

Natural Gas Conservation Programs

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Abstract

Natural gas supplies about 37% of Ontario's energy needs. Reducing natural gas use through conservation is important for reducing energy bills and for climate change mitigation.

This chapter reviews 2015 conservation program results (the most recent results available) from Ontario's two major natural gas utilities (Enbridge Gas Distribution and Union Gas), and policy developments in 2016 that directly affect utility conservation programs. 2015 results have yet to be verified by a third party and approved by the Ontario Energy Board and could still change significantly.

Based on draft results, overall natural gas savings for Union Gas were down 17% from 2014, primarily due to a drop in savings from large industrial customers. Enbridge's results were 20% higher than in 2014, due to higher savings from commercial and low-income customers.

Both companies have programs in the residential, commercial and industrial sectors. Programs are also dedicated to low-income residents, at low or no cost to participants. In the residential sector, the focus is on deep home retrofits, a program that has grown rapidly in recent years. Savings from commercial and industrial customers dominate overall program results. However, given the higher cost of electricity, these customers will often favour electricity conservation programs over natural gas programs as the rate of return is higher. This puts natural gas at a conservation disadvantage.

Total conservation spending for both utilities was \$68 million in 2015. Cost-effectiveness testing showed that natural gas utility conservation

programs make good sense – delivering roughly three dollars in benefits for every dollar spent.

There are greenhouse gas emissions reductions associated with not burning natural gas. For each year of program activity, conservation programs have resulted in a reduction of approximately 0.2% of Ontario's annual greenhouse gas emissions (300,000 tonnes per year). The average abatement cost of conservation from the utility perspective (not even including the savings from purchasing less natural gas) has been around \$15 per tonne of carbon emissions, cheaper than the current cost of allowances in the cap and trade program.

In a carbon-constrained economy, gas conservation makes even more sense. This has been reflected in a new six-year conservation framework and expanded budget for natural gas conservation. While 2015 was the first year of the new framework, due to a late start, it served in reality as a transition year that rolled over programs and budgets from 2014. Budgets for both companies combined will increase significantly to just under \$120 million per year, beginning in 2016. This is still much less than is spent on electricity conservation.

Given its climate mitigation potential, funding for gas conservation is also being made available by the Ontario government from additional sources, such as the Green Investment Fund and, in the future, potentially the Green Ontario Fund (Ontario's green bank). Careful oversight will be needed to ensure that these initiatives do not conflict and that utility programs continue to be delivered as effectively as possible.

5.1 2015 Program Results

5.1.1 Year One of a New Conservation Framework

Natural gas supplies about 37% of Ontario's energy, mainly to heat homes and buildings, heat water and run factories. In the mid-1990s, the Ontario Energy Board (OEB) decided that Ontario's gas utilities had a role to play in helping their customers reduce energy use and use this natural resource as efficiently as possible. Utilities were tasked with designing and delivering the gas conservation programs (also known as demand-side management or DSM) to their customers and be compensated for doing it, but with oversight by the OEB.

In a carbon-constrained economy, gas conservation makes even more sense. This has been reflected in a new six-year DSM Framework for the period 2015 -2020, established by the OEB.¹ The new framework provides increased budgets for natural gas conservation, and reflects the importance in the Ontario Government's Long-Term Energy Plan of putting conservation first.² It is also intended to increase the alignment between gas and electricity conservation activities and so covers the same time period as the electricity conservation framework. The ultimate goal is to ensure that resource savings are achieved as efficiently as possible and that customers receive the greatest opportunities to lower their bill by reducing consumption.³

Natural gas supplies about 37% of Ontario's energy.

Because the new framework was not released until December 2014, conservation program activities (budgets, targets, programs) in 2015 were essentially rolled over unchanged from 2014 (with minor exceptions noted later in the chapter). The new framework and expanded budget will take full effect in 2016.

The results reported in this chapter are based on the companies' 2015 unaudited draft results,⁴ thus, the findings may change.

5.1.2 Why Reported Results May Change

The conservation program results reported in this chapter are still considered "draft" more than eighteen months after the end of 2015. Why is this so, and what may change?

The transition from draft results to final results can include two major adjustments (i.e., the realization rate and the net-to-gross adjustment), usually done as part of a program evaluation. These adjustments can involve significant work by the evaluator, and are usually based on detailed analysis from a representative sample of projects. A high level of rigour in evaluation is often warranted in order to accurately measure the value of the conservation programs, and because significant financial incentives to the utilities are tied to the final evaluated results.

Realization Rate: A ratio of the final assessment of the energy savings from a conservation project to the original calculated estimate, based on additional information (often gathered through on-site visits or interviews with project participants). Factors that can affect energy savings and lead to a realization rate different than one include: changes in the number of hours a piece of equipment operates; the efficiency difference between the baseline and efficient technology; and the expected operating life.

Net-to-Gross Adjustment: Once the realization rate is calculated, the actual gross energy savings are known, but need to be converted (usually downward) into net savings through a net-to-gross

adjustment. The primary input to the net-to-gross adjustment is a correction for free ridership. There will be customers who would have undertaken conservation projects without the programs offered by gas utilities, but they may still participate in order to receive an incentive, and are known as free riders. Savings from these customers are excluded from the net savings attributed to the program, as they would have happened anyway.

All savings reported in this chapter are net savings, but are based on net-to-gross adjustment factors (e.g., a 54% reduction in savings in the case of Union's custom commercial and industrial projects) that may change with the results of the 2015 evaluation.⁵ For the mid-term review of natural gas conservation, both companies will be required to show how they have improved program design in order to lower free ridership. Reducing free ridership means that conservation spending is used more effectively and has a larger impact.

For the 2015 evaluation, both the realization rate and the free-ridership rate are being reviewed for custom commercial and industrial conservation projects. As these projects make up the bulk of reported energy savings from conservation, final results could change substantially if changes to either the realization rate or the free-ridership rate are significant. The process for evaluating 2015 results has taken longer than in previous year's due to the change in evaluation oversight to an OEB-led model (and an increased evaluation work load), as noted later in the chapter. Final evaluated results are expected within the next few months.

5.1.3 2015 Overall Natural Gas Savings

Utilities measure both the annual and cumulative natural gas savings from their conservation programs.

