to ratepayers.
- **Amortization Consideration 4: Lost Revenues** – these are recurring annual expenses and should not be amortized with program costs. We suggest continuing the current practice in Ontario and allowing for annually recovery and incorporating into future forecasts.

Performance Incentives

In this section, we discuss best practices for performance incentive (PI) design, including that they be multi-variate, scalable, and performance based, and get into considerations on how to choose specific incentive structures and metrics. We also perform a survey of PIs in other jurisdictions, looking at the target amount, threshold amount, cap, and how the PI is calculated in general. We look with greater detail at the mechanisms used in New York, Illinois, and Massachusetts, as these states all have high performing efficiency programs but calculate the performance incentives very differently.

Finally, we describe Enbridge Gas's proposed approach to the performance period for the 2023-2027 plan. Enbridge Gas's approach is fairly complicated, and includes separate calculations for 1) annual scorecards, largely based of net annual savings, 2) a share of net benefits[2], 3) long-

[1] https://blog.aee.net/how-do-electric-utilities-make-money

[2] Net benefits are the net present value of the quantifiable benefits from energy. Although it correlates with annual savings, it contains a lot more information, as the measure life will impact the value, as well as benefits from demand savings, secondary fuel savings, water impacts, operation and maintenance impacts, greenhouse gas reductions, and any other factors that are included in the primary cost-effectiveness test.

term Greenhouse Gas (GHG) reductions, and 4) long-term contractors trained and gas-fired heat pumps installed as part of its proposed Low-Carbon Transition Program.

We make several recommendations on how to improve the proposed performance incentive, including:

Multi-Year Performance Cycle

- **Recommendation 1:** We recommend moving from the proposed annual targets and metrics approach to a true multi-year approach, where budgets and targets are cumulative for the full 5-year plan period, and the performance incentive is ultimately determined based on the Enbridge Gas's performance towards achievement of the end-of-term targets. This should give more opportunity to ramp up new programs, test new measures, and respond to changing market conditions. In addition, it avoids the arbitrary barriers associated with whether a project is completed in December of one year or January of the next and eliminates perverse incentives to overspend if limited in ability to carry over funds

- **Recommendation 2:** We recommend that annual milestones be incorporated into this approach. Anticipated earnings still be calculated each year, possibly based on the estimated and reported (and potentially unverified or evaluated) performance, and fully built into the efficiency surcharges (or system benefits charge (SBC), or rate riders following the clearance of DSM deferral and variance account proceedings), going forward for the next year. Savings verifications could still happen annually, especially for programs with uncertain estimates, but could also be reduced for well-established programs, particularly where the verification process does not entail significant site visits.

Target Adjustment Mechanism

- **Recommendation 3:** We recommend considering that instead of the proposed Target Adjustment Mechanism (TAM), structure the performance incentive as a true 5-year target with annual milestones and a true-up process in the final year. If this approach is not taken, the TAM should still be eliminated, in favor of setting fixed annual targets for each year of the plan.

- **Recommendation 4**: We recommend a process to allow updates, or midterm modifications, of the targets during the 2023-2027 term. This would be a stakeholder/regulatory process resembling a streamlined version of the process used to approve the current application. Enbridge Gas has proposed something along these lines in its application, called a mid-point assessment.

- **Recommendation 5**: We recommend that if the TAM is maintained, creating a minimum value which the target cannot fall below. To avoid the case described below where the incentive targets decrease significantly from a string of slight underperformances, this minimum value should be based on the first-year target, and not be dependent on performance of future years.

- **Recommendation 6:** We recommend that no automatic updates to savings targets be made in response to information from the OEB's EM&V process such as net-to-gross ratios. If during the course of the multi-year plan, Enbridge Gas is of the view that new evaluation results or changing market conditions have made it unreasonable to meet established targets, we suggest that they formally propose updated targets as part of the mid-term modification process described above.

Choice of metrics

- **Recommendation 7**: We recommend simplifying the performance incentive structure using a main metric based on net benefits for 70% of the incentive amount. Specifically, we recommend adapting Program Administrator Cost (PAC) net benefits, plus carbon, to avoid the potentially contentious challenges of estimating participant costs and benefits as can be the case when using Total Resource Cost (TRC)-Plus net benefits[3]. While this diverges from a pure focus on gas savings in physical units, we believe net benefits is a better and more comprehensive approach. Gas savings will produce the vast majority of benefits, so the two are highly correlated, and it still directly provides the incentive to maximize savings. However, it also ensures utilities value such things as cost efficiency, capacity benefits, and longevity of savings.

- **Recommendation 8**: Should the OEB determine it appropriate to maintain the performance scorecards and natural gas savings metrics, we recommend maintaining net lifetime natural gas savings as a metric. Enbridge Gas has proposed all savings targets as net annual savings. This is different than past program year targets, which have been based on lifetime net savings. Enbridge explains in its interrogatory responses[4] that it proposed changing the natural gas saving scorecard metric since it added a net benefits incentive that captures measure life, that annual savings is simpler, and since they already promote longer life measures. However, under the proposed incentive structure, twice the award is allocated to annual savings compared to net benefits. Further, we do not think that lifetime savings is a complicated concept, especially compared to the complexity of how the scorecard works overall. The fact Enbridge already promotes a measure mix that includes long-life measures just means that it should be ok to set up an incentive structure that reflects this reality. We therefore still recommend using lifetime savings over annual savings.

- **Recommendation 9**: We also recommend that the OEB fix the avoided cost assumptions that are used in plan development for the duration of the plan, or update the target to account for changes in avoided costs beyond Enbridge Gas's control. This way, the utility will not be rewarded or punished for increases or decreases in avoided costs that they cannot do anything about.

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[3] Participant costs can be difficult and contentious to track, since this is not generally data collected by the program and thus needs to be estimated based on technical resources and other secondary sources. On the benefit side, many argue that EE technology produces many benefits to the customer beyond avoided costs (comfort, aesthetics, etc.) which policy makers cannot easily estimate.

[4] Exhibit I.9.EGI.STAFF.20

- **Recommendation 10**: If our recommendation to assign 70% of the overall performance incentive to a net benefit target is accepted, we recommend that the remaining 30% of the overall performance incentive be allocated to a limited number of up to five "countervailing metrics" that are independent or actively harmful to net benefits, or simply align with critical policy goals. These metrics could include comprehensiveness of savings (i.e., portion of participants installing multiple measures, etc.), peak day reduction in supply constrained areas, percent of savings among low income or other hard to reach customers, or participation among specific hard-to-reach sub segments.

- **Recommendation 11**: We recommend considering eliminating the GHG Reduction Incentive in order to reduce unnecessary complexity and duplication with a focus on achievement of greater net benefits overall. The GHG Reduction Incentive does not appear to add any value, given that it's just the annual savings converted to an emissions reduction amount using a fixed emissions factor.

- **Recommendation 12:** We recommend that Enbridge Gas propose natural gas savings metrics for the Savings by Design and Low Carbon Transition programs to allow the OEB and stakeholders assurance that these programs are contributing to the overall objectives of DSM.

Threshold and Cap

- **Recommendation 13:** Enbridge Gas proposes to start earning the performance incentives at 50% of the goal, an extremely low threshold compared to other utilities. We recommend raising this, consistent with past OEB approvals, so Enbridge Gas starts earning only at 75% of a target. This approach provides a much stronger incentive to continue to increase savings once the threshold is crossed and provides greater protection to ratepayers.

- **Recommendation 14:** We recommend maintaining the performance incentive structure where Enbridge Gas only begins accruing incentive dollars once the savings threshold of 75% of target is crossed, as approved by the OEB for the 2015-2020 term. We believe this approach has advantages and recommend maintaining this provision, as it provides a much stronger incentive to continue to increase savings once the threshold is crossed and provides greater protection to ratepayers

- **Recommendation 15**: Should the current performance incentive structure remain largely unchanged, we recommend considering lowering the maximum incentive to 110%-125%, and the scaling be structured so that a greater portion of the maximum is earned at 100% of the target, assuming the 100% target is appropriately challenging

- **Recommendation 16:** We recommend that the Net Benefits incentive, if maintained as proposed by Enbridge Gas, be structured more simply and similar to other scorecards, where earnings begin at a threshold percent of a target of net benefits and scale as the net benefits approach and pass the target. Enbridge Gas has proposed to start earning its Net Benefits

performance incentive when savings reach 27% of target achievement. The threshold for earning should be much higher (closer to 70%-80% of goal), as 27% would be a very poor performance not deserving of an incentive.

Incentive Amount

- **Recommendation 17:** We recommend considering establishing the overall performance incentive amount as a percent of net benefits, in advance of the planning process. This way, while higher proposed savings (and/or lower budgets) in the efficiency plan would still make it harder to achieve or exceed the full target incentive, it would also increase the overall pot of money available for earnings.

Optimal ENERGY Integrated Energy Resources

INTRODUCTION

Demand-side energy efficiency resources are generally the least expensive energy resources. As a result, adoption of the maximum cost-effective achievable efficiency should lower utility revenue requirements, is in the public interest, and is consistent with traditional policy of providing least-cost service. However, under traditional regulation, investor-owned utilities (IOUs) have inherent disincentives to pursue aggressive energy efficiency demand-side resources and have a bias toward supply-side investments. This arises from several primary regulatory practices, and the key disincentives include lost revenues from lower sales and foregone earnings from not getting a rate of return on efficiency program investment.

The lost revenue disincentive is caused from lower energy sales and revenue as a direct result of the IOU's DSM programs. In Ontario, the utilities have long been made whole from lower revenues through the OEB's lost revenue adjustment mechanism (LRAM). This still leaves a disincentive related to the types of expenses that IOUs earn a return on. In general, IOUs earn profits through a rate of return on capital investments, which is generally the case for most supply-side investments. Other utility expenses of reliably providing gas service do not earn any profit. Rather, they are simply recovered from ratepayers annually at cost. Because energy efficiency resources will ultimately substitute for traditional supply-side resources but are typically treated as non-capital expenditures recovered at cost, pursuit of efficiency results in denying the IOU future earnings opportunities by lowering the need for alternative supply-side investments.

Even if the IOUs can be ordered to pursue efficiency, experience has shown that without some remedy to the disincentives, IOUs will tend to not fully embrace and as effectively pursue efficiency resources, resulting in less overall savings and net benefits. Further, we note that the natural gas utility's implementation of efficiency programs is a voluntary business function, making the removal of disincentives and the creation of an effective positive incentive even more critical.[5] This imperative will likely become even more critical over time because of the trend toward electrification of building and industrial gas loads to meet climate goals. Under a negative load growth environment, and the need to recover fixed costs over less and less customers and gas usage, gas utilities will likely face an existential threat and have strong incentives to find ways to stem the load reductions and even build new loads.

Finally, utilities and regulators are also typically concerned with rate impacts. This is another area where efficiency is often unfairly disadvantaged compared to supply side investments. Since efficiency costs are typically paid in full each year, while supply side costs are amortized and recovered over a long-time horizon, first year impacts from efficiency can seem very high compared to first year impacts of much-higher cost supply-side investments. Amortization, with proper selection of interest rates and loan terms, discussed more below, can help mitigate rate impacts from efficiency by treating efficiency costs closer to how supply-side costs are treated.

[5] Ontario Energy Board. Demand Side Management Framework for Natural Gas Distributors (2015-2020). December 22, 2014. Page 19.

There are several approaches that can be used to overcome these disincentives, and potentially to create positive incentives, to ensure the IOU's full support and focus on pursuit of exemplary efficiency program achievement. These generally rely on one or both of the following strategies:

- For lost revenue, many utilities are now decoupled, which removes the direct link between utility revenue and throughput by truing up any variances from forecast loads annually. This holds both the IOU and its ratepayers harmless for not only efficiency programs, but changes in weather, the economy, or other exogenous impacts. Absent a decoupling mechanism, some jurisdictions, such as Ontario, have adopted some sort of lost revenue adjustment mechanism (LRAM) which compensates the utility for the estimated net lost revenue that occurs from efficiency programs. Under this scenario, a utility may receive substantial lost revenue payments even if it is already "over-earning" due to other factors like a cold winter. For this and other reasons, decoupling is generally considered to be a superior approach to LRAMs, and one that reduces ratepayer risk.
- To address the foregone earnings opportunity, some sort of positive return on efficiency investment can be provided. This can be from simply providing the same rate of return (ROR) on efficiency investments as is earned from supply-side investments, putting efficiency and supply on a relatively equal footing. Alternatively, many jurisdictions have pursued more nuanced mechanisms that can provide similar earnings opportunities but are based on the IOU's performance in delivering efficiency, rather than simply an ROR on investment. Because these performance incentives (PIs) create incentives to strive for exemplary performance (and potentially penalties for poor performance) rather than rewarding spending, they can be a superior policy approach.

While these two areas of disincentives/incentives address distinct issues, there are numerous ways to address them, sometimes separately, and sometimes with hybrid mechanisms that influence both. In addition, in designing the approaches and levels of any earnings, it is important to consider them all in an integrated fashion. The goal should be an integrated approach to overall revenue regulatory structure, program cost recovery, performance incentives and lost revenue necessary to ensure a comprehensive set of practices that collectively optimize the balance of removing disincentives, creating positive incentives, and protecting ratepayers. They are inherently linked because to a certain extent, revenue dollars are fungible, and if lacking in one area, can be made up in another. Without considering the entire package one can inadvertently provide too high or low a financial reward or penalty. Further, these mechanisms can be designed in conjunction with, or separate from, the basic core cost recovery of the utility's efficiency program expenses.

The remainder of this report reviews the various models for addressing the recovery of program expenses, and the provision of additional positive earnings incentives and/or penalties, used in other North American jurisdictions, to address utility efficiency investments. It then makes recommendations to the OEB on future cost recovery and performance incentive approaches for natural gas DSM. Because the OEB already addresses lost revenue through an

LRAM, that is not addressed directly, however, it impacts recommendations in that it means the direct *disincentive* to pursue efficiency is already removed, potentially reducing the needed magnitude of any additional incentives.[6]

[6] While LRAM does not provide a clear incentive for a utility to pursue efficiency, it neutralizes the disincentive of losing short term revenue that would otherwise exist.

PROGRAM COST RECOVERY

As discussed above, traditional utility regulation provides an equity return on the rate base of capital investments, but operating costs are simply recovered without any additional return to the company. Because utility investment in efficiency programs does not create a traditional capital "asset" through ownership and control of the efficiency energy resource (*e.g.*, the customer-owned efficient equipment) and the on-going nature of utility efficiency investments, traditionally it has been treated as operating costs, with full recovery every year, roughly contemporaneous with the spending. While this has worked in many cases, and some jurisdictions have created other mechanisms to still allow for equity earnings on efficiency such as performance incentives, full annual recovery of all efficiency expenses can still create a mismatch with supply-side investments, failing to put efficiency resources fully on an equal footing with competing energy resources.

Similar to supply-side investments, efficiency investments provide benefits over time as the customer enjoys energy cost savings. The traditional approach of treating efficiency costs as operational costs that are fully recovered on an annual basis tends to create significant short term rate impacts, even when alternative needed new resources would be more costly to acquire and rates, as well as bills, may be lower in the long run.[7] This situation may be acceptable if programs have been running at more or less steady funding for a long time, but as efficiency programs ramp up, the size of the systems benefits surcharge for energy efficiency can increase enough to create significant political opposition to efficiency, even if average bills (as opposed to rates) are still decreasing and even if efficiency is still the least cost resource in the long term. The mismatch of costs and benefits for efficiency in this situation may make supply side options falsely appear cheaper, as their costs are spread out over many years, while the costs of efficiency are all incurred in year one, even though benefits continue for an average of about 10-12 years (typical weighted average measure life of efficiency program portfolios).

While there are several ways to compensate for this inherent unequal treatment of supply versus demand resources, some jurisdictions have chosen to move away from traditional cost recovery approaches to some form of cost amortization that can spread recovery over a longer period, similar to how supply-side capital infrastructure cost recovery is usually done. This trend may accelerate, as many North American jurisdictions currently have flat or declining loads, and climate change has increased the desire to ensure all cost-effective demand-side resources are captured. Amortization of all or some portion of efficiency investments can provide many benefits, including that it:

- More directly and clearly aligns supply- and demand-side resource investments
- Improves the temporal alignment of costs and benefits
- Dramatically reduces short-term rate impacts

[7] As discussed above, rates can still be higher with efficiency even in the long run because of the energy throughput and volumetric pricing. However, with the need for ongoing new resources because of underlying natural load growth and/or retirements of capital infrastructure, efficiency resources will generally lead to long term rate reductions.

- Improves generational equity
- Better facilitates potential ramping up of programs and investments, while tempering the short-term rate impacts
- Potentially creates positive net present value to ratepayers because the utility's cost of capital is generally lower than that of private consumers, who also tend to have high implicit discount rates
- Generally reduces total cumulative ratepayer costs at any given time so long as there is continuous investment in efficiency. This is explained more below.
- May allow ratepayers to benefit from Federal and Provincial tax accounting practices to defer some payments interest free
- Can result in economic development and greater near term indirect economic benefits
- Can increase external support for efficiency investment.

FULL CONTEMPORANEOUS COST RECOVERY

Traditional cost recovery is done in a similar practice to other pass-through utility operating costs, such as fuel adjustment riders and O&M costs. At the beginning of each year, an amount per kWh or m^3 surcharge to base rates is established based on the projected utility efficiency budget and can also include other related costs (e.g., performance incentives) and the forecast load. This surcharge is designed to collect the full amount needed for cost recovery over the year and is set at the full cost divided by the expected energy sales. Often this surcharge is treated as an explicit rider to base rates that is transparent

to ratepayers as an added charge on the bill, often referred to as a "system benefits charge". In some cases, it is simply added to the underlying rates such that it is invisible to the customer on their bill.

Invariably, this approach will not perfectly recover the exact utility expenditures every month.[8] As a result, most jurisdictions will account for monthly variances, and perform a reconciliation at the end of each year and true up any shortfalls or overpayments, along with "carrying costs" based on the utilities' short term interest costs. This true up amount, either positive or negative, will then be applied to the next year's rates through a rider, ensuring a complete and final accounting of the approved cost recovery. Any additional adjustments would also be built into the forthcoming rider value, such as reductions for any costs denied for recovery, anticipated performance incentive earnings, lost revenue payments, etc. By applying carrying costs, both the utility and the ratepayers are fully compensated for any temporal mismatch between spending and collections.

This contemporaneous "expensing" of all efficiency related costs has some benefits, including:

- It is simple to apply and straight forward to understand

[8] Spending patterns over the year will not necessarily be proportional each month to the pattern of monthly system loads, and overall spending and actual loads will likely vary somewhat from planned budgets and forecasts.

- Where decoupling exists, it is comparable to how utilities are often compensated for variances in forecasted and actual loads
- It ensures a full accounting annually which enables the utility to record revenue and earnings to satisfy creditors and maintain acceptable debt costs and credit ratings
- It avoids generating outstanding future ratepayer liabilities that are created through amortization

Most North American States and Provinces that pursue utility-funded demand-side management use some form of this contemporaneous expensing approach. However, some states have recently moved away from this practice, as discussed below.

AMORTIZED COST RECOVERY

Overview

As discussed, an alternative to contemporaneous expensing is to amortize some or all of the efficiency-related costs to be recovered. Essentially one can think of amortization as simply the utility financing a loan to its ratepayers and recovering costs over time. While amortization provides advantages over annual cost recovery, it also comes with some challenges, including:

- **Complexity:** As with most any financing, this can be structured in numerous ways, and specific decisions on implementation details may have significant impact on the eventual success of the amortization structure. The primary components of any amortization cost recovery scheme include:
  - Which specific costs to be financed
  - Recovery duration
  - Whether any interest or equity return is applied
  - Level(s) of any interest or return, where applicable, and whether it is fixed or variable.
  - Whether each year's costs to be recovered is treated as a fixed, discrete loan, or combines with outstanding balances as a single loan
  - When and how any variances/true ups are accounted for
- **Debt Treatment:** Depending on how the utility treats the amortization from an accounting standpoint, the carried costs could be considered extra debt by the credit agencies and have an impact on the utility's credit rating.
- **Nominal Costs** – A common argument against amortization is that once programs have fully ramped up and have been running at a steady state for many years, nominal costs to ratepayers can be higher than they would have been under an annual expensing scenario. While this is true whenever a positive interest rate is used, as we will show later, the cumulative costs to ratepayers can be lower under amortization, especially if using an appropriate interest rate and a reasonable discount rate for the ratepayer.

Implementation Details

Interest Rate

The interest rate that the utility will get from the amortized program cost repayments can have a large impact on utility revenue requirements of amortization compared to typical cost recovery. Interest rates used in jurisdictions with amortization range from the utility rate of return in Maryland, to the short-term carrying cost of debt, used in Missouri. While using the rate of return will align demand side spending most closely with supply side spending, it also rewards utility spending, as opposed to the performance of the programs. As discussed in the Performance Incentive Chapter, we do not believe this creates the proper incentives for utilities and would thus recommend the interest rate set at the utility cost for borrowing money, or the short-term carrying cost of debt. Further, the average rate of return for US utilities is over 10%,[9] which is significantly greater than what is shown necessary to incent utilities for efficiency spending. Further, using a rate of return interest rate may create a backlash against efficiency when, after many years of program activity, costs to ratepayers appear higher than they would be without amortization (even though they may be lower on a present value basis). In fact, this is indeed happening in Maryland, and groups of stakeholders are pushing to change the cost recovery model back to standard model.[10] Maryland programs are discussed in more detail below.

Loan Term

The loan term also has impacts on program cost recovery. In current amortization models, we see loan terms varying between a straight five (5) years and the weighted average measure life of the programs. In theory, any loan term could be accommodated, and there could even be different loan terms by program and/or sector. In general, as the loan term shortens, the rate and revenue impacts will start to converge on those for annual cost recovery. We recommend using a single loan term approximately equal to the weighted average measure life of the programs, as this will best align the costs of efficiency with their associated benefits while avoiding unnecessary complexity. However, a shorter loan term could function as a good compromise between those stakeholders who want amortization and those that worry about increased interest payments and the optics of nominal SBC rates that are higher with continuous program investment that has occurred for longer than the loan term. Missouri, for example, uses a loan term of five (5) years.

Potential Linkages or Integration of Shareholder Incentives and Amortization

There are several potential linkages between amortization and the structure of the shareholder incentive that can be used. In particular, amortization can enable an incentive that is similar to the rate of return a utility earns on rate-based assets in which good energy efficiency performance is rewarded through an increase or decrease in the allowed rate of return for the amortized program expenses, as is used in Illinois and New Jersey. This type of performance incentive will be discussed more in the next section. It essentially allows for both amortized cost recovery and a performance incentive all in a single cost recovery approach.

[9] https://blog.aee.net/how-do-electric-utilities-make-money

[10] Interview with David Hill, Managing Consultant, Energy Futures Group.

For example, Illinois uses an approach that increases or decreases the allowed rate of return on the program costs up to 200 basis points based on the performance of the program.

We also note, however, that there is no particular reason why program cost recovery and performance incentive need to be linked, or that amortizing program costs should lead to a rate of return style performance incentive. In fact, we recommend thinking of each independently, separately choosing the program cost recovery and performance incentive models that best align with the policy goals. In Ontario, as discussed in more detail below, this likely means maintaining a separate performance metric type approach, even if program costs are ultimately amortized.

Hybrid Model

While it does not appear that any jurisdictions currently take this approach, in theory there could also be a hybrid approach to cost recovery, whereby different tranches of costs are recovered with different terms. This might be particularly useful if, for example, there are certain programs with very short measure life that would not, on their own, make sense to amortize. However, a hybrid model would add significant complexity to the cost recovery process. Absent a hybrid model with multiple loan terms, setting the loan term to the weighted average measure life of the efficiency portfolio would best align costs and benefits temporally.

Discrete Loan vs. Cumulative Loan

When the amortization interest rate is likely to vary over time, one final implementation detail regarding amortization is whether a utility will treat each program year costs as a discrete loan with its own interest rate and loan terms, or whether it will be added to the previous amortized uncollected balance and treated as one single loan. The practical impact of this is whether the amortized balance is treated as one large loan with a variable interest rate, or several separate loans, each with a fixed term interest rate.

