
2014 OEB Gas DSM Framework Issue Paper:

Setting Savings Targets and Budgets

On March 31, 2014, the Ontario Energy Minister issued a Directive that the Ontario Energy Board (OEB) establish a new gas DSM framework that will enable the province's regulated gas utilities to acquire all cost-effective energy efficiency resources. Among the most important elements of that framework will be guidance on how both savings goals and DSM budgets for meeting those goals are to be established. This paper addresses those issues, making clear that savings and budget levels will need to increase substantially to comply with the Minister's directive.

Savings Goals

The Minister's directive clearly states that the goal should be to acquire all cost-effective efficiency resources. Thus, savings goals should be based on a determination of how much efficiency could be acquired. Since there is no single "formula" or even a single type of study or analysis for making that determination, some judgment is needed and that should be informed by several types of information including potential studies and the experience of other jurisdictions with similar objectives.

Potential Studies

Efficiency potential studies can be a useful tool for informing savings goals, as they provide an objective assessment of efficiency potential that is based on the size and characteristics of local markets for efficiency products and services.

However, they also have some important limitations. First, they produce inherently conservative results because, among other things, they cannot a) anticipate new efficiency technologies that will develop over time, b) anticipate reductions in the cost of efficiency measures that can develop over time, c) imagine the full range of custom efficiency measures for large commercial and industrial customers (i.e. measures whose application may be specific not only to a particular industry, but even to a particular facility), and d) anticipate innovations in the design and delivery of efficiency programs that can either reduce costs or increase effectiveness in acquiring savings.¹

¹ For further discussion of these and other conservatisms see: Goldstein, David B., "Extreme Efficiency: How Far Can We Go If We Really Need To?", 2008 ACEEE Summer Study Proceedings, Volume 10, pp. 44-56

A related concern is that potential studies often rely on very simplistic ways of forecasting how much of the economic potential is actually “achievable”. For example, many assume that market penetration is entirely a function of customer paybacks and make largely untested assumptions about customers’ willingness to invest in efficiency at different payback periods. In reality, achievability is a function of the nature and severity of a variety of different market barriers – only some of which are financial – to the adoption of an efficiency technology. DSM experience also suggests addressing financial concerns is important, but other benefits of efficiency – including improved comfort, improved building durability, improved business productivity and many others – can often be used effectively to sell efficiency. Put simply, efficiency programs must be carefully designed to both address all market barriers and to leverage other benefits that efficiency measures offer – using a variety of tools including education, training, financial incentives, financing, labeling/certification, marketing, etc. It is important to recognize that the market barriers and market opportunities vary considerably from measure to measure and market to market. It is usually not possible – i.e. typically well beyond the budget available – for contractors conducting potential studies to separately assess all of the barriers and opportunities for all measures and to then separately develop market penetration estimates for each measure and market given the nature of those barriers. As a result, regulators in at least one jurisdiction (California) have simply assumed that 70% of economic potential can be captured.²

One possible additional and critically important limitation is that many efficiency potential studies rely on avoided costs that do not fully capture the value of efficiency (see TAF’s companion paper on cost-effectiveness screening).

No gas efficiency potential studies have been recently completed in Ontario. The last Enbridge Gas Distribution potential study was completed in 2009 -- it suggested that maximum achievable potential was approximately 12% over a ten year period, an average of 1.2% per year.³ The last Union Gas assessment of efficiency potential was a 2011 update to a 2008 study -- it estimated that maximum achievable potential was approximately 14% over a ten year period, an average of nearly 1.4% per year.⁴ Both the Enbridge and Union studies assumed that only 46% of economic potential could be acquired through DSM. As noted above, that is lower than California regulators and other studies have suggested is possible. Also, neither

² California Public Utilities Commission, “Interim Opinion: Energy Efficiency Portfolio Plans and Program Funding Levels for 2006-2008 – Phase 1 Issues”, Decision 05-09-043, September 22, 2005.

³ Marbek Resource Consultants, “Natural Gas Energy Efficiency Potential: Update 2008”, presented to Enbridge Gas Distribution, September 2009.