Annual savings is the reduction in natural gas use in the first year after a conservation measure is implemented. **Cumulative savings** adds up the natural gas savings achieved in each year, over the lifespan of a conservation measure. Different life expectancies are attributed to different measures. For example, an efficient showerhead will save a homeowner gas on the hot water used this year, and because the showerhead is expected to last 10 years, the cumulative savings will be 10 times the annual savings.

Cumulative natural gas savings is the primary metric the OEB uses to measure the success of most natural gas conservation programs. This rewards utilities for pursuing long-lasting conservation measures that will deliver savings for many years (e.g., building envelope improvements) and incents utilities to capture as much conservation as possible for the budget provided.

The cumulative natural gas savings (shown by sector) that each utility achieved in each year from 2012 to 2015 are shown in Figures 5.1 and 5.2 for Union and Enbridge Gas Distribution (EGD) respectively. DSM results have been variable. Union's results have declined in the past two years, with overall savings in 2015 being 17% lower than in 2014, and 44% lower than in 2013. This is primarily due to a drop in savings from large industrial customers. EGD's results rebounded slightly in 2015 and were 20% higher than in 2014, due to higher savings from commercial and low-income customers.

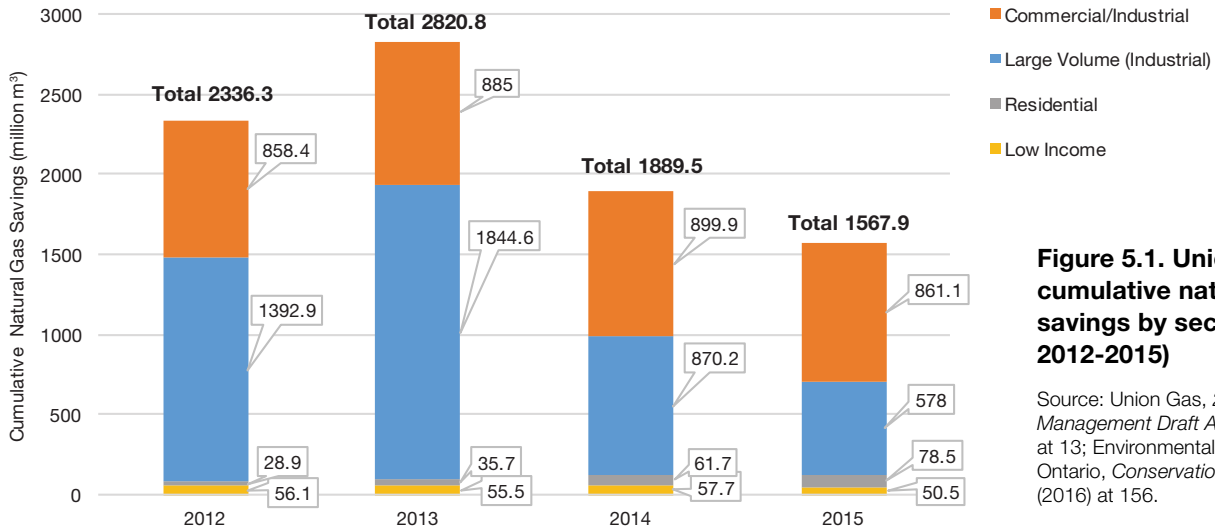


Figure 5.1. Union Gas cumulative natural gas savings by sector (Ontario, 2012-2015)

Source: Union Gas, *2015 Demand Side Management Draft Annual Report* (2016) at 13; Environmental Commissioner of Ontario, *Conservation: Let's Get Serious* (2016) at 156.

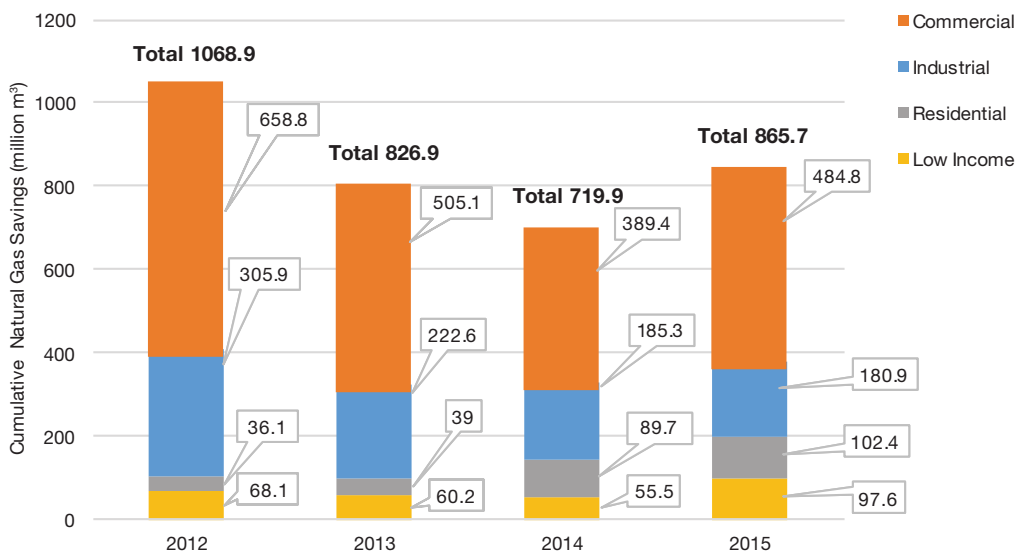


Figure 5.2. Enbridge Gas Distribution cumulative natural gas savings by sector (Ontario, 2012-2015)

Source: *Enbridge Gas Distribution, 2015 Demand Side Management Draft Annual Report* (2016) at 27; Environmental Commissioner of Ontario, *Conservation: Let's Get Serious* (2016) at 156.

Annual net gas savings are also a useful measure of conservation impact, as they can be compared with annual utility gas sales to determine how much impact conservation is having on overall gas consumption. This is shown in Table 5.1. It can be seen that the volumes saved as a percentage have remained more or less constant over the past three years, Union achieving a greater percentage than EGD. On average, all of the

conservation projects delivered in a year reduce gas consumption by 0.5-1%. Of course, most projects deliver savings for more than one year. If we assume that all conservation measures installed from 2007 onwards were still delivering savings in 2015 (a slight overestimate), gas use in 2015 was 8% lower than it would otherwise have been for Union, and 5% lower for EGD, due to utility conservation programs.⁶

Table 5.1. Net Annual Gas Savings From Conservation as a Percentage of Overall Utility Gas Sales

	2012	2013	2014	2015
Enbridge	0.6%	0.4%	0.4%	0.4%
Union	1.0%	1.3%	0.9%	0.8%

Note: Percentage of gas sales excludes sales to the small number of utility customers in rate classes not eligible for conservation programs.