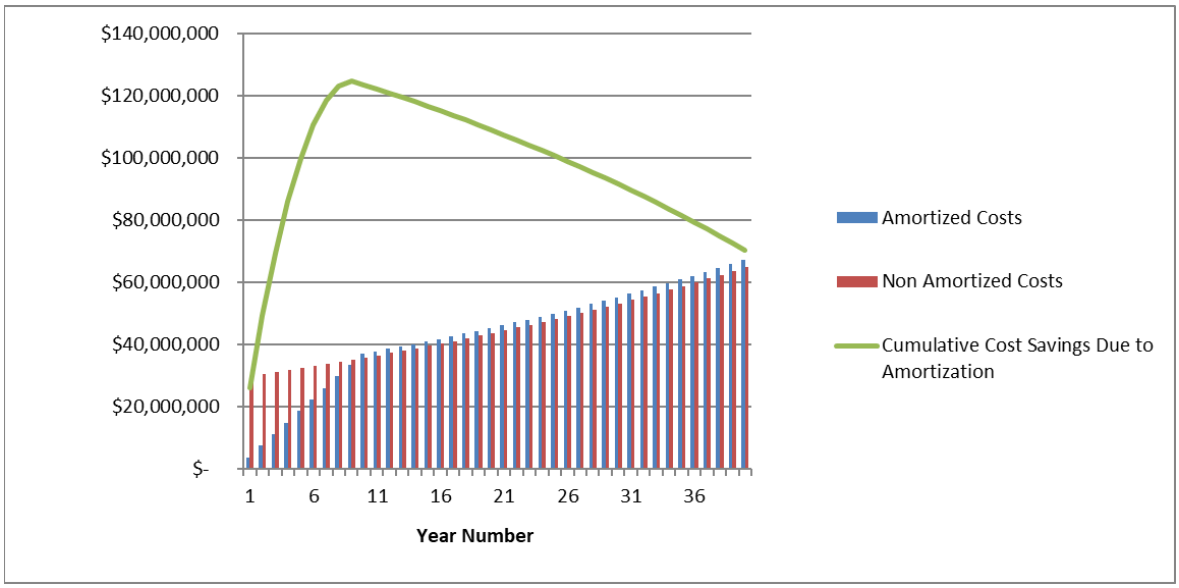
This is primarily an issue when a performance incentive is combined with amortization, as in Illinois and New Jersey. If a jurisdiction is using a rate of-return style performance incentive, there may be some perverse incentives created by using a variable interest rate, especially if program spending is ramping up. This happens because under this incentive scheme, the increased rate of return applies to not just the current year spending but to the entire uncollected amortized balance of all past years. This means that, during times of increasing spending, achieving high performance may be more valuable to shareholders in future years than in a current program year (since the rate of return boost will apply to a larger uncollected balance). A situation could thus occur where, for example, a utility with several large commercial and/or industrial projects in the pipeline at the end of a program year could decide not to push to close them in the current year, to maximize their chances of getting the higher performance incentive in the future year where it is worth more. In practice, this perverse incentive is small and unlikely to significantly come into play.

Rate Impacts of Amortization vs Annual Recovery

The most common argument against amortization is that, once programs have ramped up and the cost recovery mechanism has been in place for the loan term or longer, nominal SBCs under amortized recovery may exceed those that would occur under an annual full recovery mechanism. While this is generally true, with reasonable interest rates, savings for the ratepayers are high enough in the early years under amortization that the net cumulative costs of an amortization approach are always lower than the net cumulative costs of full annual recovery. This is particularly true if the deferred taxes are triggered and credited to ratepayers.

The chart below gives the example of a program starting with $30 million in annual expenditures, then after year 1 allowing the annual program expenditures to increase at the rate of inflation (assumed to be 2% per year). This scenario assumes a tax rate of 30%, an interest rate of 4%, and a loan term of 10 years.

Table 1: Cumulative Cost Savings from Amortization – Undiscounted, 4% Interest Rate

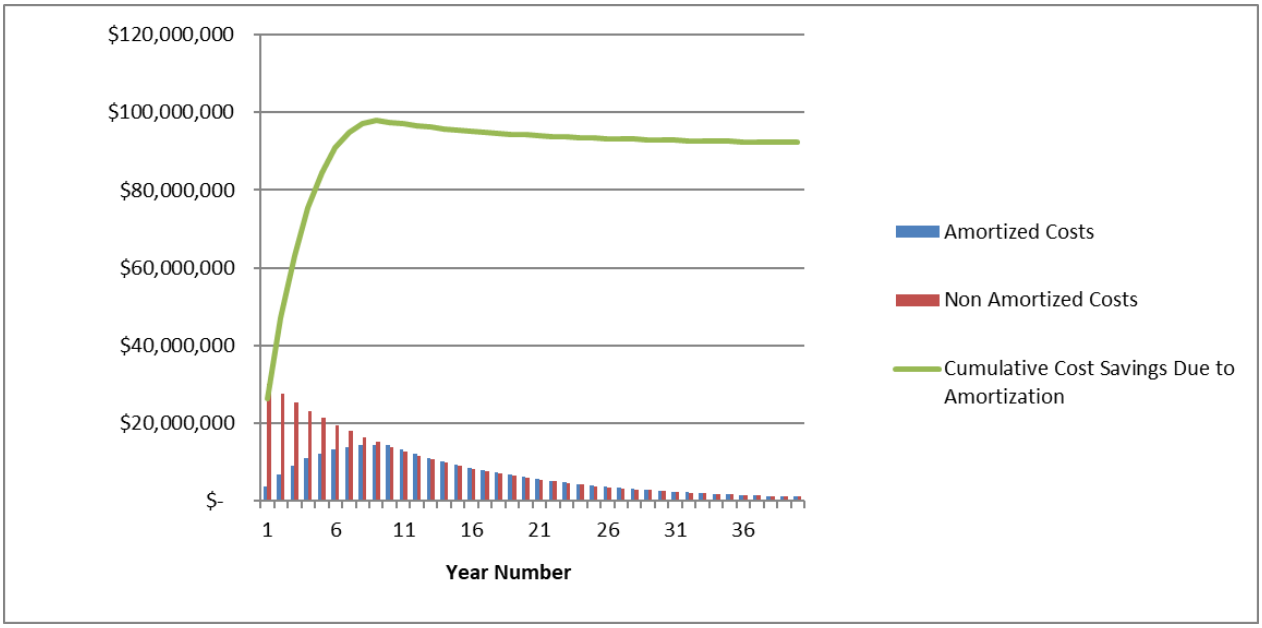


The chart shows the annual revenue requirements (program costs plus carrying costs) of the amortization and non-amortization scenarios – the bars – as well as the cumulative savings in revenue requirements in the green line. This represents the sum of all revenue requirements for the year and all previous years under the amortization scenario minus the sum of all revenue requirements for the non-amortization scenario. As seen, starting in year 10, the annual revenue requirements for the amortization scenario start to slightly exceed those for the non-amortization scenario, which is when the cumulative savings from amortization begin to decrease. However, this impact is significantly lower than the revenue requirements in the first 10 years. In fact, the early years yield so much benefit that, even in year 40, ratepayers still retain about $70 million in cumulative savings[11].

[11] This assumes a steady state of program funding. If spending stops, the early benefits from amortization would start to decrease as the utility needs to pay off the amortized payments from past program years.

Note that the above chart shows only nominal costs in each year, which does not paint an entirely accurate picture. There is significant evidence that consumers have a high discount rate, valuing money much more highly in the current year than in future year[12]. This is why, for example, most people choose 30-year mortgages even though they could achieve a lower interest rate, and significantly lower total interest payments, with 15-year mortgages[13]. The below chart shows the same scenario as above but discounts the dollar values in future years using a 10% discount rate.

Table 2: Cumulative Cost Savings from Amortization – 10% Discount Rate, 4% Interest Rate



As seen, under this scenario, cumulative savings shoot up much faster than they do without assuming a discount rate. Further, instead of declining after 10 years, they largely plateau at a net present value of about $90 million in benefits.

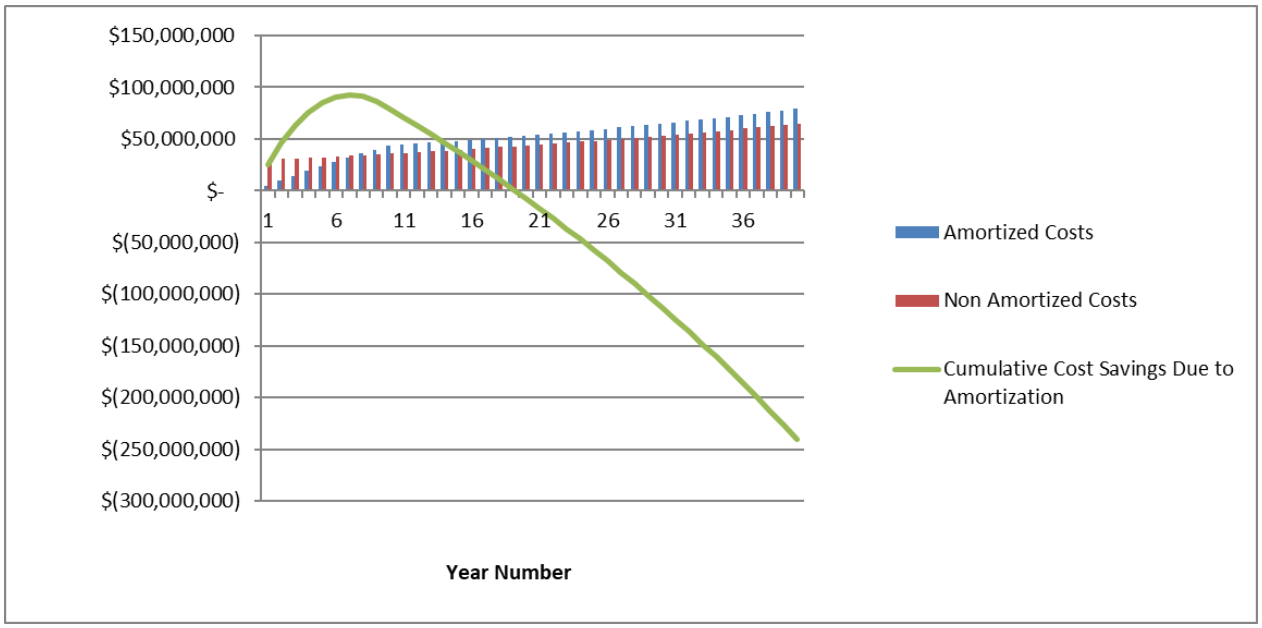
One final note is that this analysis is highly dependent on the specific interest rate used. The chart below eliminates the customer discount rate (thus showing only nominal costs), and increases the interest rate to 10%, to approximate that of a typical historical rate of return[14]. As seen, in this scenario, by year 20 net savings turn negative, and continue dropping significantly from there.

[12] This study, for example, finds a mean consumer discount rate of about 20% for energy efficiency purchases: https://www.nber.org/system/files/working_papers/w20969/w20969.pdf

[13] According to the US Bureau of Labor Statistics (BLs), 60% of mortgages in the US have a loan-term of 30 years compared to 15% with a loan term of 15-years: https://www.bls.gov/opub/btn/volume-5/what-the-consumer-expenditure-survey-tells-us-about-mortgage-instruments-before-and-after-the-housing-collapse.htm

[14] Enbridge's Current rate of return is 8.66%. https://www.oeb.ca/sites/default/files/OEB-Ltr-2022-Cost-of-Capital-Update-20211028.pdf

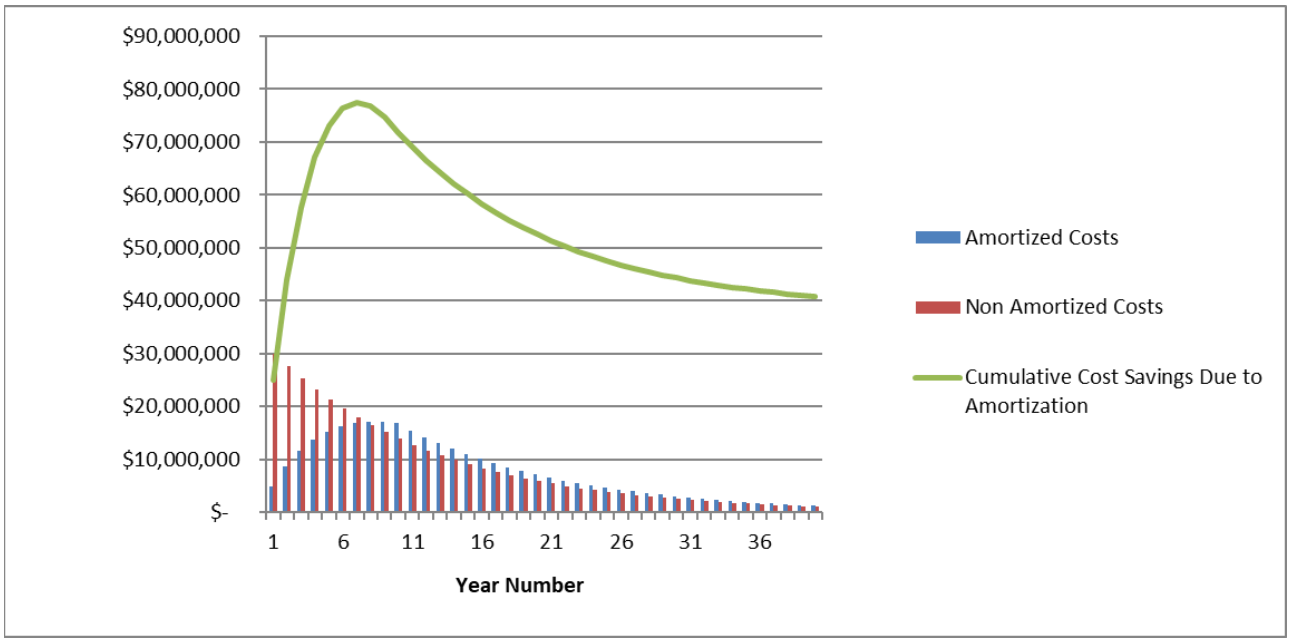
Table 3: Cumulative Cost Savings from Amortization – Undiscounted, 10% Interest Rate



The different cost curve examples shown in Table 2 (using a 10% discount rate, 4% interest rate) and Table 3 (no discount rate, 10% interest rate) illustrates the importance of carefully selecting an appropriate interest rate if amortization is implemented. It also highlights the importance of considering how costs are valued over time. As can be seen, consistent with pragmatic long term economic decision making, properly valuing costs based on net present values provides the basis to decide if proceeding with an amortization approach is appropriate.

Further, with a reasonable customer discount rate applied, even the higher interest rate scenario does not look quite as bad. The chart below, for example, applies this discount rate to the scenario above with a 10% interest rate. As seen, while the cumulative savings start dropping in year 10, due to the discount rate they plateau around $40 million, and will effectively never go negative.

Table 4: Cumulative Cost Savings from Amortization – 10% Discount Rate, 10% Interest Rate



Jurisdictions Using Amortization

While most jurisdictions use a standard full annual cost recovery approach, there are a few jurisdictions that do currently amortize efficiency program costs. The table below shows a summary of key aspects of the amortization implementation. In some cases, such as in Illinois, the legislation mandated that program expenses could be amortized[15]. In others, such as Maryland, it was a decision by the relevant regulatory agency[16].

Table 5: Summary of Jurisdictions Using Amortization for Cost Recovery

Jurisdiction	2018 Savings (% of load)	Loan Term	Interest Rate	Performance Incentive Type
Maryland	0.31%	5 years	Approved Rate of Return (~10%)	None
Illinois (electric only)[17]	2.3%	Weighted Average Measure Life	Approved rate of return plus or minus up to 200 basis points depending on performance[18]	Integrated with cost recovery. Increase/decrease rate of return up to a max of 200 basis points
New Jersey	Ramping up to all cost-effective efficiency	10 years	Approved Rate (return on equity minus 100 basis points) of Return plus or minus up to 50 basis points depending on performance	Integrated with cost recovery. Increase/decrease rate of return up to a max of 50 basis points
New York	0.68%	10 years	Rate of Return	Increase rate of return up to a max of 100 basis points
Utah	0.71%	10 years	Weighted Average Cost of Capital	None
Delaware	0.38%	5 years	Approved Rate of Return (9.7%)	None
Missouri (electric only)[19]	0.61%	5 years	Short term cost of debt (currently approximately 1.5%)	Performance earnings are separate awards for various savings and other metrics.

Maryland Experience

While many of the jurisdictions listed above have only implemented amortization recently, Maryland has been amortizing efficiency program costs since 2008. Given the 5-year amortization period in the state, this means that Maryland is at the point where nominal SBCs are higher than they would be under a non-amortized cost recovery scheme. Given the relatively high interest rate (the utilities' approved rate of return), this difference is now fairly significant.

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[15] See: https://www.ilga.gov/legislation/ilcs/ilcs4.asp?DocName=022000050HArt.+VIII&ActID=1277&ChapterID=23&SeqStart=9900000&SeqEnd=14800000

[16] See: https://www.bpu.state.nj.us/bpu/pdf/boardorders/2020/20200610/6-10-20-8D.pdf

[17] IL only has PIs for electric utilities. While both state electric IOU's have analogous PI mechanisms, this describes the PI details for Commonwealth Edison, which serves the majority of the State load. There are a few variations in threshold levels and savings depth for Ameren Illinois.

[18] This type of incentive is achieved by increasing the interest rate the utilities receive on program expenditures if the program meets certain performance hurdles and/or decreasing the interest rates if performance is unsatisfactory.

[19] Missouri only has PIs for electric utilities.

In response, some stakeholders are attempting to lower the interest rate given to the amortized program expenses and/or phase out amortization in favor of a more traditional annual expensing of program expenses. The Maryland Office of People's Counsel (OPC), while acknowledging amortization played an important role in allowing the initial steep ramp up period of Maryland efficiency programs, maintains that now that program costs are steady from year-to-year, the utilities do not have to raise capital from market sources to fund them, and so now would make more sense to be treated as a pass-through cost with full annual recovery. They advocate lowering the interest rate to the utility's actual cost of debt, which should be low given the high certainty of recovery, while at the same time transitioning away from amortizing the program expenses. Commission staff has a similar position, arguing for an interest rate set at a 5-year treasury bill along with a slightly slower transition towards full annual cost recovery[20].

The Maryland experience underlines certain dangers in the amortization approach, as well as the importance of setting the loan term and interest rate in a manner that covers the utility costs without becoming overly burdensome to the ratepayers in the long term. However, even though some stakeholders are advocating for adjustment, the program was not a complete failure. It is generally acknowledged that by limiting short term rate increases, amortization was a significant factor allowing program expansion. Further, other jurisdictions that amortize program expenses, such as New Jersey and Missouri, have not seen the same issues. We believe that the main issue for Maryland was that the interest rate was set too high, and if the rate were instead set at the price of debt as OPC now advocates, there would not currently be an issue.

COST RECOVERY IN ONTARIO

Current Approach

Ontario currently uses an annual cost recovery approach for its natural gas DSM expenses. In the 2015-2020 DSM Framework, the Ontario Energy Board (OEB), while recognizing the value of energy efficiency, set a maximum rate impact of $2 per month for a typical residential customer, inclusive of the maximum performance incentive. This translated to maximum budget thresholds of approximately $75 million for legacy Enbridge Gas and $60 million for legacy Union.[21]

While this level of funding has achieved significant savings for Ontario, the achievement is still well below the full cost-effective potential. In 2018, for example, the legacy natural gas utility DSM plans together achieved about 108 cubic meters of annual gas savings for a cost of $128 million.[22] While this is significant, it compares to a maximum cost-effective achievable potential of 338 cubic meters per year found by a 2019 potential study for Ontario.[23] However, this scenario also involves significantly higher costs, so ramping up to achieving all cost-effective savings would involve significant short term rate impacts under the current annual cost recovery approach. Amortization, if adopted now, would dramatically reduce these rate impacts, thereby better supporting a ramp up to something closer to all cost-effective efficiency. While it does do

[20] EmPower Cost Recovery Work Group Report. Case No. 9494. April 15, 2019.

[21] Ontario Energy Board. 2015-2020 DSM Framework.

[22] Ontario 2018 Annual Verification Report.

[23] Navigant. 2019 Integrated Ontario Electricity and Natural Gas Potential study. Table ES-3. Savings for 2030 minus savings for 2023, divided by seven.

this by creating future ratepayer liabilities, as shown above, customers will still enjoy total cumulative savings for an extremely long time in nominal terms, and perpetually from a present value standpoint based on a typical consumer discount rate.

COST RECOVERY CONCLUSIONS AND RECOMMENDED CONSIDERATIONS

We believe that the amortization of program expenses could be an elegant way to increase overall spending on gas efficiency programs so that a greater level of overall natural gas savings can be achieved in Ontario while avoiding sudden, large rate increases by aligning the timing of the costs and benefits of the programs.[24] By doing this, amortization brings the treatment of demand side resources closer to that of supply side resources, even if the full rate of return is not earned. We also believe that amortizing program expenses better aligns with general consumer preferences in which, for example, many homeowners choose the lower monthly payments of 30-year mortgages despite much higher total interest payments compared to 15-year mortgages[25]. We also recommend that shareholder performance incentives or penalties be kept separate, and that the amortization simply ensure the utility is made whole based on its debt costs. This eliminates compounding performance earnings over time resulting in higher costs to ratepayers and higher earnings than intended. It also can ensure Ontario maintains more consistency with current and past practice, as discussed in the next section.

We believe that amortization could be a good tool to enable program expansion, if that is desired, while minimizing short term rate impacts. Optimal recommends considering the following factors should amortization of natural gas conservation costs be implemented in Ontario:

- The **interest rate** can have a large impact on the success of amortization, as discussed above. This should be very low, as there is an extensive stakeholder process to develop, review and approve program budgets that are then approved by OEB. This process ensures an extremely low risk that program expenditures will not be recovered. Further, the amortized balance will be approved annually and become a regulatory asset, further ensuring security to any potential lender. We therefore recommend that this be set at the utility's cost of debt.
- The **loan term** set to a fixed number of years approximately representing the average measure life of a typical efficiency portfolio. Alternatively, a lower loan-term can be used, potentially as a compromise between those who want to amortize and those who want full annual cost recovery. Whichever approach is chosen, we recommend using the same loan term for all programs and sectors. This will yield a simple approach while best aligning program costs with program benefits. This can be adjusted for each plan cycle based on the planned portfolio, or fixed based on current plans, since it is unlikely to vary dramatically from one plan to the next.
- A single cost recovery approach (amortization or cost recovery) should be used for all programs and sectors to avoid the complexity involved in using different approaches for different programs.

[24] This statement is contingent on a desire to expand the programs. We would not recommend amortization without an accompanying expansion in the efficiency program goals and costs.

[25] According to the US Bureau of Labor Statistics (BLs), 60% of mortgages in the US have a loan-term of 30 years compared to 15% with a loan term of 15-years: https://www.bls.gov/opub/btn/volume-5/what-the-consumer-expenditure-survey-tells-us-about-mortgage-instruments-before-and-after-the-housing-collapse.htm

- The decision to move to an amortization structure should be informed by a full consideration of the variables above, but also by properly valuing the costs in the near and long-term. This is why it is important to use a net present value approach that applies a reasonable discount rate to efficiency costs so that they are appropriately valued in the analysis informing the decision regarding the appropriate cost recovery model.
- Approach the **performance incentive** separately from the cost recovery approach. The terms of amortization should be set to properly compensate the utility for the carrying costs of the related debt, but not to provide a rate of return. This has been done effectively in many jurisdictions with smaller and more controllable performance incentives that can be separately set. This eliminates compounding performance earnings over time resulting in higher costs to ratepayers and higher earnings than intended. It also can ensure Ontario more consistency with current and past practice, as discussed in the next section. The specifics of Ontario's current performance incentive are discussed more in the next section.
- **Lost Revenue** is a recurring annual expense and should not be amortized with the program costs. We believe this makes sense because lost revenue is simply redistributing costs that are already in rates and are thus naturally collected on an on-going basis otherwise. In addition, lost revenue balances will zero out every time a rate case happens, so it is better to stay continuously current with LRAM balances.