⁴ ICF Marbek, “2008 Natural Gas Efficiency Potential Study with 2011 Summary Report Update”, submitted to Union Gas, July 2011.

study fully considered the savings potential from (typically) low cost operational efficiency improvements in commercial buildings, which can be substantial.⁵

In addition to the limitations discussed above, the most recent Ontario studies are now old enough that they cannot reflect changes in the understanding of gas efficiency potential. Moreover, it is not clear that the avoided costs they used to value the benefits of efficiency either fully valued all of the benefits of efficiency (e.g. the benefits of deferring capital investments in transmission and/or distribution); nor is it clear that the avoided cost values for the benefits that they did assess are appropriate for today's market conditions.

Enbridge Gas is currently conducting a new potential study. However, it is not clear whether the study will assess maximum achievable cost-effective potential because the terms of reference for the study were developed before the Ontario Energy Minister's directive was issued. The Minister's directive also requires that a study of achievable natural gas efficiency potential in Ontario be conducted every three years (in coordination with the Ontario Power Authority's assessment of electric efficiency potential). However, the next such study is not required to be completed until June 1, 2016. This likely limits the ability of the OEB and other parties to rely extensively on potential studies to inform goal setting for the near term (i.e. 2015).

Experience from Other Jurisdictions with Similar Objectives

Another important reference point for establishing "all cost-effective" savings goals should be the experience of other jurisdictions, particularly those also operating under an "all cost-effective" mandate and with similar climates⁶. Their experiences should be assessed both in aggregate – i.e. across all customers and sales – and at the sector level; the latter is important because achievable efficiency potential can vary substantially from sector to sector, particularly over short to medium time horizons. For example, savings potential in the industrial sector is often viewed as more substantial – at least in the short and medium terms – than potential in the residential sector.⁷ Thus, utilities or jurisdictions with proportionally greater sales to residential customers will typically have lower total savings as a percent of total sales than utilities or jurisdictions with proportionally greater sales to industrial customers, particularly larger industrial customers.

⁵ See testimony from Environmental Defense witness Ian Jarvis in EB-2012-0451.

⁶ Similar climates is important because much of gas use in residential and commercial buildings in northern climates is related to space heating.

⁷ Residential savings potential is still quite substantial, but because it requires retrofit treatment of many more customers, it will take longer to fully acquire the potential.

Right now, there are only two other “cold climate jurisdictions” in North America that have a mandate to pursue all cost-effective gas DSM: Massachusetts and Rhode Island. Both of those jurisdictions are proposing to capture savings equal to about 1.1% of total (all sector) sales in their current plans for 2015.⁸ Though not operating under an “all cost-effective” mandate, gas utilities in Vermont (1.1% in 2013) and Minnesota (1.5% in 2015 plans) have comparable savings levels (again, in aggregate across all sectors). In both Massachusetts and Rhode Island, approximately 50% of gas sales are to residential customers and only about 20% to industrial customers.⁹ Gas sales in Ontario are less heavily weighted towards the residential sector and more heavily weighted towards the industrial sector. Thus, one would expect savings potential in Ontario to be higher than in Massachusetts and Rhode Island, at least in the short and medium term.

Budgets

Given the Ontario Energy Minister’s directive, the budgets made available for DSM on Ontario should be sufficient to capture all cost-effective gas efficiency – i.e. to meet the savings targets discussed above. Ideally, the determination of how much money that would be would be based on “bottom up” assessments – market by market – of what state-of-the art energy efficiency programs would need to do, how they would be designed and the level of financial resources those designs would require to be as effective as possible. That said, the DSM budgets of other jurisdictions that are mandated and endeavoring to acquire all cost-effective gas efficiency potential (or even similarly aggressive levels of savings) can be used as a useful reference point.