Source: Union Gas, *2015 Demand Side Management Draft Annual Report (2016)* at 10; Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report (2016)* at 23.

Gas use in 2015 was 8% lower than it would otherwise have been for Union, and 5% lower for Enbridge, due to utility conservation programs.

5.1.4 Greenhouse Gas Emissions Reductions

For every cubic metre of natural gas not combusted due to conservation, there is an associated reduction in greenhouse gas (GHG) emissions. When combusted, natural gas emits primarily carbon dioxide, with minor amounts of methane that is not combusted and nitrous

oxide. The ECO's estimate of the GHG reductions due to utility conservation programs is shown in Table 5.2. Each year, net annual savings from DSM programs, described above, have resulted in a reduction of approximately 0.2% of Ontario's GHG emissions.

Table 5.2. Annual Greenhouse Gas Emissions Reductions (t CO₂e) from Gas Utility Conservation Programs (2012 – 2015)

	2012	2013	2014	2015
Enbridge Emissions Reductions	112,703	88,940	81,115	94,491
Union Emissions Reductions	256,042	335,278	245,590	203,522
Total Emissions Reductions	368,744	424,218	326,705	298,013
Overall Ontario Emissions (Rounded)	171,000,000	171,000,000	168,000,000	166,000,000
Emissions Reductions From Conservation as a % of Overall Ontario Emissions	0.22%	0.25%	0.19%	0.18%

Note: Does not include reductions in upstream emissions. The emissions factors used are the same as for when reporting greenhouse gas emissions to the Ministry of the Environment and Climate Change.⁷

Source: ECO calculation⁸ based on net annual natural gas savings provided in: Union Gas, *2015 Demand Side Management Draft Annual Report (2016)* at 10; Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report (2016)* at 22; Environment and Climate Change Canada, *National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada, Part 3 (2016)* at 58.

5.1.5 Program Budget and Spending

The results that can be achieved from conservation programs depend on the budget provided. The budget needs to have a reasonable rate impact but still provide sufficient opportunity to the companies to pursue cost-effective conservation opportunities. As shown in Figure 5.3, under the new conservation framework, the OEB has significantly increased the utility conservation budget beginning in 2016 until 2020, resulting in an annual average budget of about \$60 million for Enbridge and \$57 million for Union.⁹ This increase will support an expanded delivery of DSM programs across all customer classes, and responds to the Minister of Energy's direction that the gas conservation framework should enable the achievement of all cost-effective DSM. The increased budget for gas conservation, while higher

than most North American jurisdictions, is still only about one-third of what will be spent on electricity conservation in the same time period based on the IESO approved budget for 2015-2020 of \$2.2 billion.¹⁰ The OEB also decided that the rate impact on a typical residential gas customer should not be more than \$2/month.

The increased budget for gas conservation is still only about one-third of what will be spent on electricity conservation.

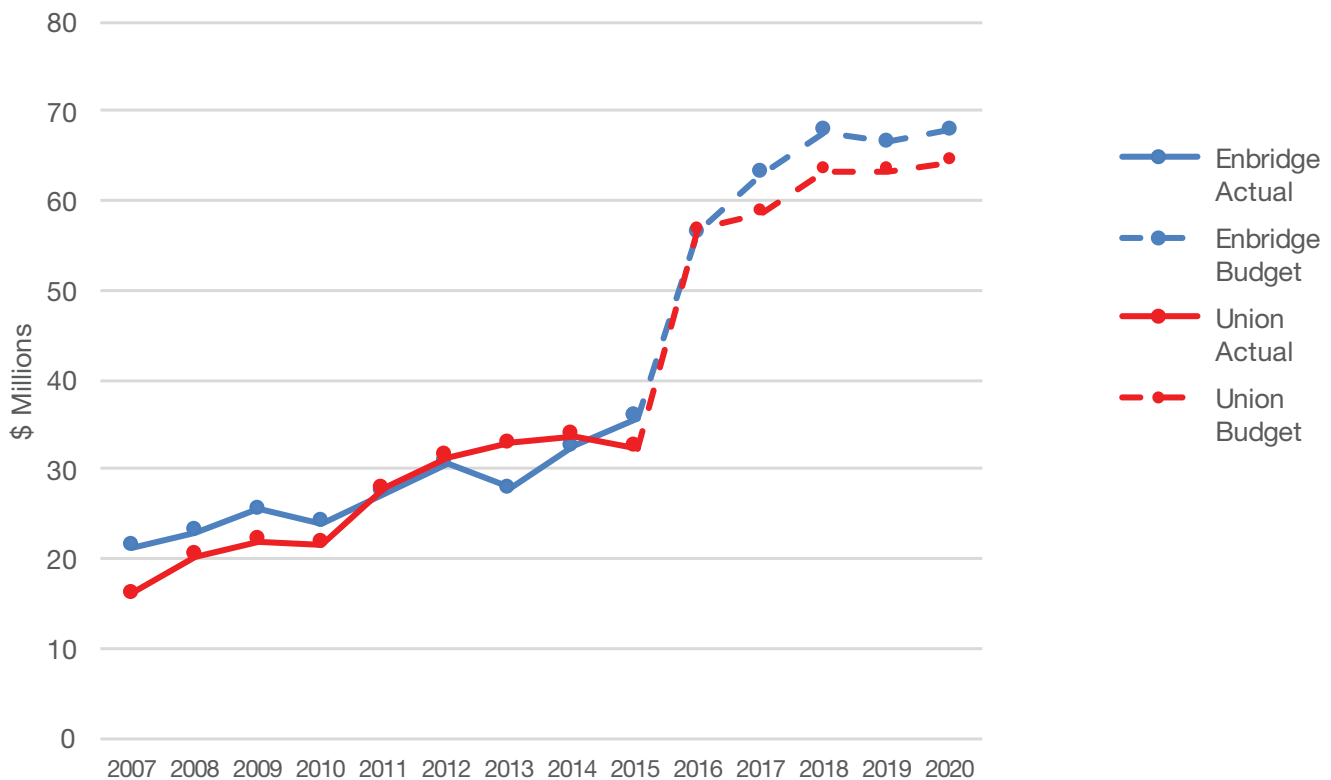


Figure 5.3. Historical spending and forecast budget for natural gas utility conservation (Ontario, 2007-2020)

Source: Union Gas, *2015 Demand Side Management Draft Annual Report* (2016) at 8; Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report* (2016) at 19-20.