PERFORMANCE INCENTIVES

DISCUSSION OF PERFORMANCE INCENTIVE MODELS

There are typically three main aspects of utility compensation for energy efficiency programs. Program cost recovery, discussed above, reimburses the utility for direct program expenditures. Lost revenue recovery or decoupling helps remove the utility's inherent disincentive to efficiency investments caused by reduced sales. Performance incentives complete the picture by allowing utility shareholders to share in the savings from energy efficiency and earn a return, analogous to the return utilities typically earn on supply side investments. These can be treated as three separate things or combined in some fashion. For example, as discussed above, a performance incentive mechanism or other shareholder earnings mechanism can be directly integrated with program cost recovery.

Performance incentives have been shown to encourage senior management to focus on meeting and exceeding efficiency goals. A 2015 ACEEE report, for example, found that the U.S. states with performance incentives achieved electric savings of 0.9% of energy sales per year, compared to 0.5% for states without performance incentives. There are also cases of specific states' goals significantly increasing once performance incentives are implemented. Ameren Missouri's efficiency portfolio, for example, went from totaling about $70 million in spending over a three-year period to $145 million (with corresponding increases to savings goals), after a lost revenue recovery mechanism and a performance incentive were implemented.[26] There is much anecdotal evidence that the existence of performance incentives—even when relatively small—have a significant influence on utility management support for, and interest in, delivering aggressive efficiency programs and achieving exemplary outcomes.[27]

At this point, the need for performance incentives is widely recognized – at least 35 states have implemented some form of incentive mechanism for energy efficiency programs.[28] However, the specific details of the incentive mechanism matter a lot, and poorly designed mechanisms may encourage utility preferentially pursuing the cheapest opportunities, discourage efficient program spending, or incent utilities to underestimate potential savings during the planning process.

The rest of this section examines specific considerations that apply to good performance incentive design.

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[26] ACEEE. Beyond Carrots and Sticks: A National Review of Performance Incentives for Energy Efficiency. May 2015.

[27] Based on direct conversations with multiple investor-owned utility managers where performance incentives were adopted.

[28] ACEEE. Beyond Carrots and Sticks: A National Review of Performance Incentives for Energy Efficiency. May 2015.

Performance Based

While it is convenient to think about the level of financial reward in terms of a percent of program budgets, actual reward mechanisms where reward amounts are a function of spending or budgets at best fail to focus attention on the real purpose—performance—and at worst can create perverse incentives. For example, if tied to actual spending (as some PIs are, including most rate of return incentive mechanisms), the incentive can encourage the utility to be less cost efficient and spend more funds than may be necessary to increase rewards.

PIs should generally be tied directly to actual outcomes, and where possible avoid rewards for simply undertaking specific actions or spending money. Performance parameters should be objective, unambiguous, measurable, and verifiable (through EM&V procedures). Focusing on actions rather than performance can result in utilities doing things simply to achieve a PI, rather than focusing on maximizing the ultimate effects of any actions. For example, simply rewarding a utility for conducting a study, offering a trade ally seminar, etc. may encourage unnecessary actions, and removes the utility focus on ensuring any actions taken result in positive outcomes. Outcome-based metrics also allow program administrators a level of flexibility in determining the most appropriate actions that will lead to success rather than being committed to something that was originally planned but perhaps later determined to be less worthwhile.

In some cases, action-based metrics may be reasonable if the action is deemed important but is likely to undermine other performance earnings – for example, low-income spending may hurt a cost-efficiency metric, as low-income programs have a higher cost of saved energy but proceed due to its importance from a policy perspective. Another reason might be if there has been persistent failure by a utility to implement a specific action that regulators and stakeholders deem important. An example of the former could be when performance incentives may be largely tied to total savings or net benefits, but with a portion cut out for specific actions – such as a minimum spending level on low income (which will likely make it harder to reach savings performance goals with a fixed budget). However, even then, one can usually structure an analogous outcome-based metric, which is preferable. For example, rather than tying a metric to low-income spending, it can be based on low-income savings.

Level of Financial Reward

PI financial rewards should be structured to be sufficient to effectively motivate utilities, while striving to avoid higher than necessary costs to ratepayers. A key driver for performance incentives is to overcome the inherent disincentives that most investor-owned utilities have towards investing in efficiency. This is both because they almost universally earn a return on investments in supply-side infrastructure as an alternative to efficiency, and because once rates are set, a utility will maximize profits by increasing its sales. As a result, the level of available performance incentive must be set within the context of the overall regulatory structure the utility operates under. For example, a decoupled electric utility that is not vertically integrated and does not earn a return on generation equipment has much less disincentive to pursue efficiency and therefore may not need as high a level of earnings as a fully regulated vertically integrated utility with no decoupling or lost revenue recovery mechanism would.

Because Ontario allows for lost revenue recovery, this somewhat lessens the need for a high PI earnings level. However, a level sufficient to put efficiency on a relatively equal footing with alternative supply-side resources may still be important. This may not necessarily mean it should be set at exactly the utilities approved rate of return on its supply-side investments. In setting the level of incentives, one should consider the potential financial and regulatory risk to the utilities, as well as any relevant legislative or regulatory mandates. For example, jurisdictions with strong legislation mandating efficiency or aggressive energy efficiency portfolio standards may not need the same level of performance incentives as jurisdictions where no efficiency is required by law.

Actual incentive amounts vary widely by jurisdiction and have ranged from 3% to 40% of program budget.[29] In general, shared-savings style incentives, where the size of the incentive is based on a percent of the benefits of the program, have tended to give higher payouts (median of 19% of budget) than direct savings- or benefits-based incentives[30] (median of 8% of budget). However, the larger payout is not a necessary feature of shared-savings incentives and is likely based on perception; small percentages of net benefits can translate into large rewards in terms of program spending[31]. For example, in 2008, Texas changed the performance incentive amount from 20% of program cost to 10% of net benefits causing actual payments to double. Experience indicates that rewards in the range of 4-8% of total efficiency portfolio budgets have been sufficient to capture utility staff attention and provide a significant motivator and are common in New England where many of the leading U.S. States are located.[32] As is described in the best practices section, the incentives in the states with the most aggressive efficiency programs typically fall within this range, and in Vermont the incentives amount to only 3% of program spending.[33] However, Vermont's efficiency program provider is a non-profit energy efficiency utility that is distinct from the electric and gas utilities, and thus has no disincentives and does not require as high an incentive as IOUs. Some utilities have argued for much higher incentives, however there is little real-world indication that levels greater than 10% of total annual budget are necessary for effective motivation Similarly, imposition of penalties can often have a large motivating factor because utilities may view a penalty as more negative than failing to earn a reward.

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[29] While PIs should be dependent on performance outcomes, a convenient benchmark for considering the total potential PI earnings is as a percentage of planned budgets because budgets serve as a good proxy for the level of effort and likely benefits. The size of performance incentives by state can be seen in the table below.

[30] Benefits based incentives, described more below, provide performance incentives based on the net benefits calculated in a cost-benefit test. They have the advantage of rewarding cost-efficiency, as well as all activities that regulators have deemed to be important (since they are explicitly recognized in the approved test).

[31] Shared savings style incentives are discussed in much more detail below.

[32] The incentives of these states are described in more detail below and generally vary based on performance.

[33] Hayes, Sara, et al. Carrots for Utilities: Providing Financial Returns for Utility Investments in Energy Efficiency. ACEEE. January 2011.

Penalties vs. Awards

PIs can include both direct financial penalties and awards, and possibly other non-financial incentives.[34] Fundamentally, economic theory implies that penalties and awards can all be viewed the same way – the avoidance of paying a financial penalty can be seen as providing the same incentive as the opportunity of earning the corresponding amount, from a purely financial opportunity cost perspective. The regulatory and political environment will likely inform decisions about whether to offer a range of penalties and awards, or only one or the other. Despite economic theory, many utilities will see penalties as unfair, and can serve to undermine support for efficiency efforts.[35] Different stakeholders will have different views on this issue. Fundamentally, one must consider issues such as: if a utility spends all the budgeted ratepayer funds but fails to capture a reasonable amount of efficiency with it, should the shareholders be held responsible for some of this excess spending, or should ratepayers incur the full cost even though they did not receive the full benefit? Typically, full cost recovery of efficiency program expenditures is awarded to utilities unless clear evidence or imprudent action is uncovered. Therefore, regulators may decide that there should be some protection to ratepayers if utilities fall below some threshold level of performance. However, we also note that utilities tend to be risk averse, potentially stifling innovation, and tend to fight hard against the imposition of a penalty. This can risk undermining a utility's political support and cooperation for implementing any sort of efficiency program. Another factor is that utilities do not have to provide efficiency programs in all jurisdictions, including in Ontario, where natural gas conservation and efficiency program delivery is optional, but encouraged. Since one of the realized benefits of these incentives is to get buy-in from utility management to treat efficiency as a viable long-term investment, we do not recommend the imposition of penalties as part of a performance incentive mechanism. Most jurisdictions that have had penalties have given them up and shifted to awards-only PIs for this reason.

Scalable

As currently the case in Ontario, financial rewards or penalties should be scalable. In other words, the better the performance the higher the reward should be. A single target where a utility either achieves a reward or not can result in perverse incentives. For example, if a utility is overachieving and meets its annual goal for a reward early, they may relax and not continue to

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[34] For example, Illinois gas utilities (and formerly electric utilities too) face a requirement to make a financial contribution to the State low income heating assistance program (LIHEAP), and more significantly, a potential penalty of the State taking over delivery of EE programs if they fail to meet goals over a three year period. Legislation ILCS 5/8-104 (https://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=022000050K8-104#:~:text=8%2D104.,and%20indirect%20costs%20to%20consumers.)

[35] From a financial opportunity cost perspective, a utility should be indifferent between a dollar lost and a dollar gained. However, in actuality, it is likely utilities may respond more aggressively to avoid penalties than to earn awards simply because they perceive penalties as associated with failure, where awards are viewed as incentives for exceeding expectations.

There is also much psychological research that finds individual consumers are much more averse to penalties than lack of the same award. Of course, from a ratepayer perspective, penalties may be preferable because they reduce the cost of EE and provide some funds back if the utilities fail to capture the planned EE.

aggressively pursue even better performance. Similarly, if a utility realizes they will not be able to reach the target three months before the end of the PI period, they may decide not to try as hard to come close. Scalable rewards provide on-going incentives (often within a prescribed range of performance only) to strive for the best outcome regardless of likely final performance. It also is viewed as fundamentally fairer, lowering the risk to the utility. This lowered risk should be considered in the overall context of setting goals and levels of reward.

In scaling metrics, one should think about a starting (or threshold) level, a band within which rewards are scalable, and perhaps an upper cap on rewards. Below the threshold level a utility would earn no reward, or perhaps be exposed to a penalty. Threshold levels in recent PI mechanism have tended to range from 65% - 85% of planned performance goals. Typically scaling of rewards once a threshold level is reached is done in direct proportion to the performance outcome. However, more complex scaling methods can be used to, for example, more heavily weight exemplary performance beyond the design levels. For example, one might structure a PI mechanism so that outcomes up to the design performance goals result in relatively low rewards, with more generous rewards for utilities that exceed the design goals, as has been the structure of the Ontario DSM incentive. Note that some designs more heavily weight outcomes between a threshold and actual design targets to ensure a focus on a minimum level of performance, while minimizing possibilities of excessive ratepayer costs for unexpectedly high performance.

Many existing jurisdictions that rely solely on rewards rather than penalties will design PIs so the utility earns the target level of financial reward if they meet 100% of the design (planned) goals. However, some stakeholders perceive meeting the plans as relatively expected and would prefer to target most of the financial rewards for truly exemplary performance. How one sets targets and financial reward levels should be considered along with the considerations around current regulatory structure, efficiency mandates, aggressiveness of the goals and budgets, risk exposure to the program administrators, and other related issues.

One should also consider reward caps. In theory, with scalable metrics one might want to allow unlimited rewards for unlimited performance achievements. This generally will most consistently support goals in jurisdictions where the pursuit of all cost-effective efficiency is desired. However, unlimited rewards can present challenges in some regulatory structures by potentially permitting unlimited ratepayer contributions that cannot be planned and approved in advance. For this reason, many regulators cap the ultimate rewards, typically around 110%-150% of design level targets. The ultimate level of any cap imposed should be set in consideration of the stringency of the goals, the level of risk in meeting or exceeding them, the process by which goals are set and evaluated, whether budgets are capped (which can act as a constraint somewhat serving the same purpose), and the possibility of extraordinary overachievements.

Evaluation, Monitoring & Verification

While not specific to PI mechanisms *per se*, EM&V plays an important role in the development and administration of PIs. As mentioned above, performance metrics should be clear, objective, measurable and verifiable. For PIs to be effective and ensure ratepayers are protected, it is important that an independent process is used to objectively measure and verify final achievements and rewards, which for most metrics will be an evaluation role. While typically

utilities will self-report achievements, these reports should be based on independent evaluations, be transparent, and at a minimum undergo a detailed review and verification process to ensure accuracy and accountability, as is the case for the Ontario DSM performance incentives.

EM&V may also lead one to design a specific metric to remedy perceived poor performance (especially if there is a multiyear pattern of poor performance). For example, if evaluations consistently find that certain important market segments are not being reached, a specific metric to incent increasing that segments participation and/or savings may be warranted.

DISCUSSION OF PERFORMANCE INCENTIVE METRICS

Multivariate

Regulators and policymakers typically have numerous objectives and goals related to efficiency portfolios. Clearly one primary goal is achievement of cost-effective energy savings and societal net benefits. However, it is rarely the only policy objective. In addition, many objectives may create some tension — possibly pushing or pulling in opposite directions. For example, a single goal of maximizing energy savings can create a perverse incentive to "cream skim" by focusing only on those resources that are easiest and cheapest to capture. This can undermine other objectives such as to achieve deep and comprehensive savings in buildings; or market transformation in the future; or equity by focusing on low-income and hard-to-reach customers.

PIs should therefore be multivariate, and use several different metrics, with varying weights in terms of reward, to provide a comprehensive structure of reward and focus for utilities. Note that this is currently done in Ontario. The specifics of the Ontario PI are discussed in detail below. It is typical the highest weight is applied to a primary goal or goals, such as net savings or net benefits achieved. However, it is useful to have other metrics that provide some countervailing influences to protect against a singular focus and to encourage a comprehensive approach to efficiency portfolios that balance many important and potentially competing policy objectives. Effective PIs may typically have a large share of earnings on the few primary interests, with a handful of other metrics offering smaller earnings or penalties that *in toto* provide a balanced perspective.

In establishing PIs, the first step is to comprehensively consider the primary and secondary objectives of efficiency portfolios. In addition, it is important to identify where these objectives may be either: 1) correlated; 2) opposing; 3) reinforcing; or 4) independent. For example, dollar benefits and gas savings may be highly correlated because typical gas efficiency programs derive most benefits from the avoided energy costs. Therefore, while maximizing both the parameters may be important objectives, it may not make sense to have separate metrics and rewards for both. Alternatively, one may desire to focus on both, but should then consider the overall weight applied to them collectively when considering importance. On the other hand, opposing objectives such as capturing savings cheaply vs. capturing deep and comprehensive savings may both be important criteria. Therefore, focusing solely on one may result in perverse incentives that undermine the other.

While multiple metrics are worthwhile, too many metrics with small rewards can divert focus and increase risk to the utility unnecessarily. A balance should be achieved that ensures some

focus on important policy objectives, while maintaining simplicity and primary focus on the overarching objectives. Typically, a large portion of total award will be on the few primary objectives, with at most a handful of smaller ones with secondary objectives. Generally, even a small amount of funds can be tied to a secondary metric and still provide an appropriate influence simply by focusing utility attention on the issue.

Metrics Used

The first choice in designing a performance incentive mechanism is what metric or metrics will be used. The specific metrics used in specific other jurisdictions will be discussed later in the report, but the most common metrics are:

- **Annual Savings** – Program goals are typically expressed primarily in annual savings, making this a natural choice for a performance metric. However, it does not recognize the life of the savings, so that a short-lived cubic meters of natural gas saved from a home energy report program will get the same incentive as a cubic meter saved from insulation, even though the latter may last 20x longer. Further, it does not differentiate between types of measures or recognize costs, so it can encourage pursuit of only the least expensive measures ("cream skimming") and result in a lack of comprehensiveness.
- **Lifetime Savings – A lifetime savings metric** addresses a key problem with an annual savings metric, by giving more credit for longer lived measures. However, there are often other parameters besides lifetime savings that create benefits from efficiency, that are not addressed. For example, peak-day capacity savings may have significant value to the gas system. In addition, important policy objectives may be undermined by a sole focus on maximizing lifetime savings. For example, many jurisdictions prioritize investments in low-income customer efficiency. Because low-income programs tend to be some of the costliest per unit of savings, serving the low-income sector when there is a limited budget will likely reduce performance toward a lifetime savings goal.
- **Gross Benefits**[36] **–** Massachusetts has recently added gross benefits as a performance metric for all sectors and programs. Because lifetime savings and gross benefits are highly correlated, this approach can serve a similar function to a lifetime savings metrics, while still recognizing other benefits from efficiency programs. Other benefits could be related to gas capacity savings, other fuel savings, or non-energy benefits such as improved productivity or health and safety. However, a focus solely on gross benefits will still have some drawbacks because it does not provide a direct signal to ensure cost efficiency. In the event a utility is unlikely to fully expend the available budget

[36] Gross benefits are defined as the total lifetime benefits of the program, without netting out any program costs. It still accounts for free riders.

held constant for the duration of the performance measurement period (e.g., the approved period of Enbridge's DSM plan), since many fluctuations in future estimates of avoided costs are generally outside of the utility's control. Should the decision be made to update assumptions annually, we recommend that they are only updated on a prospective basis and not for the purpose of calculating performance incentives in the year the assumptions are updated. This allows the utility to make adjustments to its programs in response to new information, but holds targets and performance constant, as determined at the outset of the plan period.

- **Targeted policy-driven incentives** are incentives that directly encourage performance related to specific secondary policy objectives beyond direct savings or benefits. These can be most effective when they are promoting objectives that may be undermined by a primary savings or net benefits metric. For example, low-income programs tend to have low cost-effectiveness, and thus low-income spending tends to decrease portfolio net benefits (since the money could be spent on more cost-effective programs). However, robust low-income programs are typically a very important policy objective for efficiency portfolio. Setting an explicit incentive for this type of countervailing policy goal can significantly improve performance towards these types of policy goals.
- **Action-based incentives** are metrics to encourage specific actions that are believed to be important activities that will lead to improved programs and performance but are not strictly outcome based. For example, a requirement to conduct X builder trainings, or to spend a minimum amount of funds on low-income programs. While there are sometimes good reasons to use limited action-based metrics, it is generally preferred to design metrics that directly reward improved outcomes. This is because a utility can simply go through the motions of performing certain actions because of a metric even when it is not done well or is not likely to lead to improved outcomes because of changing circumstances.

Non-Programmatic Performance Metrics

Traditional performance metrics have been either based on the results of a specific set of utility-run programs (i.e., natural gas reductions), or actions taken as part of those programs (i.e., increase low-income spending) Some jurisdictions have begun exploring non-programmatic based metrics that are less concerned with determining how an outcome was achieved or whether it was directly and fully attributable to the utility actions. In a non-programmatic performance metric, a high-level, measurable policy goal that is partially independent of utility actions may be used as a metric– for example reducing the total gas sales of the system, the average energy intensity of residential customers, or utility related carbon emissions. These approaches tend to be similar to other, non-DSM performance-based ratemaking.

The primary appeal of non-programmatic metrics is that they express and incent achievement of actual policy goals, and in the process allow for much more program administrator flexibility and innovation, and often less reliance on EM&V or the need to determine attribution. For example, these metrics can allow for activities such as market transformation programs and working with municipalities to adapt stretch codes that are very difficult to evaluate and attribute as part of traditional program-based metrics. These metrics also have the potential to save on program planning, evaluation, and verification efforts, as ultimately program attribution does not matter if the high-level goals are met.

However, there are also significant challenges to non-programmatic performance metrics. Primarily, although the outcome itself may be easy to measure (total utility natural gas sales), the outcome is generally influenced by a wide variety of factors, many of which are outside of the utility's control. A counterfactual baseline can be constructed that uses regression to adjust the baseline according to a few key variables, such as Gross Domestic Product and heating degree days. However, many factors are inevitably left out. For example, say a utility has outcome-based goals to reduce energy intensity (Btus/sq. ft.) in the commercial sector. The Covid-19 pandemic, which has caused major shutdowns of offices and other indoor commercial spaces, would likely allow utilities to blow through their targets with minimal activity, and might be difficult to adjust for.

Further, setting targets and assuring cost effectiveness can be challenging with non-programmatic metrics. One recent example we're aware of is the New York electric utilities that have potential earnings based, not only on specific efficiency program performance, but on achieving an absolute reduction in territory-wide energy sales[37]. These outcomes are adjusted using agreed procedures for economic and customer growth, and weather. However, they cannot capture all exogenous impacts, and therefore incorporate a certain amount of luck in the final performance awards. For example, if there is a trend toward increasing purchases of energy intensive consumer electronics, that may undermine an award despite high program performance. New York mitigates this concern by using multiple metrics, with much of the earnings based on traditionally measured program performance to supplement the total sales metrics.

Pay for Performance Metrics

In the 2015-2020 DSM Framework, the OEB expressed its interest in exploring a "pay-for-performance" structure, in which "both budget recovery and shareholder incentive payments would be included in one single rate ($/m^3) and paid to the utility based on final net natural gas savings." This type of mechanism is very uncommon but was in place for Duke Energy in several states in the early 2010's, under the "Save-a-Watt" moniker.[38] As originally proposed, Duke would retain 90% of the gross benefits from efficiency as its entire revenue, to cover program expenses, lost revenue recovery, and shareholder incentives. While the program was never put

[37] See here for more information on the approved performance incentive mechanisms for New York Utilities: https://nyrevconnect.com/rev-briefings/track-two-rev-financial-mechanisms/

[38] Hayes, Sara, et al. Carrots for Utilities: Providing Financial Returns for Utility Investments in Energy Efficiency. ACEEE. January 2011.

in place, a modified version where Duke earned about 50% of benefits capped at a 15% return on program costs was adopted in Ohio and North Carolina. However, this approach was always very controversial, did not seem to lead to higher savings targets than in other territories with a traditional full cost recovery approach, and led to plans with a focus on peak demand savings, rather than energy savings (which may or may not be desirable). The states in question all seem to have transitioned to a performance incentive based on a smaller share of net benefits combined with traditional recovery of program costs.

This type of incentive and cost recovery has the advantage of providing some protection to ratepayers because under very poor performance they may not have to pay 100% of the program costs. With conventional full cost recovery of efficiency program costs, all prudent program expenditures are recovered regardless of actual performance, while with pay-for-performance, the utility shareholders would bear the risk of not fully recovering program costs under very poor performance. In theory, this should also encourage very aggressive utility program efforts, without the need for a long and involved stakeholder process to develop and approve plans. However, by shifting some risk from ratepayers to the utility shareholders it can lead to requiring a higher financial up-side reward to compensate for that risk, leading to less aggressive programs for the following reasons:

- There is a pronounced supply curve for energy efficiency measures, with some cheap measures, and other expensive but still cost-effective measures. A pay-for-performance model that sets the reimbursement at a rate required to incent the utilities to be comprehensive and pursue the more expensive measures will be overpaying for all the cheaper measures. There are likely ways to get around this issue, for example by setting tiered reimbursement rates, but these would create further complication. Alternatively, if the award is set too low, it all but ensures cream skimming.
- If, like the Duke program, the payment is structured as a percent of benefits, processes around developing avoided costs and attributing savings can become extremely contentious. For this reason, it may also be harder to implement things like market transformation or codes and standards programs, where it is extremely difficult to accurately estimate attribution.
- It is difficult to create a threshold mechanism, where the utility does not receive a return below a certain savings level.
- Since utilities are often very risk averse, shifting the risk of failure to the shareholders may cause them to favor smaller, less ambitious plans than in the standard model, where they know that program costs will be covered. Further, if budgets are capped, it creates a strong incentive to only pursue cream skimming.

Given these reasons, we do not believe that this type of model is this best approach for Ontario. Most of the theoretical benefit of the pay-for-performance approach (encouraging aggressive efficiency savings and the pursuit of all cost-effective efficiency possible) can be achieved through thoughtful design of more traditional performance incentive mechanisms.