Experience of Other Jurisdictions with Similar Objectives

Consider these four jurisdictions: two cold climate jurisdictions currently required to pursue all cost-effective gas efficiency resources -- Massachusetts and Rhode Island – and two others – Vermont and Minnesota – with at least comparable energy savings goals. As Table 1 shows, these four jurisdictions have annual DSM budgets that range from 3½ to 13 times (average of 8 times) greater than the current Ontario utility DSM budgets on a gas sales normalized basis. Put another way, if the Ontario gas utilities DSM budgets were to increase to levels comparable to those of leading jurisdictions, they would be at least \$100 million per year per utility – at least \$200 million for the province – and potentially several times that amount.

⁸ Based on savings forecast in the utilities’ most recently filed DSM plans and 2012 sales from the U.S. Energy Information Administration’s form 176 data.

⁹ U.S. Energy Information Administration data from EIA form 176 for calendar year 2012.

Table 1: Leading Jurisdiction vs. Ontario DSM Budgets¹⁰

	Total Gas Sales (m ³)	Gas Sales Reference Year	Total DSM Budget	Budget Reference Year	DSM Budget per m ³ Sales
<i>Leading Jurisdictions</i>					
Massachusetts	6,319,346,456	2012	\$ 191,766,032	2015	\$0.0303
Minnesota	4,790,121,305	2012	\$ 50,833,263	2015	\$0.0106
Rhode Island	957,519,137	2012	\$ 23,491,410	2014	\$0.0245
Vermont	227,572,544	2012	\$ 1,884,124	2013	\$0.0083
Average					\$0.0184
<i>Ontario Utilities</i>					
Enbridge	11,300,100,000	2012	\$ 30,606,510	2012	\$0.0027
Union	14,617,390,000	2012	\$ 31,322,216	2012	\$0.0021
Average					\$0.0024

It is worth noting that many other jurisdictions across North America – including many who clearly do not have a mandate to pursue all cost-effective efficiency and are not attempting to even get close to that level of savings – have historically had DSM budgets that are considerably greater than the Ontario gas utilities’ budgets. The spending metric used by the American Council for an Energy Efficient Economy (ACEEE) to compare gas DSM spending between states is: total spending per residential customer. In 2011, the Ontario gas utilities spent a combined \$55.2 million on gas DSM.¹¹ That represents an average of about \$15 per residential customer.¹² In the same year, 18 U.S. states - including the southern states of Florida and Arkansas – spent at least \$20 per residential customer; 11 of those states spent at least twice as much as Ontario (i.e. over \$30 per residential customer).¹³ Both British Columbia and Manitoba

¹⁰ U.S. sales data from U.S. Energy Information Administration form 176 data (2012 is the most recent year for which data are available). Note that sales data for Massachusetts and Minnesota are only for sales by investor-owned utilities subject to DSM requirements and, in the case of Minnesota, exclude sales to transport customers which do not pay for or receive DSM services. Sales forecast for Enbridge Gas from EB-2012-0451/EB-2012-0433/EB-2013-0074, Exhibit I.A4.EGD.GEC.34; sales estimate for Union gas from EB-2011-0210, Exhibit C4, Tab 2, Schedule 1. DSM spending values for each state are from regulatory filings of the affected utilities in the state. DSM spending for Enbridge and Union Gas are from their respective 2012 annual reports (sometimes call “annual evaluation reports”).

¹¹ Enbridge Gas Distribution, “2011 Draft DSM Annual Report”, April 2012; and Union Gas, “Final Audited Demand Side Management 2011 Annual Report”, June 29, 2012.

¹² According to NRCAN, there were 3.65 million residential gas customers in Ontario in 2011.

¹³ Downs, Annie et al., “2013 State Energy Efficiency Scorecard”, published by the American Council for an Energy Efficient Economy, Report E13K, November 2013.