In 2015, conservation budgets and spending were lower than this. This is because the new framework was not finalized until December 2014, so DSM program budgets for both utilities were kept at 2014 levels for 2015.

In their 2015-2020 plans, EGD and Union both identified additional initiatives and spending for 2015, over and above the 2015 program budgets, that would help transition to the higher level of program activity planned for 2016-2020. Projected 2015 spending for these incremental items amounted to \$4.92 million for EGD and \$1.4 million for Union. These amounts were not built into their rates but would require approval by the OEB at a later date.

DSM budgets and actual spending for both 2015 programs and incremental activities are shown in Table 5.3. Total DSM spending for both utilities was \$68 million in 2015. Both utilities spent their full program budgets, with Enbridge spending several million dollars more, due to the popularity of its Home Energy Conservation program (utilities are allowed to access some additional funding if programs are more successful than anticipated). Union spent 4% of its revenue and EGD spent 3.4% of its revenue on DSM programs in 2015.

The story was different for spending on incremental activities. Given the uncertainty surrounding the OEB's approval of this spending (which was eventually given, but not until January 2016), neither company ended up spending more than a small portion of their incremental funding.

Table 5.3. 2015 DSM Budget vs Spending for the Gas Utilities

Activity	Enbridge		Union	
	2015 Budget (\$)	2015 Actual Spending (\$, % of Budget)	2015 Budget (\$)	2015 Actual Spending (\$, % of Budget)
2015 DSM Programs	32,801,939	35,220,594 (107%)	32,587,879	32,178,765 (99%)
Incremental Spending on New Framework Activities	4,920,291	559,378 (11%)	1,400,000	213,879 (15%)
Totals	37,722,230	35,779,972 (95%)	33,987,879	32,392,645 (95%)

Source: Union Gas, *2015 Demand Side Management Draft Annual Report* (2016) at 73; Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report* (2016) at 106.

5.1.6 Cost-Effectiveness

In order to ensure that DSM provides value to customers, the OEB requires that most programs pass a cost-benefit test before being offered. The required test has been the Total Resource Cost (TRC) test, which compares the costs of conservation (primarily the program administration cost and the incremental cost of energy-efficient technologies) against the benefits (primarily the financial value of energy savings). In the new framework, the test now increases the benefits by including a 15% adder to account for the non-energy benefits (including emissions reductions) associated with the programs. This modified test is referred to as the TRC-Plus test. Whether using the TRC or TRC-Plus test, a value of greater than one indicates that a program is expected to be cost-effective.

Cost-benefit calculations are performed again after programs have been delivered. Enbridge adopted the TRC-Plus test in reporting 2015 results, while Union will do so in 2016. In 2015, Union's portfolio had a TRC ratio of 2.73, indicating program benefits were almost three times as high as the costs. Enbridge's results showed a TRC-Plus ratio of 3.61. This cannot be directly compared with Union's results due to the difference in the test used.

Costs and benefits can also be looked at from the perspective of the utility. How much does the utility need to pay to save a cubic metre of gas? In simple terms, the total DSM program cost in 2015 was \$68.173 million¹¹ (including the cost of initiatives that did not have directly measurable gas savings, but excluding shareholder incentives) and the total cumulative gas savings were 2,433,699,754 m³.¹² The (non-discounted) cost per cubic metre of gas saved is 2.8¢/m³.

Put into the context of Ontario's carbon price (as established by its new cap and trade program), 2.8 ¢/m³ would be equivalent to paying \$15/t CO₂e over the lifetime of the conservation measures.¹³ This price is lower than the market price of GHG allowances, which was established at just over \$18/t CO₂e in Ontario's first two auctions. What's more, this estimated cost

of conservation does not even include the additional benefits for natural gas distributors that would accrue from distributing less gas.

These results suggest that utilities should examine spending more on conservation (beyond their approved DSM budgets), as part of their cap and trade compliance plans (see Section 5.2.2). Over the long term, more conservation may be a less expensive way to meet cap and trade compliance obligations than purchasing allowances, although this is not guaranteed (the incremental cost of conservation tends to increase as more conservation programs are implemented.) This will benefit gas customers who will bear the full burden of the cost of purchasing cap and trade allowances. In other words, when conservation is cheaper for customers than cap and trade allowances, it should be turned to first.

Utilities should examine spending more on conservation as part of their cap and trade compliance plans.

5.1.7 Program Highlights by Sector

As can be seen in Tables 5.4 and 5.5, both companies offer a variety of programs targeted to all customer segments. A brief description is given for each program

as well as the program activity, savings achieved, spending, and cost-effectiveness.

Table 5.4. Summary of Enbridge's Natural Gas DSM Programs and 2015 Program Results

Sector	Program	Description	2015 Program Activity	Cumulative Net Gas Savings (m ³)	Program Spending (\$)	Cost-Effectiveness: TRC-Plus Ratio ⁱ
Residential	Home Energy Conservation	Deep energy retrofit program designed to achieve at least 25% reduction in natural gas use in existing homes, through measures including building insulation, upgrades to space and water heating equipment, and window replacements.	5646 participating homes	102,415,214	9,362,295	2.51
Commercial	Commercial Custom	Capture energy efficiency opportunities in commercial buildings, including retrofits at time of replacement, such as installing high efficiency boilers, controls and building automation systems. Incentives of \$0.10/m ³ of annual gas savings.	563 projects	383,391,165		4.01
	Commercial Prescriptive	Fixed incentives for installation of prescriptive and quasi-prescriptive energy-efficient technologies in commercial buildings that impact space and water heating and food service equipment. Measures include demand control ventilation, small condensing boilers, and infrared heaters.	16,877 units	98,693,722		8.51
	Run It Right/Energy Compass	Encourage building owners to improve energy performance through low cost/no cost operational improvements and benchmarking. Energy Compass targets commercial customers who have a portfolio of buildings	28 participants	2,684,105		0.34
All Commercial Programs				484,768,992	6,221,724	4.34

ⁱ Ratio of benefits to costs. The higher the value, the more cost-effective the program. A value >1 indicates benefits exceed costs.