JURISDICTIONAL ANALYSIS AND EXAMPLES

The table below shows a summary of performance incentives of some of the top gas saving jurisdictions in the US. We also qualitatively describe the incentive mechanisms below for IL, MA, and NY, which for Illinois only applies to electric utilities.

Table 6: Summary of Performance Incentives by Jurisdiction

Jurisdiction	Annual Savings % of sales	Metrics Used	Incentive Structure	Minimum Threshold to Receive Incentive	Maximum Amount
Michigan	1.47%	Mostly based on net savings. Other metrics vary by utility and may include # of LI customers, comprehensiveness (percent of saving from non-lighting), etc.	50% of incentive at 100% of target metric. Ramps linearly above 100% achievement.	Portfolio PAC ratio of at least 1.25 and 100% of metric	Lower of 30% of net benefits or 20% of spending
Minnesota	1.20%	Share of net benefits	Receive 6.25% of benefits at 0.7% savings as a % of sales. 0.75% additional share of net benefits for each 0.1% savings as a % of sales	0.7% savings as a % of sales	10% of net benefits at 1.2% savings as a % of sales, or 30% of program budgets, whichever is lower
Rhode Island	1.17%	Multi-variate, based on annual savings. RI will move towards using net benefits as the main metric in its upcoming planning cycle.	1.25% of spending at 75% threshold, linearly rising to 5% of spending at 100%, then to 6.25% at 125% of goal	75% of goal	6.25% of program budget
Massachusetts	1.12%	Net benefits (37%), Gross Benefits (59%), services to renters (4%)	Scales linearly from 75% of goal to 125% of goal	75% of goal	125% of goal or about 3.6% of program budget
California	1.01%	Lifetime Savings - Max 9% of spending; ex-ante savings - max 3% of spending; Codes & Standards involvement - 12% of C&S budget; non-resource involvement - 3% of non-resource (programs that don't directly save energy) budget	Scales linearly with savings	No Specified Threshold	See limits under incentive Structures
District of Columbia	0.78%	Savings, Low Income, Jobs, Leverage external funds	Each metric evaluated on a sliding scale for a multi-year period, and includes a penalty	No Specified Threshold	See limits under incentive Structures
Utah	0.71%	No separate incentive. However, Rocky Mountain Power can earn rate of return on program expenses	n/a	n/a	n/a
New York	0.68%	Multi-variate. Described more below.	Varies by metric	Varies by metric	100 basis points of allowed return on equity

Jurisdiction	Annual Savings % of sales	Metrics Used	Incentive Structure	Minimum Threshold to Receive Incentive	Maximum Amount
Arkansas	0.63%	Share of net benefits	10% of portfolio net benefits	80% of savings goal	8% of program budget
Connecticut	0.49%	Multivariate, including savings and net benefits	2% of budget at 75% of target, scaling linearly to 8% of budget at 135% of target	75% of goal	8% of program budget
New Jersey	0.29%[39]	Verified Savings	Linearly increase ROR between 110% of goal to 50 basis points higher than base at 150% of goal. Linearly decrease ROR from 90% of goal to 200 basis points lower than base at 50% of goal.	110% of goal for incentive, 90% of goal for penalty	Maximum incentive of 50 basis points; maximum penalty of 200 basis points
Illinois	0.40% [40] (Gas)	Verified Savings (Electric Only)	Adjusts the allowed rate of return on program expenditures based on program performance (Electric Only)	Penalty at less than 100% of goal, award at more than 100% of goal (Electric Only)	200 basis points (Electric Only)
Ontario	0.41%[41]	Multi-variate. Described more below.	Each metric is scored on a sliding scale. Total incentive is determined based on pre-determined weighting of metrics. Described more below.	75% of goal for each metric.	Fixed in advance regardless of spending and saving goals.

[39] In 2018 NJ passed legislation requiring utilities to ramp up to all cost effective. The BPU has since released an order mandating gas utilities ramp up to 0.5% by the second program year and 1.1% of sales by the fourth program year.

[40] This is for gas utilities. However, Illinois currently only has PI for electric utilities.

[41] 2020 Canadian Provincial Energy Efficiency Scorecard. James Gaede, Brendan Haley, and Madeleine Chauvin. https://www.scorecard.efficiencycanada.org/wp-content/uploads/2020/11/2020-Provincial-Energy-Efficiency-Scorecard.pdf

New York

New York State's experience with performance incentives is illuminating for several reasons. New York originally implemented a performance incentive mechanism for the 2009-2011 program cycle that included both an incentive for exceeding the goal as well as a penalty for underperformance. The penalty, however, had significant unintended consequences; instead of encouraging utilities to pursue aggressive efficiency targets, it created a high degree of risk aversion, as well as an extremely contentious relationship with the regulators as the utilities argued, somewhat fairly, that at least part of the underperformance was caused by the Department of Public Service's failure to approve program plans in a timely manner. Penalties were officially removed for the next 2012-2015 program cycle, but the experience remains a good warning on the possible negative impacts of imposing a penalty, even if in theory it should be economically similar to an incentive.

More recently, New York has adjusted the performance incentive design to align with the state's ambitious vision to transform the way energy is produced, bought, and sold in New York. As part of this initiative, utilities can receive an additional rate of return on spending, up to 100 basis points, for achieving a mix of programmatic and non-programmatic metrics, known as earnings adjustment mechanisms (EAMs). EAMS vary by utility, but for Central Hudson include:

Electric EAMS

- System Efficiency
  - Component for Peak Reduction
  - Component for MWh from distributed energy resources (DERs)
- Electric Energy Efficiency
  - Component for total MWh savings. As a precondition, the weighted average measure life of portfolio must be 90% of the current average measure life of NY utilities of 7.9 years. The maximum incentive scales linearly with measure life until it reaches Central Hudson's current life of 10 years.
  - Component for reducing the energy intensity of residential customers per household
  - Component for reducing the energy intensity of commercial customers per sq. ft.
- Customer Engagement – percentage of customers that sign up for Time of Use Rates
- Environmentally Beneficial Electrification – lifetime avoided carbon from beneficial electrification such as conversions from fossil fuel to heat pumps and electric vehicles
- Interconnection – Policies to facilitate the timely interconnection of DERs

Gas EAMS

- Total Gas Savings. As a precondition, the weighted average measure life of the portfolio each year must be at least 90% of its historical life of 9.4 years.

Company earns a linearly prorated share of incentive up to 100% at a life of 10.4 years.

The New York Performance Incentive Mechanism is innovative in that 1) it is the only jurisdiction that uses a multivariate approach to an incentive mechanism that works by boosting the allowed rate of return on program investments, and 2) it experiments with non-programmatic metrics such as reducing the absolute energy intensity of its customers. While NY attempts to control for some known non-program influences in calculating these metrics, it does have the problems discussed above in the section on non-programmatic metrics.

Massachusetts

Massachusetts' performance incentives are set at the beginning of each three-year program cycle. While estimated annual incentive payments are given, the targets are true three-year targets – in the end, it is only the full cumulative performance that matters, with any true ups necessary in year three. Gas incentives for the 2019-2021 program cycle are based on:

- Value (net benefits) - $8.47 million (total planned net benefits of ~$1.3 billion)
- Savings (gross benefits) - $13.53 million (total planned gross benefits of ~$2.3 billion)
- Renter (efficiency in rented buildings) - $1 million

Incentives are disbursed on a performance incentive dollar per planned portfolio benefit, starting at a threshold of 75% of the savings goal and scaling linearly until an exemplary level of 125% of goal. At 125% of goal, utilities also receive 125% of the design incentive. The dollar values above give the design incentive levels. At 125% of goal, these incentives increase by 25%. This maximum incentive level represents about 3.6% of budgeted spending for the three years. The renter's component was added for this program cycle after years of unsuccessfully trying to improve savings in this market segment. While Massachusetts has some of the highest efficiency savings in the country, we are unclear on the value of using both net benefits and gross benefits for the saving metrics, which seems redundant. We suggest using a single metric of net benefits which would include both overall savings and cost efficiency (since increasing savings and decreasing spending both increase net benefits, and with a fixed approved budget the only method for maximizing net benefits is to maximize gross benefits).

Illinois

Illinois only provides PIs for the two electric IOUs currently. The structure of Illinois's performance incentive mechanism is outlined in SB 2814, the Future Energy Jobs Bill, passed in 2016. The bill requires efficiency program expenses to be amortized over a period equal to the weighted average measure life of each utility's portfolio of programs. Amortized balances earn a return equal the base utility rate of return, with increases of decreases of up to 200 basis points for over or under performance, respectively. The rate of return adjustment is based on a third-party verified savings of the utilities' efficiency portfolio and applies to the entire unamortized

balance of program costs from that program year and all previous years. The structure itself is fairly complicated and varies by year, but is shown in the table below:[42]

Table 7: Return on Equity PI for Illinois

Utility	% of goal achieved	ROE	% of goal achieved	ROE
	2018–25		2026–30	
ComEd	≤75%	Minus 200 basis points	≤ 66%	Minus 200 basis points
	More than 75%, less than 100%	Minus 8 basis points per % below goal	More than 66%, less than 100%	Minus 8 basis points per % below goal
	100% or more, less than 125%	Plus 8 basis points per % above goal	100% or more, less than 134%	Plus 8 basis points per % above goal
	≥125%	Plus 200 basis points	≥ 134%	Plus 200 basis points
Ameren	≤ 84.4%	Minus 8 basis points per % below goal	<100%	Minus 6 basis points per % below goal
	More than 84.4%, but less than 100%	No change in basis points	100%	No change in basis points
	≥100%	Plus 8 basis points per % above goal	>100%	Plus 6 basis points per % above goals

Basis point reductions and increases are capped at 200 in all cases presented above.

ONTARIO PERFORMANCE INCENTIVE

Enbridge Gas's Proposed Performance Incentive

Incentive Mechanism

Enbridge Gas has proposed a performance incentive mechanism for its 2023-2027 DSM plan that uses a three-pronged approach. About 60% of the overall award is allocated to annual scorecards. This is similar to the mechanism in the past – each of several scorecard categories has several target metrics with target goals and a specific allocation of the total incentive. Enbridge Gas has also proposes shifting away from net lifetime savings to net annual savings for the primary natural gas savings metric. Enbridge Gas's proposed scorecard for 2023 is shown in Table 8.

[42] ACEEE. Snapshot of Energy Efficiency Performance Incentives for Electric Utilities. December 2018. Note that the chart indicates no limit to Ameren potential penalties or earnings. However, they are also capped at no more than 200 basis points as they are for ComEd.

Table 8: Annual Scorecard for 2023

2023 Annual Scorecards	Offering(s)	Metric	Metric Weight	DSMI Allocation	DSMI below 50% Score	DSMI at 100% Score	DSMI at 150% Score
Residential Program	Residential Whole Home Residential Single Measure Residential Smart Home	Net Annual Gas Savings (m^3)	100%	22.0%	$0	$1,458,600	$2,917,200
Low Income Program	Home Winterproofing	Single Family Net Annual Gas Savings (m^3)	50%	22.0%	$0	$1,458,600	$2,917,200
	Affordable Housing Multi-Residential	Multi-Residential Net Annual Gas Savings (m^3)	50%				
Commercial Program	Commercial Custom Prescriptive Downstream Direct Install Prescriptive Midstream	Large Customer Net Annual Gas Savings (m^3) [1]	50%	22.0%	$0	$1,458,600	$2,917,200
		Small Customer Net Annual Gas Savings (m^3) [1]	50%				
Industrial Program	Industrial Custom	Net Annual Gas Savings (m^3)	100%	22.0%	$0	$1,458,600	$2,917,200
Large Volume Program	Direct Access	Net Annual Gas Savings (m^3)	100%	3.0%	$0	$198,900	$397,800
Energy Performance Program	Whole Building Pay For Performance (P4P)	Number of Participants (P4P)[2]	100%	1.0%	$0	$66,300	$132,600
		Net Annual Gas Savings (m^3) [2]	0%				
Building Beyond Code Program	Residential Savings by Design	Number of Energy Star Homes[3]	30%	8.0%	$0	$530,400	$1,060,800
		Number of Net Zero Ready Homes[3]	0%				
	Commercial Savings by Design	Number of Participants	30%				
	Affordable Housing Savings By Design	Number of Participants	30%				
	Commercial Air Tightness Testing	Number of Participants	5%				
		Number of Qualified Agents	5%				
		Total	**100%**	**$0**	**$6,630,000**	**$13,260,000**	

1. Large commercial customers have a three year average annual consumption greater than/or equal to 100,000 m3/yr. Small commercial customers have a three year average annual consumption below 100,000 m3/yr.
2. Whole Building P4P metrics are weighted 50/50% except for year 1 (2023) which is 100/0% as no savings measured until year 2.
3. Residential SBD metrics are weighted 50/50% except for year 1 (2023) which is 100/0% as no Net Zero building until year 2.

Each scorecard can have several metrics, each with their own weighting. For example, there is a max performance incentive for the Low-Income Program of $2.92 million, but this is determined by a combination of savings from single family homes and multi-family homes. Each scorecard starts earning at 50%[43] of goal and scales linearly to 150% of goal, so that when the program is achieving the goal, it earns 50% of the maximum incentive. Note that an individual scorecard cannot earn more than the maximum incentive for that scorecard, but that a metric within a scorecard can continue scaling to 200% of the goal to compensate for possible underperformance of another metric within the scorecard. For example, the total low-income

[43] Note that this is a change from the former performance scorecards approved by the OEB for the 2015-2020 DSM plans which earning didn't start until 75% of a goal was reached.

earnings will max out at $2.92 million for 2022, at 150% of the savings target. However, if Enbridge Gas achieves 200% of the target in single-family buildings and only 100% in multi-family building, Enbridge Gas will still earn the full $2.92 million.

In addition, about 30% of the total incentive is dedicated to a shared net benefit mechanism. This portion of the incentive is also determined annually and is based on the schedule shown in Table 9 below.

Table 9: Net Benefits Shared Savings Schedule

Net Benefit Range	Percentage of Net Benefits Shared
$0 - $100 million	0.00%
$100 - $200 million	1.00%
$200 - $300 million	1.25%
$300 - $400 million	1.50%
$400 - $500 million	2.00%
$500+ million	2.50%

Under this mechanism, Enbridge Gas does not get anything for the first $100 million in net benefits, calculated using the total resource-plus cost test, gets 1% of benefits for the next $100 million, and so on. There are $372.3 million net benefits forecasted for 2023, meaning that Enbridge Gas would start earning at an achievement of 27% of the savings goal.

In addition to the annual scorecards and shared net benefits mechanisms that are calculated annually, Enbridge Gas proposes two long-term metrics, which are awarded based on multi-year achievements. Five percent (5%) of the maximum incentive will be allocated to annual GHG reduction targets as shown in Table 10 below.

Table 10: Long Term GHG Reduction Incentive Schedule

Long Term GHG Reduction DSMI Scenario Analysis			
	Achieve Less than 100% Target	Achieve 100% of Target	Achieve Greater than 100% Target
Sum of 2023-2027 Gross Annual GHG Reduction Achievement		2,616,351	
Long Term (Five-Year) GHG DSMI Earned	**$0**	**$5,000,000**	**$5,000,000**

This metric is calculated over the full 5-year term and is a binary outcome – either the full incentive is awarded or none of it is. The target goal for tonnes of GHG emissions is calculated by taking the target first-year gross annual savings, multiplying by 5 (to reflect the 5 years of the program term), and then multiplying by 1.15. This 1.15 multiplier is represented as a "stretch" factor; however, since it's based on gross savings while the annual scorecards are based on net savings, it's likely that this metric will be significantly easier to achieve than the annual savings metrics.

The other long-term metric is based on the Low Carbon Transition Program and makes up about 1% of the maximum incentive. It is calculated similarly to the annual scorecard metrics but is awarded every three years as opposed to every year. Table 10 below shows the proposed incentive structure. As seen, the proposed metrics for this program focuses on number of installations and contractor trainings, as opposed to any savings targets.

Table 11: Low-Carbon Transition Scorecard

2023-2024 Long Term Scorecard	Offering(s)	Metric	Metric Weighting	DSMI below 50% Score	DSMI at 100% Score	DSMI at 150% Score
Low Carbon Transition Program	Residential Low Carbon	Number of Installations (Residential Heat Pumps)	25%	$0	$400,000	$800,000
		Number of Contractors Trained (Residential Heat Pumps)	25%			
	Commercial Low Carbon	Number of Installations (Commercial Heat Pumps)	25%			
		Number of Engineers Trained (Commercial Heat Pumps)	25%			

1. Low Carbon Transition Programs for 2025-2027 to be reassessed at the mid-point assessment.

Target Adjustment Mechanism

Enbridge Gas's plan does not contain any discrete savings targets beyond the first year of programs. Instead, Enbridge Gas proposes to use a Target Adjustment Mechanism (TAM) to determine targets of future years based on the actual performance of the previous year. Basically, the actual cost to achieve ($/m^3) in year one would be multiplied by the total year two budget to determine the savings targets for the PI in year two. In addition, there is also a 2% efficiency factor to reflect the idea that efficiency acquisition should become more efficient over time, and a 2% inflation factor to reflect higher costs over time. In practice, these two factors largely cancel each other out. The exact proposed formula is shown below:

$$Savings\ Metric_{Year\ 2} = \left(\frac{Spend_{Year\ 1}}{Savings_{Year\ 1}} \times Spend_{Year\ 2} \times Productivity\right) \Big/ Inflation$$

Where year 1 spend and savings is the audited achievement in the given year, year 2 spend is the planned budget for the upcoming year, productivity is a 2% factor to drive efficiencies in program delivery, and inflation is used to adjust for declining spending power of a dollar over time. If inflation rate is 2% for a year, both the productivity and inflation factor would be 1.02.

The TAM would be used to set goals for the 2024-2027, but Enbridge Gas's application does have proposed targets for 2023. However, the plan also caveats several reasons why these first year targets may be adjusted:

- Changes in Technical Resource Manual input assumptions
- Changes in codes and standards
- Changes in net-to-gross ratios

- Finalization of assumptions from new prescriptive measures that have not yet been vetted by the Evaluation Contractor.
- Any specific changes in inputs or adjustments factors that are made through the course of the application approval process.

PERFORMANCE INCENTIVE CONCLUSIONS AND RECOMMENDED CONSIDERATIONS

As a result of this review, we have several recommendations that could significantly simplify Ontario's DSM performance incentive mechanism and more closely align utility incentives with the OEB's policy objectives of lowering natural gas usage, reducing GHG emissions, and creating opportunities to defer supply side investments. This section goes over the key design aspects of Ontario's PI and discusses any recommendations for improvement.

Multi-Year Performance Cycle

While Ontario utilities currently create multi-year spending and savings plans, they still need to establish annual targets, and performance incentives are determined based on the achievement compared to the annual targets in each year independently. We recommend moving from the proposed annual targets and metrics approach to a true multi-year approach, where budgets and targets are cumulative for the full 5-year plan period, and the performance incentive is ultimately determined based on the Enbridge Gas's performance towards achievement of the end-of-term targets. This should give more opportunity to ramp up new programs, test new measures, and respond to changing market conditions. In addition, it avoids the arbitrary barriers associated with whether a project is completed in December of one year or January of the next and eliminates perverse incentives to overspend if limited in ability to carry over funds. Finally, it affords the utility the opportunity and incentive to make up for any shortfalls in performance in one year with more aggressive efforts.

This approach is used in Massachusetts and is now being adopted in Rhode Island and New Hampshire which are both moving away from annual awards.[44],[45],[46] Under this approach, utilities should still have annual budgets and target milestones, but be allowed to make up for shortfalls in one year in a future year. We recommend that annual milestones be incorporated into this approach. Anticipated earnings still be calculated each year, possibly based on the estimated and reported (and potentially unverified or evaluated) performance, and fully built into the efficiency surcharges (SBC), or rate riders following the clearance of DSM deferral and variance account proceedings, going forward for the next year. Savings verifications could still happen annually, especially for programs with uncertain estimates, but could also be reduced for well-established programs, particularly where the verification process does not entail significant site visits. This would be based on the first-year annual achievement compared to the first-year annual targets. Then, in subsequent years, it can be estimated based on cumulative progress to date, incorporating any true up necessary. In that way, most of the appropriate PI earnings will still be accounted for and collected from ratepayers on an annual basis, with simply a final true up in the final year of any over or under collections based on verified results.

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[44] For specifics of Massachusetts's latest Performance incentive, see the 2019-2021 term sheet: https://ma-eeac.org/wp-content/uploads/Term-Sheet-10-19-18-Final.pdf

[45] For specifics of Rhode Island RI, see their latest program plan, page 97:

[46] For the specifics of New Hampshire, see their latest program plan, page 211: https://www.puc.nh.gov/Regulatory/Docketbk/2020/20-092/INITIAL%20FILING%20-%20PETITION/20-092_2020-09-01_NHUTILITIES_EE_PLAN.PDF

Target Adjustment Mechanism

We are not aware of any other jurisdictions that set targets for the performance incentive based on actual performance of a previous year as opposed to in advance based on some form of stakeholder and/or regulatory process. The potential practical result of Enbridge Gas's proposed approach would be that the amount of Enbridge Gas's award could bounce around significantly from year to year. For example, if Enbridge Gas has an exemplary performance in year 1, achieves 150% of the target and earns the full available incentive, then in the next year Enbridge Gas would need to achieve 225% in order to achieve the full incentive (150% * 150%). Likewise, if Enbridge Gas does not perform well and only reaches 50% of target in year 1, they would only need to reach 75% of the year 1 target in order to earn the full incentive in year 2 (50% * 150%). This will likely create short term swings in the PI amount, since low performance makes achieving incentive in future years easier, while high performance may make achieving incentive in future years more difficult. It also creates a confusing set of signals for Enbridge Gas, as more savings will increase the incentive in the given year, but also make it more difficult to achieve in the next year. If Enbridge Gas is already performing well below target, for example, this approach would encourage them to do as poorly as possible to make it as easy as possible to earn the incentive in the next year. Further, there is a possibility that Enbridge Gas's performance could steadily decline, for example decreasing 10% per year. In this case, Enbridge Gas would earn a significant incentive (40% of max), for all 6 years of the program plan, but the year 6 savings target would be only 50% of the year 1 savings target. This is in fact what has been happening, based on the 2016-2020 evaluation results[47].

Consistent with our recommendation above regarding the multi-year performance cycle, we recommend considering that instead of the proposed Target Adjustment Mechanism, structure the performance incentive as a true 5-year target with annual milestones and a true-up process in the final year. This is what is done in most jurisdictions that use multi-year efficiency plans and would create a more intuitive PI structure, where consistent performance yields a consistent performance incentive amount. We do recognize that five years is a long program period over which a lot can change, impacting the cost to achieve of efficiency programs. In recognition of this fact, we recommend a process to allow updates, or midterm modifications, of the targets during the 2023-2027 term. This would be a stakeholder/regulatory process resembling a streamlined version of the process used to approve the current application. Enbridge Gas has proposed something along these lines in its application, called a mid-point assessment.[48] This approach would still allow for some flexibility in changing targets in the middle of the program period but would avoid a situation where the difficulty of earning an incentive bounces around significantly from year to year.

If this approach is not taken, we at least recommend creating a minimum value which the target cannot fall below. To avoid the case described below where the incentive targets decrease significantly from a string of slight underperformances, this minimum value should be based on the first-year target, and not be dependent on performance of future years. For example, a

[47] https://www.oeb.ca/industry/policy-initiatives-and-consultations/natural-gas-demand-side-management-dsm-evaluation

[48] Exhibit D, Tab 1, Schedule 1, p. 5

minimum future target 75% of the 2023 savings target. This would also avoid any case where there is zero performance in a year, which would result in the TAM formula producing a target of zero for the following year.

As outlined above, although 2023 savings targets are fixed in Enbridge Gas's application, these are still subject to updates based on evaluation results. In general, this approach allows program administrators to avoid having to modify their incentive structure and program design in response to changes in net-to-gross ratios and other savings factors. Even though the savings and spending goals in a program plan are typically built based on some assumption on the uptake of various measures, this is a rough prediction and in practice actual results vary widely from the assumption in the program plan, even when the cost and savings targets are still met. If the performance scorecards and TAM are maintained, we recommend that no updates to savings targets be made in response to information from the OEB's EM&V process. If a study finds a high net-to-gross ratio for a certain measure, the administrator should be forced to respond to this by de-emphasizing this measure and re-emphasizing other measures that still achieve high savings. If the PI target is automatically updated, the administrator can still meet target by continuing to promote significant numbers of the measure, despite low net savings. If, during the course of the first two years of the multi-year plan, Enbridge Gas is of the view that new evaluation results or changing market conditions have made it unreasonable to hit established targets, we suggest that they formally propose updated targets as part of the mid-term modification process described above.