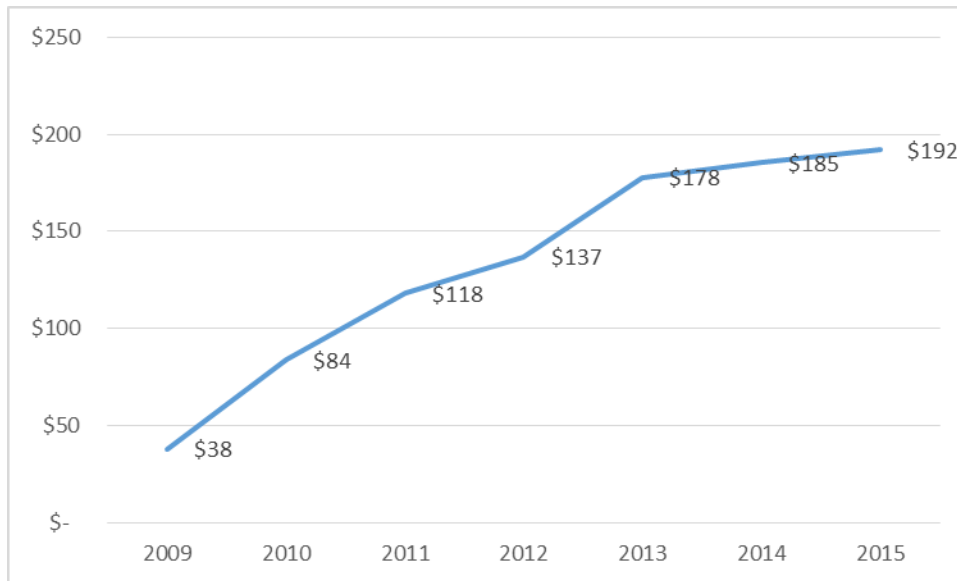
are also currently planning to spend two to three times as much on gas DSM (per m³ of gas sales) as Ontario's gas utilities spent in 2012. Put simply, gas DSM spending in Ontario has been lagging behind not only leading jurisdictions, but even "middle of the road" jurisdictions, for a number of years.

Ramp Up Period

Though gas DSM budgets in Ontario would need to increase dramatically to get to the point where the province was acquiring all cost-effective efficiency, it would not be reasonable or prudent to expect the increase to take place immediately. Some period of ramp up would be necessary to ensure that there is sufficient time to develop new and more aggressive programs, and to increase utility and private sector delivery capability in a reasonably efficient and effective manner. The experience of the Massachusetts gas utilities may be instructive in this regard. As Figure 1 below demonstrates, Massachusetts budgeted only \$38 million for gas DSM in 2009,¹⁴ the year that a new legislative requirement to acquire all cost-effective efficiency went into effect. Spending then more than doubled the following year and continued to increase fairly linearly until 2013, at which point increases leveled off. In other words, the state ramped up to acquiring all cost-effective efficiency – with a nearly five-fold increase in budget – over the course of about 4 years.

¹⁴ Note that the 2009 budget was still more than twice per m³ of annual gas sales (\$0.0060) than the current Ontario gas utility DSM budgets (\$0.0024).

Figure 1: Massachusetts Gas DSM Budgets, 2009 to 2015 (millions of nominal dollars)¹⁵



Addressing Rate Impact Concerns

Historically, when the subject of potential increases in DSM spending is raised, some stakeholders have expressed concerns about resulting rate impacts. While the Energy Minister’s directive to pursue all cost-effective efficiency does not include any caveats related to rate impacts, some discussion of the topic may be warranted to address common misconceptions.

To begin with, it should be emphasized that, customers’ principal concern is with their total energy bill, rather than the price (rate) per unit of energy consumed; indeed, most residential and smaller business customers do not even know what their gas rate is. Any customer would prefer to have a 5% higher rate if it got a 20% reduction on consumption at the same time (resulting in a total energy bill reduction of 16%). Efficiency investments that pass a TRC cost-effectiveness screening test will, by definition, reduce the total gas bill of all customers. Thus, concerns about rate impacts associated with energy efficiency tend to be about equity (i.e. about the customers who do not participate in efficiency programs), which can be addressed by offering a broad enough portfolio of programs so that, over time, all customers have the opportunity to reap the benefits of efficiency.