Industrial	Custom Solutions	Support for custom energy efficiency projects for larger industrial customers with significant process loads, accompanied by technical assistance and a continuous improvement approach. Incentives of \$0.20/m ³ for first 50,000 m ³ of annual savings, and \$0.05/m ³ above this.	116 projects	173,268,781		6.69
	Prescriptive	Fixed incentives for installation of prescriptive energy-efficient technologies in industrial applications, with a focus on air curtains and infrared heaters.	235 units	7,593,008		5.10
	All Industrial Programs			180,861,789	2,166,706	6.60
Low Income	Single Family (Home Winterproofing)	Offered to low income residents in single-family homes and low-rise multi-family homes, at no cost to participants. Focus on insulation and air sealing, as well as additional measures such as programmable thermostats and efficient showerheads.	1343 projects (586 social housing, 757 privately owned)	28,343,978	4,444,616	1.29
	Multi-Residential	Offered to low-income multi-residential buildings, social housing buildings, plus privately owned multi-residential buildings with a high proportion of low-income residents (City of Toronto only). A mixture of custom incentives and prescriptive incentives for building owners (higher incentives than in the commercial program). Free in-suite measures also provided to tenants.	96 projects	69,226,782	2,111,746	4.29
	Low Income Building Performance Management	Provides managers of low income multi-residential buildings with energy consumption information and benchmarking reports, as well as assistance to identify energy efficiency opportunities.	121 participating properties	Not tracked		Not applicable
	All Low Income Programs			97,570,759	7,173,710	2.46

Market Transformation	Residential Savings By Design	Promote use of the integrated design process to encourage construction of new homes to an energy efficiency standard 25% above the Ontario Building Code.	19 builders enrolled, 1987 new homes built in 2015 to higher standard	Not tracked	2,032,022	Not applicable
	Commercial Savings By Design	Promote use of the integrated design process to encourage construction of new commercial (part 3) buildings to an energy efficiency standard 25% above the Ontario Building Code. Offered to developments larger than 100,000 square feet.	24 new developments enrolled	Not tracked	890,464	Not applicable
	Home Labelling	Encourage realtors to use home energy ratings for resale homes.	10 new participating brokerages, 336 home ratings performed	Not tracked	121,241	Not applicable

Note: Program spending does not include overhead costs that are not associated with a specific program, thus costs are somewhat understated, and cost-effectiveness results are overstated. These overhead costs are included in the spending and cost-effectiveness results presented for the entire utility portfolio of conservation programs in Sections 5.2.4 and 5.2.5.

Source: Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report (2016)* at multiple locations.

Table 5.5. Summary of Union's Natural Gas DSM Programs and 2015 Program Results

Sector	Program	Description	2015 Program Activity	Cumulative Net Gas Savings (m ³)	Program Spending (\$)	Cost-Effectiveness: TRC Ratio ⁱⁱ
Residential	Energy Savings Kit	Pre-packaged measures to help reduce space and water heating provided at no cost to the customer. Delivery was either door-to-door or via online requests.	Distributed 19,753 kits and 1240 programmable thermostats	19,567,373		
	Home Reno Rebate	Home retrofit program designed to encourage home owners to install two or more measures to get significant energy savings and improved indoor air quality. Must achieve a minimum lifetime gas savings of 11,000m ³ using the HOT 2000 software. Rebates depend on the measure installed.	2541 participating homes	58,923,165		
	All Residential Programs			78,490,538	5,450,210	1.22
Commercial/ Industrial	Prescriptive/Quasi-Prescriptive	Measures have pre-determined savings based on the size and classification of the equipment. Incentives vary depending on the initiative installed. Consists of water heating, space heating, commercial kitchen initiatives.	3042 units	183,095,952	4,071,045	2.43
	Custom	Provides incentives for education and energy audit assessments, and for energy savings for custom projects outside the scope of prescriptive measures.	588 projects	678,002,610	7,297,352	3.06
	All Commercial/Industrial Programs			861,098,562	11,368,397	2.91
Low Income	Affordable Housing Conservation	Targets multi-family social and assisted housing market with custom and prescriptive measures. Increased incentives are also provided to help implement measures.	131 units	16,965,778		
	Home Weatherization Program	Provides low-income customers in single family homes with a free home energy audit and upgrades including various insulation measures. Other basic measures are also provided at the time of audit if they have not previously received them.	1472 participating homes	33,504,841		
	All Low Income Programs			50,470,619	7,701,035	0.85

ⁱ Ratio of benefits to costs. The higher the value, the more cost-effective the program. A value >1 indicates benefits exceed costs.



Market Transformation	Optimum Home Program	Designed to accelerate residential home builder's energy efficiency practices to 20% above Code. Program consists of three phases 1) Discovery - builder to build one home to new energy standard; 2) Production - test new building, lessons learned, training needs; 3) Transformation - full implementation to new production standards.	50.3 % of homes built by participating builders met higher efficiency standard.	Not tracked	1,405,340	Not applicable
Large Volume	Rate T2	These customers can directly access their customer incentive budget they pay in rates to identify and implement energy efficiency projects. This is a "use it or lose it" approach. Incentives also available for process improvement, feasibility studies, and metering.	92 projects	462,016,235		
	Rate 100	As for rate class T2.	18 projects	37,087,125		
	Rate T1	Incentives available for process improvement, feasibility studies, metering and custom energy efficiency projects.	40 projects	78,919,835		
All Large Volume Programs				578,023,195	3,209,716	4.68

Note: Program spending does not include overhead costs that are not associated with a specific program, thus costs are somewhat understated, and cost-effectiveness results are overstated. These overhead costs are included in the spending and cost-effectiveness results presented for the entire utility portfolio of conservation programs in Sections 5.2.4 and 5.2.5.

Source: Union Gas, 2015 Demand Side Management Draft Annual Report (2016) at multiple locations.

Some points of interest in the 2015 programs are noted below.

Residential Programs

- Both utilities have seen increased participation in their deep retrofit programs.

- In Enbridge's case, the program proved a victim of its own success, as excess demand led to the program being temporarily suspended in mid-year due to budget constraints (it was restarted in 2016). Some flexibility is provided to utilities to move funds between programs and access incremental funds for particularly successful programs, but this was not enough for Enbridge to meet program demand for the full year.

Both utilities have seen increased participation in their deep retrofit programs.