Choice of metrics

We agree with the multi-variate method and think it should remain in place regardless of whether amortization is used for cost recovery. However, the current scorecard approach is unnecessarily complex and could be significantly simplified. We recommend simplifying the performance incentive structure using a main metric based on net benefits for 70% of the incentive amount. Specifically, we recommend adapting PAC net benefits, plus carbon, to avoid the potentially contentious challenges of estimating participant costs and benefits as can be the case when using TRC-Plus net benefits[49]. While this diverges from a pure focus on gas savings in physical units, we believe net benefits is a better and more comprehensive approach. Gas savings will produce the vast majority of benefits, so the two are highly correlated, and it still directly provides the incentive to maximize savings. However, it also ensures utilities value such things as cost efficiency, capacity benefits, and longevity of savings. Further, it inherently weights all the different areas of benefits in proportion to their overall value to the Ontario economy and ratepayers.

However, should the OEB determine it appropriate to maintain the performance scorecards and natural gas savings metrics, we recommend maintaining net lifetime natural gas savings as a metric. Enbridge Gas has proposed all savings targets as net annual savings. This is different

[49] Participant costs can be difficult and contentious to track, since this is not generally data collected by the program and thus needs to be estimated based on technical resources and other secondary sources. On the benefit side, many argue that EE technology produces many benefits to the customer beyond avoided costs (comfort, aesthetics, etc.) which policy makers cannot easily estimate.

than past program year targets, which have been based on lifetime net savings. Enbridge explains in its interrogatory responses that it proposed changing the scorecard since they added a net benefits incentive that captures measure life, that annual savings is simpler, and since they already promote longer life measures. However, under the proposed incentive structure, twice the award is allocated to annual savings compared to net benefits. Further, we do not think that lifetime savings is a complicated concept, especially compared to the complexity of how the scorecard works overall. The fact Enbridge already promotes a measure mix that includes long-life measures just means that it should be ok to set up an incentive structure that reflects this reality. We therefore still recommend using lifetime savings over annual savings. We also recommend that the OEB fix the avoided cost assumptions that are used in plan development for the duration of the plan, or update the target to account for changes in avoided costs beyond Enbridge Gas's control. This way, the utility will not be rewarded or punished for increases or decreases in avoided costs that they cannot do anything about. This also mitigates any controversy of new avoided cost estimates.

If our recommendation to assign 70% of the overall performance incentive to a net benefit target is accepted, we recommend that the remaining 30% of the overall performance incentive be allocated to a limited number of up to five "countervailing metrics" that are independent or actively harmful to net benefits, or simply align with critical policy goals. These metrics could include comprehensiveness of savings (i.e., portion of participants installing multiple measures, etc.), peak day reduction in supply constrained areas, percent of savings among low income or other hard to reach customers, participation among specific hard-to-reach sub segments, etc. Under this design, the net benefits goal would ensure proper incentives to get as much savings as efficiently as possible, while the 30% reserved for other metrics allows the OEB and other stakeholders to guard against any perverse incentives such as only pursuing cheap and easy measures, and to set more specific or action-based goals in response to particular and persistent problems or policy objectives.

Additionally, it does not appear that the GHG Reduction Incentive adds any value, given that it's just the annual savings converted to an emissions reduction amount using a fixed emissions factor. This seems to duplicate the existing metrics for annual savings, and is in fact easier to achieve, since the GHG goal is based on gross savings. We recommend considering eliminating this metric in order to reduce unnecessary complexity and duplication with a focus on achievement of greater net benefits overall.

Further, it appears that Savings by Design and the Low Carbon Transition programs have no explicit natural gas savings targets and are simply assessed based on participation and trainings. As efficiency programs, the primary incentive metric should still be net savings. We recommend that Enbridge Gas propose natural gas savings metrics for these two programs to allow the OEB and stakeholders assurance that these programs are contributing to the overall objectives of DSM.

Threshold and Cap

Enbridge Gas has proposed the performance incentive earning threshold to be set at 50% of each scorecard target, significantly lower than the thresholds established in other jurisdictions.

This is also a change from previous program years, where the OEB approved a starting threshold for legacy Enbridge Gas and legacy Union of 75% of target, a level much more consistent with common practice. It is unclear why Enbridge Gas proposed this change, and we would recommend keeping the previously OEB-approved threshold for earnings at 75% of the target. Further, most PI designs give utilities a relative windfall incentive when the threshold is reached, for example giving 75% of the target incentive amount immediately upon reaching 75% of target. In Ontario, in contrast, the program administrators only begin accruing incentive dollars once the savings threshold is crossed. We believe this approach has advantages and recommend maintaining this provision, as it provides a much stronger incentive to continue to increase savings once the threshold is crossed and provides greater protection to ratepayers.

The performance incentive in Ontario stops increasing at a cap of 150% of the goal. While this is a higher cap than that seen in a lot of other jurisdictions, it may be appropriate given the relatively high maximum incentive of around 15% of spending. However, this incentive cap, combined with the fact that the maximum incentive is independent of the proposed program budget, creates a strong incentive for the utility to propose low goals. Should the current performance incentive structure remain largely unchanged, we recommend considering lowering the maximum incentive to 110%-125% of the target, and the scaling be structured so that a greater portion of the maximum is earned at 100% of the target, assuming the 100% target is appropriately challenging.

Additionally, Enbridge Gas proposes to start earning on its proposed net benefits performance incentive when savings reach 27% of target achievement. This does not represent good performance, and there is no reason Enbridge Gas should earn a shareholder incentive at these savings levels. More generally, it is unclear why the net benefits metric should be calculated differently than the scorecard metrics. We recommend that the net benefits incentive, if maintained, be structured more simply and similar to other scorecards, where earnings begin at a threshold percent of a target of net benefits and scale as the net benefits approach and pass the target.

Incentive Amount

As discussed above, the incentive amount is not driven by the spending, savings, or net benefits targets, but set in advance of the cycle via an order by the OEB. In the 2015-2020 cycle, this has equated to a maximum incentive of about 15% of program spending. This is high compared to many other leading jurisdictions, and high compared to the gas utilities' typical rate of return it can earn on supply-side infrastructure investments. However, this level of incentive is only achieved at an extremely high performance of 150% of target. That said, we do not believe that setting a fixed maximum incentive in advance with no relation to planned spending or savings is an effective way to reduce the utilities' incentive to game the planned spending and savings, as utilities still have the incentive to overestimate the unit cost of savings in order to maximize their chances of exceeding goals and earning the full incentive. While this perverse incentive is not worse than other practices in other jurisdictions, the fixed incentive amount does not fully eliminate it. Further, with fixed performance incentive amounts, lower budgets equate to higher return on investment for utilities giving extra incentive to propose low budgets and low savings. Obviously, that is an unrealistic example, but more generally there is no way to assure

that an incentive amount that is set before the spending and savings are known represents a reasonable share of net benefits from the energy efficiency programs. Note that this perverse incentive may not be that bad, given a reasonable stakeholder process to help set the budgets and goals for the plan. In fact, it does not seem to be the case that goals in Ontario are set unreasonably low – although a significant maximum incentive is available, neither legacy utility has come close to achieving it over the 2015-2020 term.

In order to eliminate utility incentives to overestimate budget and/or underestimate savings, we recommend considering establishing the overall incentive amount as a percent of net benefits, in advance of the planning process. This way, while higher proposed savings (and/or lower budgets) in the efficiency plan would still make it harder to achieve or exceed the full target incentive, it would also increase the overall pot of money available for earnings. In effect, while the incentive for the utility to propose a plan overestimating costs and underestimating savings may still remain, this would also create a countervailing incentive to decrease planned budget and increase planned savings in order to maximize the total available shareholder incentive. While ultimately approval of plans is up to the OEB in any case, we believe this tension provides a good check on the utilities and encourages them to strive for maximum, but realistically achievable, goals.

To ensure that this is a reasonable return on program spending, the OEB could determine the percentage of net benefits to be assigned to the performance incentive by considering a reasonable cost of saved energy and the desired utility return on its overall DSM investment and effort. For illustrative purposes, if the OEB thinks that reasonably aggressive programs could achieve savings at an average of $10/CCM, each CCM result in $20 in net benefits, and the OEB wants to target a 15% return program spending for the maximum incentive, then the OEB could set the incentive amount at:

$$\frac{\frac{\$10}{MCF} * 15\%}{\$20} = 7.5\% \; of \; net \; benefits$$

This method of setting the incentive amount will help mitigate the perverse utility planning incentives as discussed above, while ensuring that the total award is not overly generous. Note that this is not a shared savings or pay-for-performance approach, in which a portion of the realized net benefits from the program is shared with utility shareholders. Rather, this proposes using the shared savings calculated from the program plan (not the actual results) to set the size of the maximum incentive. The portion of the maximum incentive earned by the utility would still be determined by the multi-variate metric calculations and achievements described above.

Optimal ENERGY *Integrated Energy Resources*

Review and Comparison of Enbridge Gas Inc.'s Proposed 2023-2027 Natural Gas Demand Side Management Programs

Prepared for

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by:

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EXECUTIVE SUMMARY

This report examines Enbridge Gas Inc.'s (Enbridge Gas) proposed 2023-2027 portfolio of natural gas efficiency programs (referred to as demand side management (DSM) programs in Ontario) and compares it to that of other North American program administrators. To do this, we took a double pronged approach. First, we compared Enbridge Gas's sector level metrics (cost and depth of savings) to efficiency programs run by National Grid in Rhode Island, Ameren in Illinois, and Centerpoint in Minnesota. Secondly, we performed a broad-based review of programs in other jurisdictions to identify any new programs or qualitative design elements (such as marketing approach, incentive structure, etc.) that Enbridge Gas could apply to improve their overall program offerings[1].

We chose National Grid in Rhode Island, Ameren in Illinois, and Centerpoint in Minnesota for the quantitative review, as these are all jurisdictions with a long history of robust efficiency programs, address similar sectors, and have similar climates as Ontario. Further, these jurisdictions all have a similar regulatory structure as Ontario, where the program administrator submits a multi-year program plan, and the plan is reviewed by various stakeholders and the relevant regulatory agency before approval for the expenditures.

We conclude with several recommendations for new programs and program design improvements. These include, by sector:

Residential Sector

1. Coordinate delivery of the gas program with the equivalent electric utility program. This is discussed in more detail later.
2. Ensure that expenses related to home audits are completely covered by the program (as opposed to paid by the customer and rebated).
3. Lower the barriers of participation in the whole home program by training a set of qualified contractors who offer standardized pricing.
4. Offer incentives for pre-weatherization barriers and health and safety.
5. Eliminate furnaces and boilers completely as offered measures, as they are now code baseline, and any promotion through the program creates a lost opportunity for electrification.
6. Consider offering 0% financing for weatherization and pre-weatherization measures.
7. Ensure that multi-family buildings and renters/landlords are adequately covered by targeted messaging and participation pathways, and integrating residential and commercial and industrial (C&I) offerings with a one-stop-shopping experience.

[1] We did not limit the broad-based review to any set number of jurisdictions, but looked towards any programs that may have interesting program design elements. In the end, specific jurisdictions we drew from include British Columbia, Washington, Vermont, Oregon, Michigan, Maine, Massachusetts, and California

8. Proactively coordinate with other funding sources such as government or non-profit programs to offer enhanced incentives where possible.
9. Perform direct installation of low-cost measures such as aerators, showerheads, smart thermostats, and pipe insulation during the initial energy assessment.
10. Use virtual audits and hybrid audits to add more customized program participation pathways.
11. Consider adding a behavioral program.
12. Consider adding a midstream smart thermostat program.

Low Income Sector

13. Investigate the cause of the low cost to achieve natural gas savings in the low-income sector for Enbridge Gas compared to other leading jurisdictions and ensure that most resources are dedicated to comprehensive energy retrofits.
14. Ensure that Enbridge Gas's programs are able to meet the needs of smaller, one- to four-family low-income rentals including the ability to easily initiate and complete the participation process, in addition to larger multi-family renters. Consider adding a scorecard metrics to explicitly reward participation in this segment.
15. Ensure large multi-family buildings are treated comprehensively with both in-unit and common area measures, even if the common area measures do not go through the "low-income" program.
16. Closely coordinate with any non-profits, community action agencies, federal/local governments, etc., who are offering programs or funding for efficiency in Low Income buildings. Any additional funding would ideally be used to prioritize cost & safety upgrades so that Enbridge Gas funds can be used to push to install more measures on the cost-effective priority list. Enbridge Gas could also leverage existing infrastructure by providing funding directly to these agencies.
17. Link efficiency programs with credit collections and payment plan departments, as is being done in Illinois.

Commercial and Industrial Sector

18. Significantly reduce or eliminate incentive caps for C&I projects.
19. Perform a process evaluation with an express goal of understanding programs influence on decision making process and recommend ways to increase participation and reduce free ridership.
20. Consider moving towards negotiated incentives for custom projects.
21. Evaluate the effectiveness and extent of current account management for large and medium customers and encourage account managers to push to create multi-year Memoranda of Understanding outlining specific energy commitments. Alternatively, expand the Energy Performance (Whole Building P4P) program to include all large C&I customers.

22. Consider adding RCx/SEM/Energy Manager programs.
23. Ensure that the Small Business Direct Install Program effectively integrates with the electric side, and focus the gas program on envelope measures, as is done in the residential sector.
24. Revisit the technical caps for the Large Volume Program, for both technical assistance and implementation.
25. Ensure robust project-level measurement and verification activities on projects funded through the Large Volume program.
26. Withhold a portion of the efficiency charge on the Large Volume Self-direct to help cover program administrative costs.
27. Clarify cost-effectiveness requirements, and ensure that each customers' multi-year efficiency plan is cost-effective on an aggregate level.
28. Ensure that Enbridge Gas's other programs can effectively meet the needs of eligible customers, with a goal of demonstrating enough value that customers opt not to self-direct.

New Construction

29. Revamp the incentive structure on Energy Star Homes to motivate additional participation, reduce free ridership, and encouraging additional savings beyond the minimum to achieve Energy Star certification.
30. Add pre-construction financial support for builders constructing net zero homes for feasibility studies, modeling, and other expenses needed to achieve net zero. Also consider adding an intermediate savings level which gives increased incentives for buildings that approach net zero but do not quite reach it.
31. Offer financial incentives on Commercial New Construction, in addition to training and workshops.
32. Increase the incentive cap for both the ENERGY STAR for New Homes and Net Zero Energy Ready offerings.
33. Measure the baseline as standard practice, rather than code minimum.
34. Offer incentives for additions and major renovations for residential projects.

Low Carbon Transition and Integration with Electric Efficiency

In addition to these specific recommendations, we find that moving towards a true joint delivery model with fully integrated electric and gas programs is likely the single most impactful step that could be taken to improve program delivery and cost efficiency. The proposal for the low-carbon pilot demonstrates some of the impacts of this siloed approach to each fuel – the programs main focus is to promote gas-fired heat pumps, even though electric heat pumps are already commercially available in Ontario, and likely deliver more carbon savings for less cost than gas-fired heat pumps. A truly integrated efficiency portfolio could take a holistic approach to energy savings and carbon reduction, without having to focus on only one aspect of energy

usage. In addition, a jointly delivered program provides a one-stop shop to customers who would otherwise have to go through two separate programs in order to fully address their facilities total energy use, as well as save costs, as a single program administrator save on many of the administrative and evaluation related costs that would otherwise be duplicated with two administrators. We provide two examples of how Ontario may integrate its gas and electric programs – a model where utilities collaborate to offer the same programs statewide under a single brand, as is done in Massachusetts, and true third-party program administration, as is done in Oregon.

RESIDENTIAL PORTFOLIO

OVERVIEW TABLES

Table 1: Residential Overview

Comparison Metrics	Enbridge Gas - Ontario	National Grid-Rhode Island[2]	Centerpoint - Minnesota[3]	Ameren - Illinois[4]
Programs/ Offerings	Whole Home, Single Measure, Smart Home	Single Family Retrofit, Multi Family Retrofit, Prescriptive HVAC, Behavioral, New Construction	Prescriptive incentives, DIY Efficiency, Behavioral, Home Retrofit, New Construction, School Kits	Single Family Retrofit, Multi Family Retrofit, Prescriptive Incentives, School Kits, Public Housing
Sector Level Cost to Achieve ($/first year annual m^3)[5]	$2.77 CAD[6]	$2.87 USD	$0.95 USD	$0.61 USD
% of sector sales saved[7]	0.15%[8]	0.77%	0.98%	0.28%[9]
Net to Gross Ratios	Whole Home – 95% Thermostats – 96% Air Sealing – 95% Insulation – 67%[10]	**Retrofit** Wifi thermostats – 54% Weatherization-87% DHW – 74% **Prescriptive** Boilers – 79% Water heaters - 100% Wifi thermostat – 100%	Not Estimated	Thermostats – 90% Home energy retrofit - 80%-90% Showerheads/aerators – 100%

[2] The Narrangasset Electric Company d/b/a National Grid. 2020 Efficiency Year-End Report. May 3, 2021. http://rieermc.ri.gov/wp-content/uploads/2021/05/4979-year-end-report-2020-puc-5-3-21-1.pdf

[3] Centerpoint Energy. Natural Gas Conservation Improvement Program 2020 Status Report & Associated Compliance Filings. May 3, 2021.

[4] Ameren Illinois Q4 2020 Report Spreadsheet. https://ilsag.s3.amazonaws.com/Ameren-IL-Q4-2020-Report-Spreadsheet.pdf

[5] First Year Annual Savings has been used in this comparison as that is the metric proposed by Enbridge Gas. However, first year annual savings likely do not show the full benefit of the program.

[6] Enbridge's proposed 2023 residential savings target is 14,757,274 m^3 as found on Exhibit D, Tab 1, Schedule 3, Page 4. The budget is $40,804,802, as found on Exhibit D, Tab 1, Schedule 1, Page 11. The dollar amounts have not been converted to match country currency rates.

[7] Usage for US jurisdictions come from EIA-861 data.

[8] We estimated savings as a percent of sales by dividing the target 2023 residential savings by the estimated 2020 residential sector forecast consumption data taken from the OEB's 2019 Achievable Potential Study, Appendix_x1_Forecast_Potential_Consumption_20191218, tab 07a.

[9] Amount of savings restricted by stringent budget caps in the legislation

[10] Exhibit I.5.EGI.GEC.7_Attachment 1

Table 2: Natural Gas Utility Residential Conservation Program Details

	Program Name	Budget [11]	First Year Annual Savings (m^3)	$/ m^3
Enbridge Gas – 2023 Proposed	Whole Home Retrofit	$30,629,918[12]	7,759,125	$3.95
	Single Measure	$4,617,424	826,549	$5.59
	Smart Home	$3,977,235	6,171,600	$0.64
	Total ON Residential (CAD)	**$40,804,802**[13]	**14,757,274**	**$2.77**
National Grid RI – 2020 Actuals	Energy Star HVAC	$2,521,100	683,499	$3.69
	EnergyWise (Home energy Retrofit)	$8,924,600	673,178	$13.26
	EnergyWise Multifamily	$659,700	151,502	$4.35
	Home Energy Reports	$366,500	2,941,063	$0.12
	Residential New Construction	$436,600	87,725	$4.98
	Marketing and Community Based Initiatives	$117,800	-	$-
	Total RI Residential (USD)	**$13,026,300**	**4,536,967**	**$2.87**
Centerpoint Minnesota – 2020 Actuals	Home Efficiency Rebates	$9,858,963	11,746,063	$0.84
	DIY Home Efficiency	$462,630	763,612	$0.61
	Home Insulation Rebates	$1,345,162	1,033,288	$1.30
	Home Energy Reports	$1,073,655	3,237,824	$0.33
	Home Energy Squad	$1,630,115	311,899	$5.23
	High-Efficiency Home	$5,113,680	3,676,250	$1.39
	New Home Construction Rebates	$389,737	222,635	$1.75
	School Kits	$363,080	325,841	$1.11
	Total MN Residential (USD)	**$20,237,022**	**21,317,412**	**$0.95**
Ameren Illinois – 2020 Actuals	Multi-family Initiative	$164,397	9,163	$17.94
	Single Family Initiative	$383,081	204,648	$1.87
	Direct Distribution Efficient Products Initiative (School Kits)	$138,781	189,788	$0.73
	Public Housing Initiative	$152,370	23,469	$6.49
	Retail Products Initiative	$2,136,274	4,457,262	$0.48
	Total IL Residential (USD)	**$2,974,903**	**4,884,330**	**$0.61**

[11] Dollar figures are in CAD for Enbridge Gas and USD for National Grid, Centerpoint and Ameren

[12] Due to data availability, Enbridge Gas administrative costs are allocated at the sector level, while admin costs for other programs are allocated at the program level. This may make Enbridge's look cheaper at the program level but should not impact sector level comparisons.

[13] Enbridge Gas's proposed 2023 budget information is from Exhibit I.6.EGI.STAFF.13,Attachement 1 and savings information from Exhibit I.5.EGI.GEC.7,Attachment 1. The Total row includes sector admin costs of $1,580,225.

Summary and Discussion

Table 1 compares a few key metrics from Enbridge Gas's 2023 plan with the latest actual results from 2020 for some peer North American efficiency program administrators. As shown in Table 1, while there is a wide range of costs to achieve natural gas savings in the residential sector across different jurisdictions, Enbridge Gas's proposed cost to achieve is at the high end of the other comparator utilities, at $2.77 per m^3. The highest cost comparison jurisdiction, Rhode Island, pays close to the same per unit saved to the Enbridge Gas plan. Costs in Illinois and Minnesota are significantly less than they are in Ontario and Rhode Island.

However, Enbridge Gas's costs can be partially explained by looking at the program level detail in table 2. About 75% of Enbridge Gas's total residential budget goes to its whole home offering, which is generally a high-cost program - $13.26/ m^3 in RI, $5.23/ m^3 in MN, and $1.87/ m^3 in Illinois. Further, in these jurisdictions this program is jointly administered with the electric utility, allowing some administrative and incentive costs to be split between each fuel. Further, Rhode Island's lower costs are largely driven by very high behavioral savings, while low costs in Illinois and Minnesota are partly driven by thermostats, savings "kits" including low-flow showerheads and faucet aerators, and furnaces/boilers (in Minnesota), which we would not recommend for Enbridge Gas. In Illinois, the costs to achieve are particularly driven by 33,000 smart thermostats rebated in 2020 – the retail products program is about 90% of total residential savings and almost entirely from thermostats (although note that this reflects a year where Covid made home energy visits difficult). While we would not encourage Enbridge Gas to shift the focus away from a whole home approach, the comparison does indicate that Enbridge Gas would likely be able to bring costs down somewhat by increasing the number of thermostats rebated, adding a behavioral program, jointly running the program with the Independent Electricity System Operator (IESO), or by implementing significant virtual audits. While Enbridge Gas should be aggressive in promoting low-cost measures during home assessments and institute large midstream thermostat programs, they should make sure to maintain the focus on home assessments and envelope measures as, on a lifetime savings basis, these measures ensure efficiency upgrades that will provide long-term, cost-effective savings.

Table 1 also shows that savings are quite a bit lower as a percent of sector load than the other utilities examined – total savings are half of those achieved in Illinois, the utility with the next lowest savings, even though Illinois cannot legislatively spend more than 2% of utility revenue on natural gas energy efficiency. This high-level look indicates that Enbridge Gas should have room to achieve more savings in its residential program. If Enbridge Gas brought residential costs to halfway between where they currently are and what is achieved by Illinois, for example, savings would increase to 0.23% of load[14].

[14] Halfway between Enbridge Gas's cost to achieve of $2.77/ m^3 and Ameren's of $0.61/ m^3 is $1.69/ m^3. Applied to 2023 residential budget, this equates to about 24.1 million m^3 saved. Divided by estimated residential sales of 10.6 billion m^3, this equates to savings of 0.23% of load.