¹⁵ Budgets for 2009 through 2012 from ACEEE State Energy Efficiency Scorecards for 2010 through 2013; budgets for 2013 through 2015 from Massachusetts Department of Public Utilities order in regulatory proceedings 12-100 through 12-111, January 31, 2013.

It is also important to recognize that there are four factors associated with DSM that could potentially affect rates:

- DSM spending, which has the effect of increasing rates;
- Avoided capital expenditures, such as on transmission and distribution systems, which have the effect of lowering rates;
- Lower demand, which has the effect of lower rates; and
- The spreading of fixed utility costs across a smaller volume of sales (commonly called utility “lost revenue”) which has the effect of increasing rates.

To suggest that the last of these is a concern is tantamount to suggesting that the province would not want consumers to save energy even if savings could be acquired for free, or worse, that the province would prefer that its residents and businesses wasted more energy so that rates could go down. It is hard to imagine any such interpretation of provincial policy. Thus, the only three effects that should be of interest are the upward pressure on rates caused by DSM spending, the downward pressure on rates caused by avoided capital expenditures, and the downward pressure on rates caused by lower demand (commonly called price suppression effects).

The impact on rates of DSM spending deserves consideration. In 2012, Union Gas’ and Enbridge Gas’ customers were collectively forecast to consume about 26 billion m³ of gas. Assuming that annual gas sales remain at approximately those levels, every \$100 million in DSM budget would add an average of about \$0.0039 to the cost of an m³ of gas. Current residential gas costs are on the order of \$0.40 to \$0.45 per m³.¹⁶ Thus, assuming gas DSM spending was allocated approximately in proportion to sales by customer class, every \$100 million in gas DSM spending in the province would result in a residential rate increase of about 1%. Thus, gas DSM spending could increase by a factor of roughly five – to \$300 million between the two large gas utilities – and still add only about 3% to the average residential bill.

Moreover, that is just the cost side of the equation. The province’s gas utilities have not recently estimated the value of avoided capital expenditures associated with DSM. Nor have they ever estimated the price suppression effects of lower demand resulting from efficiency programs.¹⁷ Thus, we do not know the extent to which the impacts of DSM budgets on rates would be offset – perhaps even more than offset – by the factors that put downward pressure

¹⁶ All costs, including commodity, cost adjustments, transportation, delivery and fixed monthly charges divided by average annual consumption of 2200 m³ for Union Gas and 3000 m³ for Enbridge Gas (<http://www.ontarioenergyboard.ca/OEB/Consumers/Natural+Gas/Natural+Gas+Rates>).

¹⁷ See the TAF cost-effectiveness screening paper for further discussion of this topic, including estimates of the magnitude of this benefit estimated for other jurisdictions.

on rates. In addition, beyond the impact on capital expenditures, there would be substantial (TRC) economic net benefits – literally hundreds of millions of dollars – associated with each year of DSM implementation.

Since customers ultimately care more about their total gas bill than about the cost per unit of gas consumed, the best answer to any lingering concerns about rate impacts is to ensure that DSM portfolios become substantial enough and sufficiently balanced so that all customers can access programs over time.

Conclusions

Ultimately and ideally, gas savings goals and budgets to achieve those goals should be based on a bottom-up assessment of the opportunity to acquire all cost-effective gas efficiency resources. In the meanwhile, all available evidence suggests that Ontario’s gas savings goals should increase substantially – to in excess of 1% of sales per year – and that the utilities’ budgets should increase fairly dramatically – by at least three-fold (i.e. to at least \$200 million per year) and likely to considerably higher levels given the in-efficiency of the market.

Attribution and Use

This brief has been prepared for TAF by Chris Neme, Energy Futures Group, with research support from TAF Policy Researcher, Rebecca Mallinson. Please treat this material as ‘draft’ as elements may evolve during the course of discussions and in the formulation of input to the formal OEB consultation. Please note that the views and ideas expressed in these briefs are presented by the Toronto Atmospheric Fund to support the discussion around developing a new gas DSM policy framework. We welcome your views about these or other issues related to natural gas conservation policy in Ontario.