- Union also offered a highly successful home retrofit program (2015 participation levels were 2.5 times greater than 2014). This program (Home Reno Rebate) is designed to encourage home owners to install two or more measures to get energy savings, which must achieve a cumulative savings of 11,000 m³. There has been reluctance to promote this program by some contractors, fearing it will impact their timely sale of HVAC equipment.¹⁴

◦ In 2015, Union began promoting this program to townhouses and semi-detached homes (previously only detached homes were targeted) and over 100 homes of this type participated.

- Union's Energy Savings Kit (offering free water pipe insulation, low-flow showerheads, and faucet aerators) was discontinued after 2015 as a result of the OEB's decision on 2015-2020 DSM plans. Both utilities have offered this type of program for many years, and the OEB is of the view that the market for these measures is saturated. Enbridge exited this offering several years ago.

Commercial and Industrial Programs

- Both commercial and industrial customers must balance competing energy efficiency projects between natural gas and electricity programs, with a limited budget. With natural gas costs being low in comparison to electricity, the return on any energy efficiency investment will likely weigh more in the favour of electrical CDM activities to the detriment of natural gas DSM activities. This was noted as a concern by Enbridge and Union. For greenhouse gas reductions, natural gas conservation is likely more important than electricity conservation.
- Efforts are needed to reach smaller customers who have historically had little participation in conservation programs. Enbridge has set up a dedicated sales team to reach these smaller commercial customers and Union also flagged the need to increase awareness of conservation in this segment. This became a larger focus of program activity from 2016 forward.
- Enbridge's Run it Right program, which motivates improved energy performance in buildings through benchmarking and operational improvements, was not cost-effective, based on monitored year-to-year differences in energy consumption. Enbridge has found it difficult to accurately measure the energy impact of operational improvements, as these are often outweighed by other year-to-year differences that affect building consumption.
- Union has a direct access budget mechanism for its largest industrial customers, that allows these customers to have first access to a conservation

budget (funded from their rates) that can be used to implement energy savings projects. This program had high participation rates: 97% of eligible customers submitted energy efficiency plans and 78% completed at least one project, although only 33% utilized their entire budget.

Utilities have expanded their low-income programs in large multi-family buildings beyond social housing.

Low-Income Programs:

- Utilities have expanded their low-income programs in large multi-family buildings beyond social housing to private buildings with a high percentage of low-income residents. Union had a successful low-income market rate multi-family demonstration project in 2015 (this segment was not previously eligible for this program), while Enbridge had already made this building segment eligible, although only within the City of Toronto.
- Enbridge worked with Toronto Hydro to develop a pilot to integrate their respective low-income programs for single-family homes, and achieve both gas and electric savings in a single program with one application and delivery channel. If successful, the intent is to apply this model across the province.

Market Transformation Programs

- Enbridge's Savings By Design program encourages beyond-Code energy efficiency levels in commercial new construction. Enbridge has recognized that building types other than condos represent an opportunity to secure additional savings and has begun to target these developments, including schools, offices, churches and long-term care facilities.
- Enbridge exited the voluntary home labelling program. The goal of this program was to promote the value of voluntary home energy ratings to buyers and sellers in

the residential resale market, but the program did not ultimately prove successful in convincing realtors and clients to undertake home energy ratings as part of home sales.

- Union’s Optimum Home program is intended to accelerate residential home builders’ energy efficiency practices. By the end of 2015, nineteen of the top fifty builders in Union’s franchise area had advanced to the production and final transformation phases of the program.

5.1.8 Performance Against Targets

Utility performance on conservation is measured by the OEB against a complicated “scorecard” of targets. The 2015 targets were rolled over from 2014. Each utility is still eligible for performance incentives scaled to their performance against targets, paid for by ratepayers through natural gas rates. The most important targets for utilities are the cumulative natural gas savings achieved from their combined suite of resource acquisition programs in the industrial, commercial and residential sectors. However, the scorecards also include additional targets for progress on more specific conservation program goals. The 2015 draft conservation results in comparison to their targets for Enbridge Gas Distribution and Union Gas are shown in Table 5.6.

Table 5.6. Summary of 2015 DSM Performance Metrics Against OEB-Established Targets for Enbridge and Union Gas

Component	Performance Metric	Enbridge			Union		
		Weight %	Median Target With Upper and Lower Boundaries	Results	Weight %	Median Target With Upper and Lower Boundaries	Results
Resource Acquisition							
Gas savings from residential, commercial and industrial market segments	Cumulative savings (million m³ gas)	92	1,011.9 ± 25%	768.05	90	816.6 ± 25%	939.5
Residential deep savings	Number of participating homes, achieving 25% gas savings in aggregate	8	762 ± 25%	5,646	5	1245 ± 25%	2,537
Commercial/industrial deep savings	% reduction in baseline consumption among all custom projects	Not Applicable			5	8.88% ± 1%	8.24%
Low Income							
Single-family	Cumulative savings (million m³ gas)	50	24.1 ± 25%	28.34	60	26 ± 25%	33.5
Multi-family (part 3)	Cumulative savings (million m³ gas)	45	68.7 ± 25%	69.23	40	17.6 ± 25%	16.9
Low Income Building Performance Management	% of part 3 conservation participants enrolled in benchmarking program	5	40% ± 10%	65%	Not Applicable		



		Enbridge			Union		
Market Transformation							
Residential Savings by Design	Number of completed units built to 25% higher than Code	40%	1111 ± 25%	1,987	Not Applicable		
	Number of builders enrolled	60%	18 ± 33%	19			
Commercial Savings by Design	Number of new developments enrolled	100%	18 ± 33%	24	Not Applicable		
Home Labelling	Number of listings by realtors committed to providing data field for energy rating	50%	5000 ± 100%	41,650	Not Applicable		
	Number of home ratings performed by buyers and/or sellers	50%	4500 ± 50%	336			
Optimum Home	% of homes by participating builders built to 20% above Code	Not applicable			100%	30% ± 5%	50.3%
Large Volume							
Rate T1	Cumulative natural gas savings (million m³)	Not applicable			60%	206.256 ± 25%	78.919
Rate T2	Cumulative natural gas savings (million m³)	Not applicable			40%	1029.841 ± 25%	499.103

RED Below lower band of target

YELLOW Between lower and upper bands of target

GREEN Above upper band of target

Source: Union Gas, 2015 Demand Side Management Draft Annual Report (2016) at 70-71; Enbridge Gas Distribution, 2015 Demand Side Management Draft Annual Report (2016) at 26.