ENBRIDGE GAS'S APPROACH TO THE RESIDENTIAL SECTOR

Enbridge Gas's residential portfolio largely focuses on weatherization and building envelope measures. The vast majority of sector budget is dedicated to the Residential Whole Home offering, which combines an on-site audit with incentives for gas-saving measures. While this program still offers some rebates for early retirement of old furnaces and boilers, a 2019 regulation setting minimum efficiency at a 95 AFUE means there is limited opportunities to incent additional savings, and motivated Enbridge Gas to change the incentive for furnaces, and to mandate that any house receiving a furnace incentive also has to install two additional measures. This change successfully increased the portion of savings coming from insulation and air sealing measures. It also increased the average number of measures completed per home from 2 to 3.2 in 2020. In recognition of the need to provide multiple avenues for participation in their programs, Enbridge Gas is also proposing to offer a Residential Single Measure Program for 2023. While this program will also focus on the same air sealing and insulation measures offered by the Whole Home Program, it will allow participants to receive incentives without any energy audit requirements. Enbridge Gas also offers a Smart Home Program that offers rebates for adaptive thermostats. In 2023, Enbridge Gas is modifying the incentive structure for this program in order to encourage more adoption from middle income customers.

Note that the Canadian Federal Government has recently introduced the Greener Homes Grant Program that has some overlap with the Residential Whole Homes Program. This program offers up to $600 for a home energy evaluation, and $5000 towards energy efficient retrofits. Enbridge should continue to work with this program to ensure that it's Whole Home offering supplements, and does not compete with, the Greener Homes Grant Program. One way to do this would be to offer enhanced incentives for eligible gas savings measures. Another way would be to use Greener Homes funds preferentially on measures that do not have direct gas savings. For example, the Greener Homes funds offers up to $2,625 on resiliency measures and up to $5,000 on renewable energy, however no home can get more than $5,000. A home that wants resiliency measures/renewable energy in addition gas-saving measures could draw funds from a Greener Homes fund for the former and from Enbridge for the latter.

APPROACHES FROM OTHER JURISDICTIONS

Google Blitz Thermostats

Ameren Illinois has been running an advanced thermostat program for the residential sector since at least 2018. In 2020, when the pandemic was causing difficulties with a lot of energy efficiency programs, it decided to perform a "blitz" campaign for the measure. For this blitz, Ameren increased its thermostat incentive from $100 to $125 but also coordinated with Google, Ecobee, and other manufacturers to offer concurrent discounts. As a result, the leading thermostats were available to customers for under $25, with some even being free. These discounts were combined with an aggressive multi-channel marketing push, leveraging email, direct mail, social media, broadcast media, and via established partnerships. Counterintuitively, direct mail proved to be particularly effective, as it reached a customer base that had not responded to previous digital based campaigns for thermostats. The one-month campaign sold about 12,000 thermostats, almost the full annual participation from the previous two program years, and over a third of the

33,000 thermostats rebated in 2020. In 2020, thermostat savings reached 4,15 million m^3, 85% of the residential sector total. Ameren also targeted this blitz towards low-income customers, giving away another 3,000 free thermostats with optional professional installation. Ameren continues to offer free thermostats to low-income zip codes, without need for income verification. Note also that this program is jointly delivered by the electric and gas utilities. This brings down costs significantly, as the incentive is split between both, and there is no worry about overlap in marketing and administration expenses.

Figure 1: Smart Thermostat Promotion Sample

Mass Save Existing Building Incentive Structure

As Enbridge Gas notes in its program filing, it can be increasingly difficult to prompt participation in residential programs as the main savings driver moves shifts from heating and hot water equipment to envelope measures. This is due to a combination of 1) large upfront costs for insulation measures, 2) less obvious that upgrades are needed as envelope does not "fail" in the same way that a furnace might, and 3) more complicated to figure out what the issue is and how to address it. The Massachusetts utilities solve this problem in part by combining very generous incentives combined with zero interest financing with an easy-to-understand process that ensures consistent, quality service and standardized pricing.

First, on top of the standard free energy assessment, Massachusetts's program provides extremely generous incentives, including free air sealing and 75% of the cost on insulation measures. Further, to get around the split-incentive barrier, insulation measures are offered at no cost to residential rental properties, regardless of income level. Incentives are also offered on what are called "pre-weatherization" measures, including replacing knob & wire tubing, remedying combustion safety concerns that may be necessary to rectify before the house can be safely weatherized. These weatherization measures are combined with free low-cost measures, such as

low-flow devices and thermostats. In addition, 0% interest financing is made available for any costs that are not covered by the incentives. Up to $25,000 is made available for standard measures such as heating system replacements, water heaters, insulation, and windows. An additional $25,000 is further made available to install a wood pellet heating system, for 2-4 family buildings, and for certain necessary health and safety measures, including remediation of knob & wire tubing, asbestos, or vermiculite. This means that each participant has access to up to $50,000 in interest free financing, with loan terms up to 84 months, to apply towards the portion of the measure costs that are not covered by incentives.

In addition to the generous incentives, the Massachusetts programs aim to reduce the stress involved in soliciting multiple quotes from contractors and worrying about their competency by maintaining a list of qualified contractors that were required to agree to offer standardized pricing on projects done through the weatherization program. This ensures that the customer will receive the same pricing, and a quality installation, regardless of which specific contractor is chosen. The Massachusetts PAs also maintain relationships with electricians and other contractors that can mitigate common pre-weatherization barriers. If the customer desires, these contractors can be directly assigned to evaluate the barrier, so that they do not need to find a contractor on their own.

Massachusetts program has been successful at driving significant participation and deep savings – Eversource in MA saved 48,182 lifetime m^3 per participant in its program in 2020, compared to 12,404 m^3 for Enbridge Gas. However, it also has the obvious downside of being expensive. The Massachusetts' residential portfolio costs $4.2/ m^3, compared to $2.1/ m^3 in Enbridge Gas's latest plan and costs below $1/ m^3 in Northern midwestern states such as Illinois and Minnesota. This is further reflected in specific incentive levels, where, for example, Massachusetts expects to pay $800 per air sealing job, compared to $100-$150 for Enbridge Gas's program. However, despite higher costs to achieve, Massachusetts' programs are still comfortably cost effective – the Massachusetts Home Energy Program, for example, had a TRC of 2.15 in 2019[15]. However, also note that the societal cost test and total resource cost test only looks at the full incremental cost of the measure, and is agnostic about which party fields the costs. Increasing the incentive therefore does not impact these two tests, increases the cost-effectiveness of the participant cost test, and decreases the cost-effectiveness of the utility cost test. In the end, it is a policy decision as to whether the increased savings, participation, and net to gross ratio that come from higher incentives is worth the trade-off of more expensive programs[16]. That said, you can still learn from elements of the Massachusetts program design to increase participation without significantly increasing costs.

First, as anyone who has done major home renovations can tell you, the prospect of finding a competent and reasonably priced contractor with availability is almost more intimidating than the actual cost of doing the work. Massachusetts' approach of maintaining a list of trained and

[15] MA Statewide Annual Report. 2020.

[16] Net-to-gross ratios vary by measure type, from 76% for natural gas water heaters, to 97% for weatherization, to 108% for direct install measures. More generally, higher incentives and increased marketing tends to lower free ridership, as free riders do not need high incentives to participate, since they plan to install the measure anyway. This relationship is discussed in more detail later in the report.

qualified contractors offering a fixed price can therefore significantly reduce the stress of weatherization work for the homeowner. As an added benefit, these contractors double as effective program marketers. Second, the Massachusetts program administrators partner with local banks and credit unions to make large amounts of 0% interest financing available. This financing can have a disproportionate effect on participation compared to the cost of buying down the interest rate or covering an occasional default. Finally, note that, as in the Ameren example, joint delivery between electric and gas utilities significantly reduces costs and allows for more overall comprehensive treatment (since the assessment can look at both electric and gas measures).

Manufactured Home Initiative

Manufactured homes are often a particularly hard-to-reach segment for home energy retrofit programs, as they typically have low-to-moderate income residents, who are likely to be time stressed gig-economy workers, and often lack trust in program officials. However, they represent a significant energy savings opportunity, as standard insulation and air sealing measures can make a large impact on consumption. In 2019, Puget Sound Energy (PSE), the largest utility in Washington State, began a stakeholder process to determine how to better reach the 66,000 manufactured homes in its service area.

As a first step, PSE commissioned a study looking explicitly at the baseline, likely measures, and barriers specific to manufactured homes in their service territory.[17] Based on these study results, PSE identified an ideal customer journey and flagged tangible steps that would increase participation in the sector, including increased rebates, door-to-door outreach, a version of the standard home energy report that was more tailored to manufactured homes, and contractor referral network specifically for manufactured homes. The committee also set up a system to track and monitor seven different quantitative metrics that would reflect the program's success. They continued to meet bi-weekly during implementation to review program status and determine whether any program design modifications were needed. As a result of these efforts, manufactured home participation increased by 54%, corresponding to a 200% savings increase. The general lessons of this success can apply not just to manufactured homes, but any hard-to-reach subsector. In fact, PSE is planning on expanding this approach to all income eligible customers in upcoming program years.

Virtual Audits

The Enbridge Gas filing specifies that they are currently running a pilot on virtual audits and will use these results to determine its viability as a future offering enhancement. While it is important for Enbridge Gas to gain its own experience with virtual audits, it should also draw on the lessons learned from other jurisdictions that have explored this new approach. Massachusetts, for example, started performing virtual audits at scale in March 2020, early in the Covid pandemic, and expanded to a "hybrid" audit in July, which combines virtual audits with a shorter in-person follow-up. In the first year, Massachusetts performed over 20,000 virtual and hybrid

[17] Puget Sound Energy. 2020-2021 Biennial Conservation Plan. Exhibit 6, Supplement 1

audits. An evaluation report looking at the successes and failures of the model had a few key conclusions[18]:

- Customers generally had a positive reaction with the audit, with 89% expressing satisfaction, and 93% saying that they would recommend the program to friends and family.
- Virtual audits led to increased change orders during the actual work, as virtual audits were more likely to mis-identify measures. In total, 22% of virtual audits were subject to major change orders of $1,500 or more, compared to 12% for in person audits. Most cases were from wall insulation, as virtual audits were unable to identify whether walls were already insulated and so by default included them in the scope. While this is not a major problem for participants, it causes difficulties for contractors in terms of scheduling and staff planning and caused many contractors to perform in-person visits to the home to confirm the scope prior to the official installation date.
- Virtual audits were more likely to miss pre-weatherization barriers than in person audits. This change was meaningful, but not huge – 16.9% of virtual audits identified pre-weatherization barriers in the home compared to 21.1% of in person audits.
- Self-installed measures led to much lower in-service rates. In virtual audits, the participant would be tasked with installing certain free measures – such as showerheads, faucet aerators, thermostats, and LED bulbs – that previously would have been installed directly. The in-service rates for these measures went from 100% in the in-person audits to 43% for showerheads, and 55% for aerators and thermostats.
- Virtual audits resulted in reduced costs and higher reach. Eliminating the time spent driving to the physical location reduced labor time and indirect costs, and avoided scheduling inefficiencies, including those due to traffic, weather, and customer no-shows. Auditors who had historically been able to perform 2-3 audits per day were able to perform 4-5 virtual audits per day.
- In the longer term, it was found that virtual audits have the potential to dramatically increase the flexibility of the program offering. For example, virtual audits could help move away from a one-size-fits-all energy audit, towards something more customized to the participants interests and needs. This also brings opportunity to further specialize staffing, for example separating assessment and sales roles, or directing customers to specialized technology experts, as opposed to generalist audits.

[18] Guidehouse Consulting. Residential Coordinated Delivery Virtual Home Energy Assessment Study. March 12, 2021. https://ma-eeac.org/wp-content/uploads/MA20R26-B-VHEA_Report_FINAL_12MAR2021.pdf

In conclusion, there was widespread agreement among program managers, assessors, and participants that the benefits of virtual audits outweighed the downsides, and that they would continue to be an integral part of the program even after Covid related concerns subside. This is confirmed in Massachusetts' 2022-2024 Energy Efficiency Plan, which specifies that a virtual audit with an Energy Generalist will be the default customer intake method.

NEW PROGRAM IDEAS

In addition to the program design elements described above, we surveyed other jurisdictions for any new program ideas that Enbridge Gas is not currently planning on implementing. Many jurisdictions had standard prescriptive rebate programs for efficient equipment. However, since for natural gas this is mainly applicable to furnaces and boilers, opportunities for this are more limited for Canada after the increase in code baseline. We do, however, recommend promoting thermostats in a mid-stream program, ideally jointly with IESO.

Other programs involve distributing free energy saving "kits" with low-cost energy savings measures such as faucet aerators and low-flow showerheads. Most of these programs, such as Illinois' "Direct Distribution" program are focused on events at schools, where they could double as educational opportunities. However, Centerpoint Minnesota also runs a program called "DIY Home Efficiency" that gives customers free or very low-cost efficiency measures. However, we do not recommend these programs as they focus only on a few easy-to-install measures, and have been found to have uncertain savings, and in service rates are typically low.

The main program that we identified that may make sense in Ontario is a behavioral program. This program is described more below.

Behavioral (Home Energy Reports)

Many of the jurisdictions we reviewed, including Minnesota, Rhode Island, and some Massachusetts utilities, offered a behavioral program, also often known as Home Energy Reports. In this program, which has been offered for 10+ years in many jurisdictions, a personalized monthly report comparing the customer's energy use to a peer group, recommending easy energy savings measures, and directing customers to other efficiency programs for more complex efficiency. In recent years, there has been increasing use of housing, demographic, and geographic information systems (GIS) to deliver more personalized recommendations to each customer. This program is typically outsourced to a third-party implementer, such as Oracle, who runs similar programs throughout North America. Savings are estimated by using a control group of customers that does not receive the report and comparing average usage to the other customers that do receive the reports. Savings in the 1-2% range are typical. Traditionally these programs are given a one-year measure life; however, there have been some evaluations suggesting that savings can persist for years once the reports are sent[19].

[19] Opinion Dynamics. 2018 Behavioral Modification Initiative Persistence Study. October 21, 2019. https://ilsag.s3.amazonaws.com/AIC_2018_Behavioral_Modification_Persistence_Study_Memo_FINAL_2019-10-21.pdf

Note that for this program, cost-effectiveness is dependent on the scale of the utility. There are large up-front costs associated with creating the data integrations that enable the program that may mean it is not viable for smaller utilities. However, Enbridge Gas, with its 3.4 million residential accounts, appears to be more than large enough to make this program cost-effective. For comparison, in 2020 the Rhode Island program had 312,000 participants with a benefit-cost-ratio of 5.25, and the Minnesota Centerpoint's program had 200,000 participants with a benefit-cost ratio of 2.14.

CONCLUSION AND RECOMMENDATIONS

Overall, it appears that Enbridge Gas's proposed programs for the residential sector compare well to those of other jurisdictions. While they are more expensive than many US administrator's programs, such as those in Illinois and Minnesota, this is understandable since Enbridge Gas cannot promote significant furnaces/boilers due to recent code changes. While we do recommend expanding thermostat offerings which should help Enbridge Gas lower total costs, we do not recommend lowering total incentives for weatherization measures. Instead, Enbridge Gas may want to actually increase incentives in order to increase participation from hard-to-reach market segments and lower free ridership rates. However, as discussed more fully below, we do recommend that Enbridge Gas coordinate with IESO to offer integrated gas and electric programs. This should allow Enbridge Gas to reduce its direct costs, particularly administrative, marketing, and overhead, by allocating a share of the program costs to electric ratepayers. This will also enhance the offerings by ensuring the programs can offer comprehensive, fuel-neutral recommendations, avoid a confusing mix of competing or overlapping programs, and provide better one-stop-shopping customer service. In addition, we think Enbridge Gas's proposal to add more flexibility in how customers can participate is a good idea and encourage Enbridge Gas to not stop at the Single Measure Program, but rather to continue adding customized pathways to meet the specific needs of various customers. Our specific recommendations include:

1. Coordinate delivery of the gas program with the equivalent electric utility program. This is discussed in more detail later.
2. For the whole home approach, the audit should be free, and paid up-front (Enbridge Gas plan states that "Assessment incentives are provided to cover a significant portion of a participant's audit related cost. Specifically, participants receive $550 for completing the pre- and post-energy audits). Ensure that expenses related to home audits are completely covered by the program (as opposed to paid by the customer and rebated).
3. Lower the barriers of participation in the whole home program by training a set of qualified contractors who offer standardized pricing.
4. Offer incentives for pre-weatherization barriers and health and safety.
5. Eliminate furnaces and boilers completely as offered measures, as they are now code baseline, and any promotion through the program creates a lost opportunity for electrification.
6. Consider offering 0% financing for weatherization and pre-weatherization measures. In Massachusetts, the PAs buy down the interest rates on loans from local banks and credit

unions. Historic default rates have been very low, under 0.75%[20]. Consider offering 0% financing for weatherization and pre-weatherization measures.

7. Create explicit participation pathways for multi-family buildings and renters/landlords are adequately covered. Ensure that multi-family buildings and renters/landlords are adequately covered by targeted messaging and participation pathways, and integrating residential and commercial and industrial (C&I) offerings with a one-stop-shopping experience.
8. Proactively coordinate with other governmental or non-profit funding sources to offer enhanced incentives where possible. Proactively coordinate with other funding sources to offer enhanced incentives where possible.
9. Perform direct installation of low-cost measures such as aerators, showerheads, and pipe insulation during the initial energy assessment. In addition, the program should offer direct installation of smart thermostats. However, because this may require an electrician on-site, it may be more appropriate to be done with the weatherization services rather than at the initial assessment visit. Perform direct installation of low-cost measures such as aerators, showerheads, smart thermostats, and pipe insulation during the initial energy assessment.
10. Use virtual audits and hybrid audits to add more customized program participation pathways.
11. Consider adding a behavioral program.
12. Consider adding a midstream smart thermostat program.

[20] https://www.energy.gov/sites/prod/files/2014/01/f6/f1-avers-ma_heat_loan_overview.pdf

LOW INCOME

OVERVIEW TABLE

Table 3: Low Income Overview

	Enbridge Gas - Ontario	National Grid-Rhode Island	Centerpoint - Minnesota	Ameren - Illinois
Program Offerings	Single Family, Multi Family	Single Family, Multi Family	Single Family, Multi Family, Rentals, Non-Profit, Heating System Tune-up	Single Family, Multi family, Gas Kits
$/ m³	$2.91 CAD	$10.68 USD	$7.15 USD	$1.81[21] USD
LI Spending as a % of total portfolio	21%	17%	9%	43%
Net to Gross Ratios	100%	100%	100%	100%

[21] The Ameren low income program costs per unit of savings are very low for two reasons: 1) Ameren offers extensive other low cost programs for low income, such as midstream retail products programs, and also counts a proportional share of market-based program participation as low income; 2) Ameren is a combined electric-gas utility and has significant gas funding budget caps, and therefore electric ratepayers cover a major share of program costs; and 3) Much of Ameren's spending and savings are related to joint programs with the State of Illinois that use significant state and federal funding to supplement Ameren's contributions, while still allowing Ameren to claim full savings for the program.

Table 4: Low Income Program Details

	Low-Income Offering	Budget[22]	Savings (m^3)	$/ m^3
Enbridge ON- – 2023 Proposed	Home Winterproofing	$14,375,115[23]	2,872,796	$5.00
	Affordable Housing Multi-residential	$7,138,928	5,015,604	$1.42
	Total Enbridge Gas Low Income Planned (CAD)	**$22,987,685[24]**	**7,888,400**	**$2.91**
National Grid RI – 2020 Actuals	Single Family	$2,221,900	89,578	$24.80
	Multi Family	$1,806,800	287,694	$6.28
	Total RI Low Income (USD)	**$4,028,700**	**377,273**	**$10.68**
Centerpoint MN - 2020 Actuals	Low-Income Weatherization	$2,353,750	275,920	$8.53
	Low-Income Rental Efficiency	$294,226	55,994	$5.25
	Low-Income Free Heating System Tune-Up	$47,754	24,718	$1.93
	Non-Profit Affordable Housing Rebates	$345,481	49,750	$6.94
	Low-Income Multi-Family Housing Rebates	$39,911	24,690	$1.62
	Total MN Low-Income (USD)	**$3,081,122**	**431,071**	**$7.15**
Ameren IL – 2020 Actuals	Income Qualified Community Action Agency	$658,214	129,230	$5.09
	Income Qualified Single Family	$4,427,015	1,689,374	$2.62
	Income Qualified Multifamily	$108,203	15,048	$7.19
	Smart Savers	$379,428	1,245,511	$0.30
	Direct Distribution Efficient Products Initiative (Community Kits)	$97,973	40,587	$2.41
	Direct Distribution Efficient Products Initiative (AR Kits)	$3,333	11,572	$0.29
	Total IL Low-Income (USD)	**$5,674,166**	**3,131,322**	**$1.81**

Discussion

Enbridge Gas's proposed cost to achieve its targeted natural gas savings reductions in its low-income offerings are very low compared to other jurisdictions, and about the same as the cost for the market rate program, even though the low-income program pays incentives that cover the full cost of the measures. By contrast, low-income programs in other jurisdictions have a cost to achieve at least 3x the market rate residential programs. The level of detail given in the program filing does not allow a full analysis of what's driving this low cost, but it seems likely to be from a preponderance of low-cost measures in common areas of large multi-family buildings that are more similar to commercial measures than residential measures. Enbridge Gas should ensure that

[22] Dollar figures are in CAD for Enbridge Gas and USD for National Grid, Centerpoint and Ameren

[23] Due to data availability, Enbridge Gas administrative costs are allocated at the sector level, while administrative costs for other programs are allocated at the program level.

[24] Enbridge Gas's proposed 2023 budget information is from Exhibit I.6.EGI.STAFF.13,Attachement 1 and savings information from Exhibit I.5.EGI.GEC.7,Attachment 1. The Total row includes sector admin costs of $1,473,642.

adequate budget is available to comprehensively serve low-income residents in single family homes, as well as ensure that in-unit measures get installed in the multi-family program, in addition to common area measures.

Enbridge Gas's spending on low-income is in the middle of the other jurisdictions, except for Illinois, which has made low-income spending a high policy priority, receiving over 40% of all efficiency funds.

ENBRIDGE GAS APPROACH TO LOW INCOME SECTOR

Enbridge Gas proposes two main offerings aimed at the low-income sector in its service area. The Home Winterproofing offering is a standard program aimed at single family houses, that provides a free energy assessment with direct install of low-cost measures, combined with 100% incentives for all identified weatherization measures. The assessor will also install a carbon monoxide detector if one is not present and will perform "minor improvements" to mitigate health and safety issues.

The Affordable Housing Multi-Residential (AHMR) offering provides prescriptive and custom incentives, as well as direct installation of low-cost measures. In this program, prescriptive rebates are offered for measures such as condensing water heaters, energy recovery ventilators, and condensing make-up air units. Custom incentives are also available for projects on larger buildings, such as boilers, controls systems, and energy management systems, at a rate of $1.00 per m^3, up to 50% of project cost or $200,000. Direct installation is done for low-cost measures such as heat reflectors, showerheads, and aerators. The program will also fund the cost of a building assessment up to $8,000.

LOW INCOME EFFICIENCY BEST PRACTICES

Due to the fairly standard nature of low-income programs, our approach to reviewing the sector consisted of gathering general best practices to achieve savings in this often hard-to-reach sector. These include:

- Use a **coordinated**, **jurisdiction-wide approach.** This means not only between electric and gas utilities, but also between any other government programs or non-profits offering relevant services. For example, the Massachusetts utilities collaborate closely with the Low-Income Energy Affordability Network (LEAN), an association of nonprofits set up explicitly to coordinate the delivery of government and utility funded energy efficiency services to low-income customers[25]. LEAN has regular meetings with the utilities to monitor program progress and discuss new program ideas. The Illinois' utilities also coordinate with a network of Community Action Agencies (CAAs) in order to coordinate utility program delivery with state and federal programs such as the Weatherization Assistance Program (WAP) and the Low Income Home Energy Assistance Program (LIHEAP).