In order to motivate the gas utilities to pursue DSM aggressively, the OEB has approved a shareholder incentive which rewards utilities for performance. Based on the 2015 draft pre-audit results, the utilities could be eligible for \$17.866 million in incentives (\$10.318 million for Enbridge Gas Distribution and \$7.548 million for Union Gas). EGD could be eligible for about 93% of

its maximum incentive payment, and Union eligible for 69% of its maximum, as shown in Table 5.7.

The OEB has not yet approved the 2015 incentive payments, as the reports are still in draft and are unaudited.

Table 5.7. Shareholder Incentive Amounts Earned and Available for 2014/2015

	Incentive Earned (thousand \$)	Max. Incentive (thousand \$)	Incentive earned as % of Max.	Earnings as a % of DSM spending	Incentive Earned (thousand \$)	Max. Incentive (thousand \$)	Incentive earned as % of Max.	Earnings as a % of DSM spending
	2015				2014			
Enbridge	10,320	11,090	93%	29%	7,650	10,870	70%	24%
Union	7,548	11,002	69%	23%	8,988	10,820	83%	27%

Source: Union Gas, 2015 Demand Side Management Draft Annual Report (2016) at 9; Enbridge Gas Distribution, 2015 Demand Side Management Draft Annual Report (2016) at 21.

5.2 2016 Policy Developments Affecting Natural Gas Conservation Programs

5.2.1 Cap and Trade Funding for Home Retrofits and Other Gas Conservation Measures

In February 2016, the government announced that \$100 million from the Green Investment Fund (a “down payment” for initiatives expected to be eligible for funding from cap and trade proceeds) would be flowed to Union Gas and Enbridge to help an estimated 37,000 homeowners undertake energy audits and retrofits.¹⁵

Union and Enbridge will use the funding for the same retrofit program they already offer, but will be able to reach more customers. Eligibility for this program will extend beyond homeowners who heat their homes with natural gas to homeowners using oil, propane, wood, and electricity, and to homeowners outside of the Enbridge and Union service territories. The Green Investment Fund dollars address the concern of program demand outstripping budget, which forced Enbridge to suspend their home retrofit program in

mid-2015. Both companies expect that the additional funding provided through the Green Investment Fund will allow them to meet program demand through the end of 2018.¹⁶

The program was launched on October 31, 2016 and by year end, the utilities had already provided incentives for more than 1,600 home audits and retrofits.¹⁷

After the conclusion of our reporting year, Ontario released the final regulation that governs the Ontario Climate Change Solutions Deployment Corporation on February 17, 2017.¹⁸ The corporation is now referred to as the Green Ontario Fund, and was described in Ontario’s Climate Change Action Plan as a “green bank”. The objective of this corporation is to drive the deployment of commercially available technology that reduces greenhouse gas emissions from buildings or from the production of goods made in Ontario. This fund is directed towards commercial enterprises as well as homeowners. Its focus will be on reducing market barriers to the adoption of new low carbon technologies, by improving information access, providing incentives and using financial de-risking tools. Activities covered by this financing activity include fuel-switching, use of

There is potential for confusion and overlap between the existing electric and gas utility DSM programs and those being funded by the Green Ontario Fund.

energy storage and renewable energy and deep energy retrofits. Starting in 2018, Ontario will provide up to \$1.1 billion from the cap and trade auction proceeds. The program has not started yet. There is potential for confusion and overlap between the existing electric and gas utility DSM programs and those being funded by the Green Ontario Fund, which will need to be addressed. A planned Memorandum Of Understanding between the Green Ontario Fund and the Ontario Ministry Of Environment and Climate Change is intended to address these potential conflicts.¹⁹

5.2.2 Cap and Trade Compliance Plans and Charges on Customer's Bills

In December 2016, the Board set natural gas rates to include the anticipated costs of cap and trade compliance with the new rates taking effect in January 2017.²⁰ The average homeowner in Ontario uses about 2,400 m³ of natural gas per year,²¹ which produces 4.5t CO₂e/year. The ECO estimates that this will translate into a price increase of roughly \$7/month, using an average price of \$18.40/t. For commercial enterprises, for example, a customer using 50,000 m³/year, this will translate into an added cost of about \$1,700/year.

In theory these price increases should spur increased interest in customers wanting to participate in the gas company's DSM programs to reduce the amount of natural gas they use to reduce their costs today and in the future in the event that the price of carbon allowances increases.

Both Union and Enbridge filed their first cap and trade compliance plans with the OEB in 2016 (covering

the 2017 year only), indicating how they would meet their compliance obligations at reasonable cost to ratepayers. In theory, utilities could have proposed incremental conservation activities if they believed this would be cheaper than purchasing allowances. This was not done in the initial plans but may be pursued by utilities in future compliance plans.

5.2.3 Natural Gas Conservation Potential Study

In June 2016, ICF International completed a natural gas conservation potential study for the Ontario Energy Board (the ECO participated as an observer on the working group that assisted in the development of this study).²²

This study asked how much natural gas use in Ontario could be reduced out to 2030 through conservation – this is defined as the achievable potential. Achievable potential is determined by assessing the technical potential for all mainstream natural gas efficiency measures, determining what percentage of this is economic (benefits outweigh costs) and then what percentage of the economic potential can realistically be achieved. The TRC-Plus test was the benefit/cost test used in this study.

The study found that there is a technical potential to reduce natural gas use by 46% by 2030 relative to the reference case (see Table 5.8). Selecting only measures that were economic, natural gas use could be reduced by 27% in 2030. The estimated achievable potential was lower still, as it is dependent on the realistic market penetration rates for programs and the budget utilities would have to incent conservation projects among their customers. The impact of carbon pricing was not directly measured, but was simulated through a sensitivity analysis that increased the value of avoided natural gas by 50%. This increase in gas costs had the impact of making more conservation measures cost-effective, increasing the economic potential savings by 24% in 2030.²³

There is a technical potential to reduce natural gas use by 46% by 2030.

Table 5.8. Natural Gas Conservation Potential Study Results

Year	Projected Natural Gas Use – Reference Case (million m ³)	Potential Savings From Conservation (million m ³ , % reduction in gas use from reference case)				
		Technical Potential	Economic Potential	Achievable Potential – Budget Unconstrained	Achievable Potential – Budget Semi-Constrained	Achievable Potential – Budget Constrained
2020	26,306	9,233 (-35.1%)	6,448 (-24.5%)	1,869 (-7.1%)	1,338 (-5.1%)	1,187 (-4.5%)
2030	27,962	12,896 (-46.1%)	7,409 (-26.5%)	4,973 (-17.8%)	3,468 (-12.4%)	2,510 (-9.0%)

Note: Unconstrained potential is based on a conservation budget sufficient to fund the full incremental cost of conservation projects; semi-constrained assumes a gradually increasing budget that is double the approved 2016 conservation budget by 2020 and onwards, and constrained assumes a conservation budget that matches the 2015-2020 budgets set by the OEB, and remains at 2020 levels in subsequent years.