[25] For more information about how LEAN works with the Massachusetts utilities, see here: https://www.nclc.org/images/pdf/pr-reports/report-lean-green.pdf

- Promote **health and safety measures** through the efficiency program. Many low-income homes have significant health and safety issues (mold or other moisture issues, asbestos, knob & tube wire, etc) that need to be rectified before weatherization can be done. Impact evaluations in Massachusetts, Rhode Island, and other states have found significant financial benefits from addressing these issues, in the form of reduced hospitalizations, deaths, and sick days[26]. Ideally, these quantifiable benefits can be included in cost-effectiveness screening. In either case, utility programs should be willing to address these issues despite the lack of direct energy savings to facilitate safe installation of weatherization measures[27].
- Leverage other **low-income programs for marketing.** In the US, CAAs have a long-standing presence in low-income communities which they can use to drive participation in utility programs. Other programs, such as heating/fuel assistance, housing authorities, rental assistance, and utility rate discounts, can all be used to identify and recruit new customers. In Massachusetts, the utilities have a data sharing agreement with the Department of Transitional Assistance to automatically enroll anyone who receives public benefits into natural gas discount rates. This also allows the utility to keep abreast of newly eligible participants to target for the program.
- Offer **targeted participation pathways.** Many successful jurisdictions develop targeting outreach or offerings to recruit specific subsegments, such as multifamily, high-energy users, manufactured (mobile) homes, renters, landlords, speakers of other languages, etc. Centerpoint Minnesota, for example, has developed separate offerings targeting small rentals (1-4 units) and large multifamily. It also offers enhanced prescriptive incentives to owners of low-income multi-family buildings[28]. Vermont proactively flags and pursues high energy using households for recruitment into the program[29]. Other programs have tracts explicitly for multi-family, that ensure both in-unit and common areas are treated holistically. In this case, even though the whole building is treated at the same time, common areas do not typically receive the 100% incentive, as the landlord is often a for-profit business.

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[26] For example, this 2021 study in Massachusetts finds about $1,500 of NEIs per home, due to reduced thermal stress, increased home productivity, reduced fire risk, and reduced arthritis: https://ma-eeac.org/wp-content/uploads/TXC50_LIMF-HS-NEIs-Final-Report_2021.08.12.pdf

[27] In states such as Massachusetts, the guidelines for energy efficiency explicitly call for including health benefits in cost-effectiveness screening. See here for the guidelines and the order approving them: https://www.mass.gov/doc/dpu-20-150-a-appendix-a-final-revised-guidelines-5321/download https://www.mass.gov/doc/dpu-20-150-a-order-approving-revised-energy-efficiency-guidelines/download

[28] CenterPoint Energy's 2021-2021 Conservation Improvement Program Triennial Plan. Docket No. G-008/CIP-20-478. July 1, 2020.

[29] Annie Gilleo, et al. Making A Difference: Strategies for Best Successful Low-Income Energy Efficiency Programs. ACEEE. October 17, 2017.

- Ensure that customer needs can be addressed easily with a **single point of contact.** Low-income people are often time stressed and navigating the different programs that may be available to them is difficult in the best case. Even if there are multiple utility and/or non-utility programs available, it is important that there is a single point of contact to help direct them to the right information and navigate through the entire program delivery process.
- Link efficiency programs with credit collections and payment plan departments. For example, Ameren and Com Ed in Illinois have made a commitment to automatically refer anyone who interacts with the arrearage or collection departments to the efficiency program.

CONCLUSION AND RECOMMENDATIONS

While overall Enbridge Gas's low-income programs seem to be reasonably designed, the program review has provided a few key recommendations:

13. Investigate the cause of the low cost to achieve for Enbridge Gas compared to other leading jurisdictions and ensure that most resources are dedicated to comprehensive energy retrofits.
14. Ensure that Enbridge Gas's programs are able to meet the needs of smaller, one- to four-family low-income rentals including the ability to easily initiate and complete the participation process, in addition to larger multi-family renters. Consider adding a scorecard metrics to explicitly reward participation in this segment.
15. Ensure that large multi-family buildings are treated holistically, with incentives for both common area and in-unit measures Enbridge Gas has taken a first step in coordinating the delivery of the LI programs with the IESO by aligning the eligibility requirements of their LI programs to those of IESO. While this is good, it is very important to fully integrate the electric and gas sides into a seamless experience for the customer with a single point of contact, both to address gas and electric measures, but also to address in-unit and common area measures in a comprehensive fashion. Ensure large multi-family buildings are treated comprehensively with both in-unit and common area measures, even if the common area measures do not go through the "low-income" program.
16. Enbridge Gas should also closely coordinate with any non-profits, community action agencies, federal/local governments, etc, who are offering programs or funding for efficiency in Low Income buildings. Any additional funding would ideally be used to prioritize cost & safety upgrades so that Enbridge Gas funds can be used to push to install more measures on the cost-effective priority list. Closely coordinate with any non-profits, community action agencies, federal/local governments, etc., who are offering programs or funding for efficiency in Low Income buildings. Any additional funding would ideally be used to prioritize cost & safety upgrades so that Enbridge Gas funds can be used to push to install more measures on the cost-effective priority list. Enbridge Gas could also leverage existing infrastructure by providing funding directly to these agencies.

17. Link efficiency programs with credit collections and payment plan departments, as is being done in Illinois.

COMMRCIAL AND INDUSTRIAL

OVERVIEW TABLE

Table 5: C&I Overview

	Enbridge Gas - Ontario	National Grid-Rhode Island	Centerpoint - Minnesota	Ameren - Illinois
Program Offerings	Commercial: Custom, Prescriptive Midstream, Prescriptive Downstream, Direct Install; Industrial Custom;	New Construction, Retrofit, Small Business Direct Install, C&I Multifamily	Food service rebates, HVAC rebates, Custom rebates, Design assistance, Industrial Process, Retro-commissioning, Multi-family, Steam Trap Audits	Standard, Custom, Retro-commissioning
$/ m³	$0.58 CAD	$1.63 USD	$0.30 USD	$0.96 USD
% of sector sales saved	0.53%[30]	0.67%	1.19%	0.15%[31]
Net to Gross Ratios	**Prescriptive** DCV – 8% Boilers – 30% Air Curtains – 50% Kitchen Ventilation – 62% **Custom** Ventilation – 14% Boilers – 42% Industrial – 51%	**Prescriptive** Boilers – 57.6% Cooking – 57.6% DHW – 59% **Strategic Energy Management – N/A** **Retrofit** – 108.8% **Direct Install** – 90.4%	Not estimated	Downstream – 42% (HVAC) to 67.5% (specialty) Custom - 93.9% Upstream – 80% RCx – 82% to 94%

[30] We estimated savings as a percent of sales by dividing the target 2023 commercial and industrial savings by the estimated 2020 commercial and industrial sector forecast consumption data taken from the OEB's 2019 Achievable Potential Study, Appendix_x1_Forecast_Potential_Consumption_20191218, tab 07a

[31] Illinois savings levels restricted by statutory budget caps.

Table 6: C&I Overview

	Commercial & Industrial Offerings	Budget	Savings (m^3)	$/ m^3
Enbridge Gas – 2023 Proposed	Commercial Custom	$11,895,830	17,051,254	$0.70
	Commercial Direct Install	$4,765,983	3,542,144	$1.35
	Commercial Prescriptive Midstream	$2,421,117	2,027,759	$1.19
	Commercial Prescriptive Downstream	$2,436,237	1,734,187	$1.40
	Industrial Custom	$17,828,114	50,376,897	$0.35
	Total ON C&I (CAD)	**$43,090,889[32]**	**74,732,241**	**$0.58**
NG RI - 2020 Actuals	Large Commercial New Construction	2,726,000	1,566,567	$1.74
	Large Commercial Retrofit	3,030,700	2,464,718	$1.23
	Small Business Direct Install	134,100	100,156	$1.34
	Commercial and Industrial Multifamily	333,500	44,590	$7.48
	Commercial Pilots and Financing Costs	596,900	-	$-
	Total RI C&I (USD)	**$6,821,200**	**4,176,031**	**$1.63**
Centerpoint MN - 2020 Actuals	Commercial Foodservice Equipment Rebates	$594,189	1,158,276	$0.51
	C&I Heating and Water Heating Rebates	$3,664,975	21,350,227	$0.17
	C&I Custom Rebates	$1,495,119	4,098,655	$0.36
	Natural Gas Energy Analysis	$378,041	144,033	$2.62
	Energy Design Assistance	$1,567,519	4,112,824	$0.38
	Industrial Process Efficiency	$319,557	370,088	$0.86
	C&I Training and Education	$31,187	-	n/a
	Engineering & Certification Assistance	$197,014	-	n/a
	Recommissioning Study & Rebates	$240,250	751,410	$0.32
	Multi-Family Building Efficiency	$1,383,035	443,473	$3.12
	Steam Trap Audit	$29,948	422,433	$0.07
	Total MN C&I (USD)	**$9,900,834**	**32,851,417**	**$0.30**
Ameren Illinois - 2020 Actuals	Standard Initiative	$2,010,021	1,502,377	$1.34
	Custom Initiative	$2,344,776	3,138,766	$0.75
	Retro-Commissioning Initiative	$260,526	170,065	$1.53
	Total IL C&I (USD)	**$4,615,324**	**4,811,208**	**$0.96**

Discussion

The range in cost to achieve natural gas savings for the C&I sector is also highly variable, though somewhat tighter than the range seen in the residential and low-income sectors. Enbridge Gas comes in on the low end of this range, at $0.58/ m^3, despite significantly lower net-to-gross ratios than the comparator jurisdictions. Issues regarding these net-to-gross ratios are discussed

[32] Enbridge Gas's proposed 2023 budget information is from Exhibit I.6.EGI.STAFF.13,Attachement 1 and savings information from Exhibit I.5.EGI.GEC.7,Attachment 1. The Total row includes sector admin costs of $3,743,608 for commercial and $4,956,114 for industrial for a combined total of $7,699,722.

more below. Enbridge Gas is in the middle range in terms of percent savings, significantly higher than Illinois, whose budget is restricted by a statutory cap, and significantly lower than Minnesota, which does not use a net-to-gross ratio.

Since the C&I sector encompasses many different programs and offerings, we will be providing multiple separate discussions – one for core commercial and industrial programs (prescriptive downstream, prescriptive midstream, commercial custom, industrial custom and whole building pay for performance), one for the small business direct install, and one for the large volume industrial program.

PRESCRIPTIVE AND CUSTOM PROGRAMS (DOWNSTREAM, MIDSTREAM, COMMERCIAL CUSTOM, INDUSTRIAL CUSTOM AND WHOLE BUILDING PAY FOR PERFORMANCE)

Enbridge Gas Approach

Enbridge Gas's prescriptive and custom programs form the core of the approach to the commercial and industrial sector. While Enbridge Gas defines four separate offerings (downstream, midstream, custom and pay for performance), similar considerations apply to each and they are often combined into a single program, and so they are all discussed together here.

The downstream prescriptive program offers standard rebates designed to cover around 40% of the incremental cost to well-known technologies. Technologies rebated include air curtains, dock door seals, condensing make-up air units, demand control ventilation, ozone laundry, and energy recovery ventilators. Enbridge Gas also provides contractor trainings on the program offerings and may increase incentives for certain key segments such as renters/owners and accounts with multiple buildings in the service area.

The midstream prescriptive offering was launched in 2018 with a focus on food service equipment. Since then, it has added condensing water heaters and condensing unit heaters to the program. It is delivered through a third-party implementer who recruits and enrolls distributors and retailers and provides training on effectively upselling the efficient equipment.

The Commercial Custom offering is designed to provide incentives for more complicated efficiency projects whose savings calculations require site-specific or more complicated calculations and modeling. The custom program provides 50% of the cost up to $10,000 for energy audits, as well as $0.25/ m^3 of savings (up to a cap of 50% of incremental cost or $50,000) for implementing gas saving measures.

In addition, Enbridge Gas offers an Industrial Custom offering, that is similar to the commercial offering, but aimed at industrial facilities. This program covers 50% of the costs of third-party energy audits, studies, and metering, as well as $0.20/ m^3 for the first 50,000 m^3, and $0.10/ m^3 for any additional savings. The incentive is capped at $100,000 per project, or 50% of the incremental cost.

Finally, Enbridge Gas offers what it calls a whole building pay for performance program. This is a less standard program design, and offers a "holistic, multi-year approach to energy management designed to engage and support customers in driving deeper savings year-over-

year." Initially this program will target schools with higher-than-average energy usage. Enbridge Gas Energy Solutions Advisors (ESAs) will establish long-term relationships with the participants and support them through the process of benchmarking energy use and identifying/implementing energy savings measures. Program funds will cover costs associated with enrolling in the program, including meter upgrades and technical assistance. Further incentives will be provided in years 2 and 3, at \$0.30/ m^3 for each year over year incremental savings (relative to the metered baseline), with a bonus incentive of \$0.20/ m^3 at the end of the contract if the customer saves at least 20% over the baseline.

COMPARISON AND APPROACHES OF OTHER JURISDICTIONS

Midstream/Upstream Incentives

Midstream and upstream incentives are paid directly to the retailer/distributor (midstream) or manufacturer/distributer (upstream) instead of the ultimate customer. They have been shown to significantly increase participation over downstream incentives, as it ensures that equipment is in stock when needed and significantly reduces barriers to participation. The table below shows the measures offered midstream by Enbridge Gas and several comparison jurisdictions. In general, midstream and upstream incentives make sense:

- When a large portion of purchases happen on an **emergency or time dependent basis.** Most purchases for many types of equipment, including HVAC and water heaters, happen when an existing system fails. In these cases, customers don't have time to shop around and will buy whatever is in stock and available. Upstream incentives ensure that distributors and contractors have efficient equipment in stock and increase the likelihood that they will recommend the efficient technology.
- When the technology does **not have widespread adoption.** Moving incentives upstream for measures that already have significant market share will likely result in very high free ridership, as upstream incentives capture the whole market and cannot be targeted to segments that are less likely to be free riders. Further, as noted above, upstream incentives will ensure that the technology will be available from distributors and retailers. Some measures that fall into this category may be heat pump water heaters and ductless mini-splits.
- Equipment needs to be **installed by a contractor**. In these cases, since the incentive will be going direct to the contractor instead of the customer, they will be highly motivated to ensure its sale.
- The equipment is a **one-for-one replacement**. Equipment that needs controls are other add-ons to capture savings may be too complex to be offered upstream.

For gas programs, commercial cooking equipment are the measures most promoted with upstream incentives. This is because this equipment is a "one-for-one" replacement in a contractor-driven market where purchasing decisions are usually made on a time-dependent

basis. The table below shows which measures are promoted upstream in many of the jurisdictions we surveyed for this report.

Table 4: Midstream Offerings by Jurisdiction

Midstream	Enbridge Gas	Illinois	Massachusetts	Minnesota	Fortis BC
Smart thermostats		x			
Boilers		x			
Commercial Kitchen	x	x	x		x
Condensing Unit Heaters	x				
Condensing Water Heaters	x		x		
Tankless Water Heaters			x		
Indirect Water Heaters			x		

As seen, each jurisdiction takes a different approach to which measures are promoted through midstream and upstream. Boilers, tankless water heaters, and indirect water heaters are all promoted midstream/upstream by other jurisdictions but not Enbridge Gas. Due to changes in code, boilers would not make sense for Enbridge Gas promotion. Otherwise, although Enbridge Gas may want to implement a midstream thermostat program (aimed mainly at the residential market), its midstream incentive program has good technology coverage.

Net-to-Gross Ratios

Enbridge Gas's program applications discusses how lower NTG ratios as a result of the 2018 free ridership evaluations have significantly impacted their ability to claim savings for many measures in their custom and prescriptive programs. For comparison purposes, the tables below show the NTGs used in Ontario, Massachusetts, and Illinois.

Table 5: Enbridge Gas Net-to-Gross Ratios

	Measure	NTG
Prescriptive	Boilers	0.30
	Kitchen Ventilation	0.62
	Infrared Heating	0.11
	DCV	0.08
	ERV	0.30
	Air Curtains	0.50
Custom	Boilers	0.42
	Other	0.26
	Ventilation	0.14
	Industrial	0.51
	Overall	0.50

Table 6: Massachusetts Net-to-Gross Ratios

MA	Custom	Prescriptive
New and Replacement	0.61	0.84
Retrofit - Building Shell	0.54	n/a
Retrofit - Hot Water	0.71	n/a
Retrofit - Other	0.92	0.66

Table 7: Illinois Net-to-Gross Ratios

Measure	NTG
Custom Gas	0.939
Prescriptive - HVAC	0.426
Prescriptive - Thermostats	0.713
Prescriptive - Specialty	0.675
Prescriptive - Steam trap	0.608

While differences in categorization make direct comparisons difficult, it is clear the NTGs for Enbridge Gas are far lower than those of its peer jurisdictions in the US. While it isn't possible to give a clear explanation for this without a dedicated study examining the detailed program design and how it reaches customers, some possible explanations include:

- **Low incentives.** Incentives that are very low compared to the cost of the project do not induce a lot of participation, leading to high free ridership. However, it does not seem that rebates for Enbridge Gas are significantly lower than similar rebates in other jurisdictions. Note that Massachusetts has switched to negotiated incentive rates for custom projects where, in theory, program administrators are able to pay only enough to convince the customer to do the project. Part of the motivation behind this change was to reduce free ridership rates.
- **Low incentive cap.** In most C&I programs, including Enbridge Gas's, the majority of savings come from a small number of very large projects. If there is a low maximum cap on incentive, then these very large projects are likely to be free riders (since the ultimate incentive is very low compared to the size of the project). Enbridge Gas's commercial custom program, for example, has a cap of $50,000 per project. If most savings are coming from projects in the $500,000 - $3,000,000 range, it does seem likely that this cap is contributing to high free ridership. This number does seem very low compared to Enbridge Gas's peer programs – FortisBC has cap of $500,000 for commercial buildings and $1 million for industrial; and in Massachusetts and Illinois there are no defined incentive caps.
- **Marketing and Technical Assistance.** Programs that simply wait for a customer to apply, process the application, and disburse the rebate tend to have high free ridership. Other programs aggressively market the program, work with large accounts to proactively identify and pursue efficiency projects, and, when an application does come in, actively look for ways to modify or expand the scope to

increase the savings. Unsurprisingly, these programs tend to have much lower free ridership. As a result, the close account management approach, described more below, would likely help increase NTG rates. Indeed, a Massachusetts study found that free ridership in gas customers dropped from 46.9% to 18.6% when the customer had an assigned account manager, and to 4.5% if the customer also had a Memoranda of Understanding[33]. Also note that while Enbridge Gas does offer support for technical assistance, the amount is lower than for some of its peer programs – for example, Enbridge Gas offers 50% cost share up to $10,000 on energy studies ("where deemed appropriate by an ESA"), while FortisBC offers 75% cost share up to $37,500.

- **Assumed Baseline.** The baseline used in savings calculations may impact the free ridership rate, particularly in cases where industry standard practice is appreciably higher than code. For example, if code requires an 80% efficient boiler, but almost everyone installs 90% efficient boilers, a custom program may claim savings from going from 80% efficiency to 90%. In reality, however, this participant is a free ridership because the utility program is not impacting standard practice.
- **Market Driven vs. Retrofit.** Retrofit programs tend to have much lower free ridership than market driven. For example, demand control ventilation is likely standard practice for new construction and new ventilation systems, so any rebates on new systems would have very high free ridership. However, this would still be a good retrofit measure since, as long as projects are initiated by the utility, the baseline is based on what the customer currently has, and so they will not generally be free riders.

Account Management and MOUs

One approach that successful C&I programs have taken to medium and large C&I customers is assigning solution providers, or account managers, to form ongoing, long-term relationships with each customer. These account managers serve as a one-person liaison behind the commercial or industrial account and the efficiency programs, and can help the customer identify opportunities, secure necessary technical assistance, and secure available rebates from all applicable programs. Based on Enbridge's interrogatory responses, it appears that Enbridge Gas uses dedicated account managers, or Energy Solutions Advisors (ESAs), though size thresholds and specific responsibilities for ESA's are not clearly delineated[34]. This approach does also appear to be similar to Enbridge Gas's Energy Performance Program approach, which is currently being offered to schools, but could be expanded to all medium and large sized C&I customers.

In many Enbridge Gas peer programs, account managers are also encouraged to sign Memoranda of Understanding (MOUs) with their accounts, particularly those with high energy

[33] Tetra Tech. TXC49 (C&I NTG) MOU Research Results. February 2019. https://ma-eeac.org/wp-content/uploads/MA-Xcut_MOU-Analysis-Results-Memo_15Feb2019_v2.pdf

[34] See Exhibit I.10.EGI.STAFF.27, p.5-6

consumption. In the MOUs, the customer agrees to a multiyear commitment for actions saving a set amount of energy, and the program administrator commits to certain incentive levels and/or technical assistance. For example, Eversource Energy in Connecticut has an MOU with the state's largest energy consumer, United Technologies, agreeing to a dedicated utility incentive team, a predictable incentive structure, and a 15% electric and 8.2% gas savings target over three years[35]. National Grid and Boston University have a similar MOU agreeing for a 5% per year gas reduction for three years[36]. As noted above, these practices can have significant impacts on free ridership in addition to savings comprehensiveness as shown through the 2017 study in Massachusetts mentioned above.

Possible Program Additions

Retro-commissioning

Retro commissioning (RCx) programs are commonly offered to help businesses identify and address low/no-cost efficiency measures.[37] An RCx study will also identify opportunities for more capital-intensive measures that can be rebated through the prescriptive or custom tracks. Com Ed, based in Illinois, for example, offers four different retro commissioning tracks – standard RCx, Monitoring-based RCx, RCxpress, and RCx Building Tune-up, distinguished by their time and financial commitments[38]:

- Standard RCx require a year to complete, are offered only to customer larger than 500,000 ft2, and require a $25,000 customer commitment.
- Monitoring Based RX are supported by multi-year agreements between the utility and the building owner and uses interval metering data and a building automation system to identify, implement, and verify measures on a rolling basis. It is offered for buildings larger than 300,000 ft2, and fully funds the initial study and the monitoring system integration.
- RCxpress projects are offered to buildings between 150,000 and 500,000 ft2. It features a somewhat limited scope compared to the RCx. The utility fully funds the study, provides bonus incentives after implementation, and requires a $5,000 - $10,000 customer commitment.
- The RCx Building Tune-up project is aimed at customers who are too small to qualify for any of the other offerings. It focuses on the most common RCx measures, so that it can deliver a lower cost deliverable on a faster schedule. It fully funds the initial RCx study, up to $35,000, with additional bonus incentives on implementation.

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[35] Kelly, Megan. Everyone Benefits when Everyone Pays: The Importance of Keeping Large Customers in Utility Programs. 2016.

[36] Ibid.

[37] See here for an example of a retro-commissioning program, from Pacific Gas & Electric in California: https://www.pge.com/en_US/large-business/save-energy-and-money/facility-improvement/retrocommissioning.page

[38] Guidehouse. Combined Utility Retro-commissioning Impact Evaluation Report. April 26, 2020.

To avoid market confusion, Com Ed markets these tracks together under a single name, Retro-Commissioning Flex. The 2020 program year saw 132 RCx projects, for about 2.2 million m^3 of annual savings.

Strategic Energy Management

Strategic Energy Management (SEM) programs are, in a sense, an evolution from both retro commissioning and MOUs. SEM refers to a system of organizational practices and policies that instill a continuous, systematic approach for continuous energy improvement. There are currently at least 27 efficiency program administrators offering SEM programs, with more being added rapidly. While these programs have significant variations between program administrators, one illustrative example is Energy Trust of Oregon. The Energy Trust's SEM program has two tracks. The First Year SEM track is available for participants who are interested in testing the waters of SEM, but not ready for a multi-year commitment. Under this track, the company offers trainings and workshops to cohorts of participants. Over a 14-month period, each customer goes through an implementation, reporting and report completion phase. There are additional incentives available for implementing O&M projects that save energy. The Full SEM track has a similar structure but is targeted to companies that are willing to make a 2–5-year commitment. Participating companies do not have to pay for any of the training or workshops but must make commitments to develop an energy plan, attend training, create an energy team, and report energy savings.

The Energy Trust has found their SEM program successful not only in capturing O&M savings, but also in driving other program activity in more capital-intensive measures. For example, Energy Trust data indicates that customers in the SEM program are four times more likely to annually complete a capital project than similar customer that did not participate in SEM. There is also strong evidence that SEM will significantly lengthen the persistence of O&M measures compared to RCx, an intuitive finding based on the continuous nature of SEM[39].

We note that Enbridge Gas used to offer a Strategic Energy Management Program but stopped enrolling new customers in 2018 and did not propose continuing the program. This program was not very successful, and only one of the five eligible participants received incentives in 2020, due other competing priorities. While this is unfortunate, we think that Enbridge Gas should work to improve the design of the old program rather than completely giving up on it. In particular, Enbridge Gas can look towards the example of Energy Trust and other successful administrators and, for example, create multiple participation tracks for companies that are not quite ready for a long-term commitment. For the longer-term track, commitment to the project could be secured by company management, and formalized in a Memoranda of Understanding. In addition, partnering with IESO would likely make this offering more desirable as companies could reduce both gas and natural gas usage via the same levels of engagement.

[39] Rogers, Ethan, et al. Features and Performance of Strategic Energy Management Programs. January 2019.

Energy Manager Subsidy

In one other program for very large customers, utility program administrators will directly subsidize the salary of an energy manager who will act as a full-time employee at the participating organization. This energy manager will be help identify opportunities, secure financial incentives, report, and track results, and instill a culture of continuous energy management in the organization.

In Ontario, IESO already has had a successful manager program since 2011. As such, Enbridge Gas may want to look towards the example of FortisBC, who has an energy manager program designed to supplement BC Hydro's program on the electric side. In this program, FortisBC funds the salary – up to $60,000 – who will work under an existing BC Hydro energy manager to drive participation in FortisBC's gas programs as well as BC Hydro's electric programs[40]. Organizations with a FortisBC energy manager include BC Housing, Metro Vancouver, University of British Colombia, and several school districts.

Recommendations

While Enbridge Gas's programs are largely in line with those of similar jurisdictions, there are a few steps that could lower free ridership, increase depth of savings, and expand participation:

18. Significantly reduce or eliminate incentive caps for C&I projects
19. Perform a process evaluation with an express goal of understanding programs influence on decision making process and recommend ways to reduce free ridership
20. Consider moving towards negotiated incentives for custom projects
21. Evaluate the effectiveness and extent of current account management for large and medium customers and encourage account managers to push to create multi-year Memoranda of Understanding outlining specific energy commitments. Alternatively, expand the Energy Performance (Whole Building P4P) Program to include all large C&I customers.
22. Consider adding RCx/SEM/Energy Manager programs.

SMALL BUSINESS DIRECT INSTAILL

On top of the C&I programs described above, Enbridge Gas has also been offering a small business direct install program aimed at smaller commercial customers. Similar to other direct install programs, Enbridge Gas's offerings pay for a free on-site assessment by a trained and contracted service provider that will identify low-cost energy efficiency measures. The service provider goes on to produce a report outlining the opportunity and, pending customer approval, installs the identified measure. Enbridge Gas's incentives will cover 75-80% of the incremental equipment cost and 50% of the labor cost. The program initially focused on air curtains for shipping doors, dock door seals, and demand control kitchen ventilation. Going forward, the

[40] See, for example: https://www.fortisbc.com/rebates-and-energy-savings/rebates-and-offers/rebates-business/energy-specialist-frequently-asked-questions

program will also include destratification fans, pedestrian door air curtains, and add-on ventilation measures.

We were not able to find another gas-only small business direct install program in North America. Typically, when gas measures are done, it is in conjunction with an assessment that also looks at electric measures such as lighting. The gas measures done are typically showerheads, faucet aerators, pipe insulation, tank wrap, and thermostats. While in theory, there are small business direct install measures that do custom measures including those related to envelope and ventilation, in practice there is rarely significant penetration for these measures. It seems hard to believe that shipping doors are common enough in small businesses to support a cost-effective direct install infrastructure, and the measure is likely cheaper to promote as a stand-alone effort directed at applicable businesses.

This leads to our recommendation on the small business proposal:

23. We recommend that Enbridge Gas partner with IESO in the future for joint delivery of the program. If this is not done, Enbridge Gas should look to significantly expand this program into an assessment aimed to perform all cost-effective gas opportunities, including envelope measures, smart thermostats, and other heating system controls, similar to what is done on the residential side. We also recommend that Enbridge Gas look at other approaches that may be able to address the air curtain opportunity more cost-effectively. FortisBC, for example, has a program dedicated to air curtains, with explicit marketing.

LARGE VOLUME PROGRAM

Enbridge Gas Approach

Enbridge Gas's Large Volume Program is directed at their largest industrial customers – in 2022, Enbridge Gas anticipates 37 customers eligible for the program who, combined, make up 20% of Enbridge Gas's total load. Thus, targeting this customer group has a potential to make significant impacts on total usage. This is a self-direct program, where customers need to use the funds that they would have paid to fund efficiency at their own facilities. Each customer in this program has an assigned Enbridge Gas Technical Account Manager. To participate in the program, the customer must work with the Account Manager to submit an Energy Efficiency Plan detailing a series of potential efficiency projects. Incentives are available for both technical assistance and project implementation:

- 50% of an engineering feasibility study, capped at $10,000
- 66% of a Process Improvement Study, capped at $20,000
- 50% of a Steam Trap, capped at $6,000
- 50% of metering costs, capped at $5,000
- $0.10/ m^3 saved up to $100,000 or 50% of project costs

If a customer does not participate in the program, or does not expend all their dedicated funds, they go into an aggregate pool. Other participants in the program can draw from this pool, on a first-come first-served basis, with $0.05/ m^3 saved available, up to $40,000 per project. It does not appear as if there are any project level measurement and verification (M&V) requirements.

Comparison with Other Self-Direct Programs and Recommendations for Enbridge Gas

These types of self-direct programs for large customers are relatively common in North America – with at least 16 US states having some form of self-direct (not to be confused with opt-out programs, which allow large customers to avoid paying the efficiency surcharge completely). Well-designed self-direct programs can bridge the gap between industrial customers wanting control of their own funds and utility/society desire to capture the significant amount of cost-effective efficiency that is typically available at these large facilities. In general, best practices of self-direct programs include:

- Allow multi-year efficiency plans, so that a customer can use funds from many years on a single project
- Require some contribution to administrative expenses (so that the customer does not have access to 100% of the funds that they would have paid into the efficiency program surcharge)
- Require project level measurement and verification
- Put unused funds into an account that others can access
- Require projects be cost-effective at a customer level (each project or measure does not need to be cost-effective, but the customer's activities over several years needs to be)

Ideally, there would be a set of programs that directly serves the needs of large customers, instead of an opt-out or self-direct program. However, self-direct is more desirable than an opt-out, because it still ensures that the large customers not paying the efficiency surcharge are investing in efficiency. That said, any self-direct program should be offered among a robust portfolio of other programs tailored to large customers' needs and that can offer an alternative to self-direct. As an example, Energy Trust of Oregon allowed its self-direct customers to participate in other programs, while getting 50% of the full eligible incentives. At the same time, it ensured tailored programs to meet the needs of the largest customers, such as close account management, technical assistance, and strategic energy management. As a result, less than 15 of the 150 eligible currently choose to self-direct.

This raises several recommendations for Enbridge Gas's Large Volume Program:

24. Revisit the technical caps, for both technical assistance and implementation, as they seem very low compared to the size of the customer base. For example, FortisBC's custom program will pay 75% of technical assistance up to $37,500 and has a $1 million cap on project incentives for industrial facilities.

25. Ensure robust project-level measurement and verification activities on projects funded through the Large Volume program.
26. Withhold a portion of the efficiency charge to help cover program administrative and EM&V costs.
27. Clarify cost-effectiveness requirements, and ensure that each customers' multi-year efficiency plan is cost-effective on an aggregate level.
28. Ensure that Enbridge Gas's other programs can effectively meet the needs of eligible customers, with a goal of demonstrating enough value that customers opt not to self-direct.

It appears as if most other jurisdictions do not include savings from self-direct programs in their overall savings targets or performance incentive metrics, since the utility does not really have much control over what is done. Given, this, self-direct programs are not often evaluated for free ridership. So while there are not many points of comparison to Enbridge Gas's very high rates of free ridership for these programs, it does make sense given the low degree of utility control over projects. Given these considerations, Enbridge Gas and other stakeholders may want to consider whether it makes sense to include projected savings from this self-direct program in the annual goals and performance incentive scorecards.

NEW CONSTRUCTION (SAVINGS BY DESIGN)

ENBRIDGE GAS APPROACH

Enbridge Gas proposes two paths for the residential market rate program. The Energy Star New Homes (ESNH) path targets builders in municipalities that have demonstrated low levels of penetrations for these standards (only homes in municipalities with penetration of new Energy Star Homes of less than 15% are eligible). It will provide $1,650 per home for homes built to Energy Star Version 17. Each builder (inclusive of all subsidiaries) can only participate once per year and receive incentives for a total of 50 homes. The Net Zero Energy Ready (NZER) path will sponsor visioning sessions and workshops for developers ready to start building net zero homes. It will provide incentives of up to $15,000 per home, plus a $1,500 evaluation incentive to help determine whether the home did in fact achieve Net Zero Ready standards. As in the ESNH path, builders are only able to participate once per year. New homes participating in the NZER are required to use natural gas as a fuel source for space and/or water heating.

The affordable housing Savings by Design program also offers technical assistance at the design phase to encourage houses to be built at least 20% better than code. Technical assistance of up to $7,500 is available to offset consulting fees because of design team attendance at training, and $1,000 per unit, up to $120,000 is available for meeting the target. Half of the incentive is given at the time of the permit application, with the other 50% upon completion of construction, based upon the as built energy model.

The Commercial New Construction offering focuses on training, education, and workshops for developers who commit to building at least 25% better than code. Trainings include visioning sessions between the design team and program staff, assistance with energy modeling, assessment of final design, and a post building participant survey. Any commercial building over 25,000 ft^2 that commits to using natural gas as a fuel source is eligible. There are no quantified savings expected from this program, and performance will be based on the number of participants in the workshops.

Finally, Enbridge Gas is also adding a new construction program aimed specifically at improving the air tightness of commercial construction. The aim of this program is to transform the market to adopt air tightness testing as a routine part of building pre-commissioning, both by building out contractor capacity and by providing financial incentives. Testing incentives will cover $0.50 per square foot, up to a maximum of $30,000, with 50% of the cost up to $15,000 of any envelope measures taken because of the testing.

COMPARISON TO OTHER JURISDICTIONS

In general, Enbridge Gas's proposed new construction programs seem much less generous and much less comprehensive than many best-in-class programs. As examples, Massachusetts' residential program, and FortisBC's commercial program.

Mass Saves Residential New Construction

Massachusetts offers several targeted offerings for different types of new construction, including standard offerings (for both low- and high-rise), a passive house offering[41], a path to zero offering, a zero energy modular homes offering, and a dedicated offering for renovations/additions. Instead of giving a flat incentive per home, as the Enbridge Gas program does, the standard offering calculates incentives based on the savings over a typical home – savings scale based on the amount of savings above a reference home. Compared to the Enbridge Gas incentive of $1,650, Massachusetts offers a much larger $10,000 per unit incentive cap, with extra funds available for hitting certain savings targets. The passive house offering gives even more generous incentives, paying 100% of the cost of a feasibility study, 75% of the costs of energy modeling, $500 per unit for pre-certification, $2,500 per unit for certification, and a performance bonus of $0.75 per kWh at $7.50 per therm saved. To support workforce development, they also offer luncheons, building science workshops, and passive house accreditations for interested builders. Further, in recognition that Passive House is a very strict standard, Mass Saves will be offering a track for builders who are ready to get significant savings (50-60%), but not quite ready to go all the way to passive[42].

Fortis BC Commercial New Construction

Fortis BC offers similar training and air tightness incentives as Enbridge Gas's proposed program, but supplements that with significant incentives based on actual performance. In addition to 50% of the cost of energy modeling, there is a $1.00 per square foot incentive for step 1 buildings (or 10%-20% above code in jurisdictions not subject to step code), $1.60 per square foot for step 2 (20%-30% above code), and $2.20 per square foot for step 3 (more than 30% above code) buildings. These additional financial savings make securing participation and tangible savings much more likely compared to Enbridge Gas's program, which focuses entirely on training and workshops.

RECOMMENDATIONS FOR ENBRIDGE GAS

In order for a builder to be eligible, Enbridge Gas requires any new construction building to commit to using natural gas as a fuel source for space and/or water heating[43]. As a first step, the OEB should consider whether this makes sense from a policy perspective, given provincial and national GHG emission reductions goals. New construction is increasingly using heat pumps for space and water heating – Massachusetts program data, for example, indicates that all-electric new construction is the norm in above code construction[44]. Further, there is increasing evidence that all-electric new construction results in lower costs in addition to a significant GHG reduction. A recent study from the Rocky Mountain Institute, for example, finds lower initial costs for all-electric homes in most cities examined and lower lifecycle costs for all cities, in addition to GHG

[41] Covers the full cost a feasibility study, 75% of energy modeling costs, offsets certification related costs, and provides a performance bonus for actual savings. Also has a contractor training element.

[42] Massachusetts Joint Statewide Electric and Gas Three-Year Energy Efficiency Plan: 2022-2024. April 30, 2021

[43] Exhibit E, Tab 2, Schedule 2, p. 14, 20, 25

[44] Ibid

savings of between 50% and 93%, depending on the fuel mix of the electricity[45]. In this light, it is unclear if ratepayer funds should be encouraging natural gas in new construction at all. However, if the programs do go forward, Enbridge Gas should consider expanding the comprehensiveness and incentive structure to encourage additional above code savings. Specific recommendations include:

29. The incentive of $1,500 for the residential new construction program does not seem like it would be sufficient to motivate additional Energy Star Homes. Further, the flat incentive rate does not encourage additional savings beyond the minimum to get Energy Star Certified, and it is unclear why builders should be limited on receiving incentives to only one home per year. Consider revamping the incentive structure to something more like the Massachusetts program, which pays based on the energy savings over an average home, with bonus incentives for certain certifications. This would include significantly increasing the per home incentive cap and eliminating the requirement that a builder can only receive incentives on one home per year. This requirement undermines any market transformation goals the program may have. Revamp the incentive structure on Energy Star Homes to motivate additional participation, reduce free ridership, and encouraging additional savings beyond the minimum to achieve Energy Star certification.
30. Vision sessions and workshops are unlikely to significantly move the needle on net zero homes. Consider also adding pre-construction financial support for feasibility studies, modeling, and other expenses needed to achieve net zero. Also consider adding an intermediate savings level which gives increased incentives for buildings that approach net zero but do not quite reach it. Add pre-construction financial support for builders constructing net zero homes for feasibility studies, modeling, and other expenses needed to achieve net zero. Also consider adding an intermediate savings level which gives increased incentives for buildings that approach net zero but do not quite reach it.
31. Offer financial incentives on Commercial New Construction, in addition to training and workshops.
32. Increase the incentive cap for both the ENSH and NZER offerings.
33. Measure the baseline as standard practice, rather than code minimum.
34. Offer incentives for additions and major renovations for residential projects.

[45] Rocky Mountain Institute. The Economics of Electrifying Buildings. 2018. https://rmi.org/insight/the-economics-of-electrifying-buildings/

LOW CARBON TRANSITION AND INTEGRATION WITH ELECTRIC EFFICIENCY

Enbridge Gas is also proposing to offer Low-Carbon Transition Programs in the residential and commercial sectors, designed to promote hybrid electric-gas heating systems and gas-fired heat pumps when they become available in Ontario (which Enbridge Gas says will be in 2024). While gas fired heat pumps will reduce energy use compared to gas furnaces and boilers, it is unclear what benefits they would have over electric heat pumps, which are lower cost, produce greater emissions reductions, and are currently commercially available. Further, while it is likely that partial electrification does make sense for some buildings, any program not considering full electrification is losing opportunities for GHG emissions reductions. A best practices low-carbon program would be fuel agnostic, choosing technologies based on cost-effectiveness and emissions reduction, as opposed to what type of energy they run on.

This reflects a broader problem with a lack of integration between Enbridge Gas's gas efficiency programs and IESO's electric programs. Customers tend to approach energy use holistically, regardless of whether it's electricity or natural gas, and most important gas measures – insulation, air sealing, demand control ventilation, wi-fi thermostats – also save electricity due to lower cooling and ventilation requirements. Further, having to deal with two different program administrators, with different applications, incentive structures, and requirements, adds significant transaction barriers to the participation process, as well as duplicative administrative costs for application processing, energy assessments, technical assistance, marketing, and EM&V. In addition, by cost sharing program and rebate costs, both electric and gas ratepayers can benefit. All the other best-in-class natural gas efficiency programs that we reviewed were integrated with electric efficiency, so that customers could address energy use holistically through a single point of contact at the program administrator. While Enbridge Gas's application and interrogatory responses mention that it will explore opportunities to further align its programs with those of IESO's, it does not lay out specific steps, or commit to full integration.[46] This is likely the single best step that Enbridge Gas could take to improve the savings and cost-effectiveness of its program offerings. As such, we lay out two different ways that US States have effectively integrated gas and electric efficiency programs.

MassSave

In Massachusetts, five electric utilities and six gas utilities offer standardized, integrated programs under a single statewide umbrella brand MassSave. Under this structure, the utilities collaborate to produce and submit a single statewide plan, albeit one with separate goals and budgets for each utility. This effort created a single set of statewide programs, with common branding, a common portal, and a "one-stop-shop" for all fuels and customers[47].

Differences between Program Administrators (PA) in size, fuel type, data systems and customer demographics mean integrating the programs was a significant coordination challenge.

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[46] Exhibit I.16.EGI.Staff.86

[47] This was enabled and prompted by 2008's Green Community Act, which can be found here: https://malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169

To resolve this, the PAs have set up management committees representing each PA. This coordination was encouraged and overseen by an energy efficiency advisory council, established by 2008 legislation and given the purpose of, among other things, program oversight activities, to "examine opportunities to offer joint programs providing similar energy efficiency measures that save more than one fuel resource or to coordinate programs targeted at savings more than one fuel resource." The legislation also specified that "any costs for joint programs shall be allocated equitably among the efficiency programs[48]." These management committees meet regularly to set overall strategic oversight for their respective subject or sector. Items addressed include what programs and measures to offer, program delivery models, how to ensure electric and gas opportunities are both addressed no matter which utility did the original intake, incentive structure, marketing approach, and evaluation planning. Not only did this approach result in increased electric and gas savings, but it also saw significantly reduced administrative expenses as, for example, the PAs could evaluate emerging technologies one time, and even higher shared staffing resources.

Energy Trust of Oregon

In 2002, instead of trying to sort through the electric and gas coordination issues and resolve utility conflicts of interest, Oregon decided to set up a third-party administrator. As a result, through an RFP process, the Oregon PUC selected the non-profit organization the Energy Trust of Oregon as a dedicated program administrator of all ratepayer funded efficiency in the state. The Energy Trust is governed by a grant agreement with the PUC that includes provisions to ensure quarterly and annual performance reports, annual budgets, two-year action plans, long-term strategic plans, third party reviews, and annual performance metrics. Annual goals are incorporated into the utilities' integrated resource plans to ensure that resource planning accounts for the efficiency. This structure has seen significant success in program delivery, consistently ranking in the top 10 states for efficiency according to ACEEE's annual scorecard[49]. Other states with a similar administrative model, such as Vermont and the District of Colombia, also perform highly.

[48] See the Massachusetts' Energy Efficiency Advisory Council Bylaws for more information: https://ma-eeac.org/wp-content/uploads/MA-EEAC-By-Laws-as-Adopted-2-25-15.pdf

[49] ACEEE's latest scorecard for 2020 can be found here: https://www.aceee.org/state-policy/scorecard

CONCLUSION

Overall, the largest issue that arises from comparing Enbridge Gas's efficiency programs to those of other gas utilities is the lack of integration with electric efficiency. A fully integrated electric and gas energy efficiency portfolio would not only enhance customer service and participation by providing a more comprehensive efficiency service, but would also significantly save on administration, assessment, evaluation, and other costs. This is especially true as the focus from efficiency programs moves from electric and gas savings to carbon savings (Massachusetts has made this change explicit in the program goals for the upcoming program cycle). We therefore strongly recommend developing a specific plan with tangible steps on how and when this integration will happen – whether it will be coordinating delivery with IESO, or a third-party administrator contracted to the OEB, as is done in Massachusetts (coordinated delivery) and Vermont (non-utility administrator).

In addition, we have found several key recommendations for each sector that should be able to increase depth of savings, expand participation, and/or lower free ridership. These include:

Residential Sector

1. Coordinate delivery of the gas program with the equivalent electric utility program. This is discussed in more detail later.
2. Ensure that expenses related to home audits are completely covered by the program (as opposed to paid by the customer and rebated).
3. Lower the barriers of participation in the whole home program by training a set of qualified contractors who offer standardized pricing.
4. Offer incentives for pre-weatherization barriers and health and safety.
5. Eliminate furnaces and boilers completely as offered measures, as they are now code baseline, and any promotion through the program creates a lost opportunity for electrification.
6. Consider offering 0% financing for weatherization and pre-weatherization measures.
7. Ensure that multi-family buildings and renters/landlords are adequately covered by targeted messaging and participation pathways, and integrating residential and commercial and industrial (C&I) offerings with a one-stop-shopping experience.
8. Proactively coordinate with other funding sources such as government or non-profit programs to offer enhanced incentives where possible.
9. Perform direct installation of low-cost measures such as aerators, showerheads, smart thermostats, and pipe insulation during the initial energy assessment.
10. Use virtual audits and hybrid audits to add more customized program participation pathways.
11. Consider adding a behavioral program.
12. Consider adding a midstream smart thermostat program.

Low Income Sector

13. Investigate the cause of the low cost to achieve for Enbridge Gas compared to other leading jurisdictions and ensure that most resources are dedicated to comprehensive energy retrofits.
14. Ensure that Enbridge Gas's programs are able to meet the needs of smaller, one- to four-family low-income rentals including the ability to easily initiate and complete the participation process, in addition to larger multi-family renters. Consider adding a scorecard metrics to explicitly reward participation in this segment.
15. Ensure large multi-family buildings are treated comprehensively with both in-unit and common area measures, even if the common area measures do not go through the "low-income" program.
16. Closely coordinate with any non-profits, community action agencies, federal/local governments, etc., who are offering programs or funding for efficiency in Low Income buildings. Any additional funding would ideally be used to prioritize cost & safety upgrades so that Enbridge Gas funds can be used to push to install more measures on the cost-effective priority list. Enbridge Gas could also leverage existing infrastructure by providing funding directly to these agencies.
17. Link efficiency programs with credit collections and payment plan departments, as is being done in Illinois.

Commercial and Industrial Sector

18. Significantly reduce or eliminate incentive caps for C&I projects.
19. Perform a process evaluation with an express goal of understanding programs influence on decision making process and recommend ways to increase participation and reduce free ridership.
20. Consider moving towards negotiated incentives for custom projects.
21. Evaluate the effectiveness and extent of current account management for large and medium customers and encourage account managers to push to create multi-year Memoranda of Understanding outlining specific energy commitments. Alternatively, expand the Energy Performance (Whole Building P4P) program to include all large C&I customers.
22. Consider adding RCx/SEM/Energy Manager programs.
23. Ensure that the Small Business Direct Install Program effectively integrates with the electric side, and focus the gas program on envelope measures, as is done in the residential sector.
24. Revisit the technical caps for the Large Volume Program, for both technical assistance and implementation.
25. Ensure robust project-level measurement and verification activities on projects funded through the Large Volume program.
26. Withhold a portion of the efficiency charge on the Large Volume Self-direct to help cover program administrative costs.
27. Clarify cost-effectiveness requirements, and ensure that each customers' multi-year efficiency plan is cost-effective on an aggregate level.

28. Ensure that Enbridge Gas's other programs can effectively meet the needs of eligible customers, with a goal of demonstrating enough value that customers opt not to self-direct.

New Construction

29. Revamp the incentive structure on Energy Star Homes to motivate additional participation, reduce free ridership, and encouraging additional savings beyond the minimum to achieve Energy Star certification.
30. Add pre-construction financial support for builders constructing net zero homes for feasibility studies, modeling, and other expenses needed to achieve net zero. Also consider adding an intermediate savings level which gives increased incentives for buildings that approach net zero but do not quite reach it.
31. Offer financial incentives on Commercial New Construction, in addition to training and workshops.
32. Increase the incentive cap for both the ENSH and NZER offerings.
33. Measure the baseline as standard practice, rather than code minimum.
34. Offer incentives for additions and major renovations for residential projects.