Source: ICF International, *Natural Gas Conservation Potential Study: Final Report* (2016) at iv.

The conservation potential study was a requirement in the Minister of Energy's March 26, 2014 directive to the OEB.²⁴ The purpose of the study is to inform conservation program design and delivery (complementing utility efforts), and to assist the OEB in determining whether the savings targets and budgets for natural gas utility conservation are appropriate. The results of the study will likely be used as part of the mid-term review of the natural gas conservation framework (to be completed in 2018), and perhaps for the next framework, beyond 2020. While this study was quite well done, its estimates of conservation potential are only an approximation. Weaknesses of this type of study include an imperfect approximation of the potential for conservation through operational and behavioural changes, and an inability to develop a complete list of conservation technologies and predict how these will change in the future. The ECO is of the view that the conservation potential study should only be used as one piece of evidence among many in determining appropriate targets and budgets for utility conservation.

5.2.4 Ontario Energy Board Evaluation of Conservation Program Results

The final conservation results for 2015 need to be approved by the Ontario Energy Board before financial incentives are paid out to utilities. Because of the large incentives involved, this evaluation is quite thorough. The most important tasks are to determine whether the amount of reported gas savings is accurate, and

what influence the utility program had on the customer decision to undertake the conservation project (i.e., the conversion from gross savings to net savings). Most effort is devoted to evaluating larger custom commercial and industrial conservation projects, given their greater contribution to gas savings and incentives.

2015 is the first year in which conservation results will be evaluated by a contractor reporting to Ontario Energy Board staff (the ECO participates as an observer on the advisory committee that supports this evaluation). This change should give the Board greater confidence that the evaluation results are accurate and that the incentive payments to utilities are justifiable and in the best interests of gas customers.

Significant evaluation work was undertaken in 2016, including developing an evaluation plan for the length of the DSM framework and a more detailed scope of work for the evaluation of 2015 results. However, the actual evaluation of 2015 results (including a new study of program free-ridership) did not really get underway until 2017, and is not expected to be finalized until summer 2017, some sixteen months after the utilities submitted their initial 2015 reports to the Board. This has raised some concerns from utilities, as any conclusions reached in the 2015 evaluation (e.g., changes to the free-ridership rates) will also impact 2016 and 2017 results and incentives, but are provided too late for the utilities to alter their programs in these years.

Endnotes

- Ontario Energy Board, *Demand Side Management Framework for Natural Gas Distributors (2015- 2020)*, EB-2014-1034 Report of the Board (22 December 2014).
- Ontario Ministry of Energy, *Planning Ontario's Energy Future, a Discussion Guide to Start the Conversation* (2017).
- Ontario Energy Board, *Demand Side Management Framework for Natural Gas Distributors (2015- 2020)*, EB-2014-1034 Report of the Board (22 December 2014) at 1.
- Union Gas, *2015 Demand Side Management Draft Annual Report* (22 April 2016); Enbridge Gas Distribution, *2015 Demand Side Management Draft Annual Report* (22 April 2016) online: <www.oeb.ca/industry/policy-initiatives-and-consultations/natural-gas-demand-side-management-dsm>.
- Ontario Energy Board, *Union Gas Limited and Enbridge Gas Distribution Inc., Applications for approval of 2015 – 2020 demand side management plans*, Decision and Order, EB-2015-0029/EB-2015-0049 (20 January 2016) at 74.
- The sum of annual savings from 2007-2015 conservation programs is 1028.9 million m³ for Union Gas and 575.3 million m³ for Enbridge, in comparison with 2015 gas sales of 13,405 million m³ for Union Gas and 11,728.3 million m³ for Enbridge.
- Ministry of the Environment and Climate Change, *Guideline for Greenhouse Gas Emissions Reporting* (Toronto: MOECC, December 2015) at 86 (Appendix 10, Tables 20.3 (for CO₂) and 20.4 (for CH₄ and N₂O)).
- Calculation: volume of net natural gas savings multiplied by the combined global warming potential of the three GHGs associated with natural gas combustion:
- Ontario Ministry of Energy, News Release, "Ontario Investing \$100 million to Create Jobs and Help Homeowners Save Energy" (4 February 2016).
- Personal communication, Enbridge Gas Distribution (20 June 2017).
- Ontario Ministry of Energy, information provided to the ECO in response to ECO inquiry (21 March 2017).
- Ontario Climate Change Solutions Deployment Corporation*, O Reg 46/17 made under the *Development Corporations Act*.
- "Ontario Creates Green Bank to Fund Low-Carbon Tech", online: Aird and Berlis LLP <energyinsider.ca/index.php/ontario-creates-green-bank-to-fund-low-carbon-tech/>. [Accessed 30 June 2017]
- "Backgrounder Natural Gas Rate Changes -January 2017", online: Ontario Energy Board <www.oeb.ca/oeb/_Documents/QRAM/backgrounder_qram_20161221.pdf>. [Accessed 30 June 2017]
- "Natural Gas Provides Great Value", online: Enbridge <www.enbridgegas.com/homes/accounts-billing/residential-gas-rates/natural-gas-provides-great-value.aspx>. [Accessed 30 June 2017] Union Gas assumes an average customer consumption of 2,200 m³/year.
- Ontario Energy Board, *Natural Gas Conservation Potential Study* by ICF International (Ottawa: updated July 2016) online: <www.oeb.ca/sites/default/files/uploads/ICF_Report_Gas_Conservation_Potential_Study.pdf>.
- Ibid, at xvi.
- Directive from the Minister of Energy to the Ontario Energy Board (26 March 2014) online: <www.oeb.ca/oeb/_Documents/Documents/Directive_to_the_OEB_20140326_CDM.pdf>.

Greenhouse Gas	Emission Rate (kg/m ³)		Global Warming Potential
CO ₂	1.863	kg/m ³	1
CH ₄	0.000037	kg/m ³	21
N ₂ O	0.000033	kg/m ³	310
Total	1.875 kg CO₂e/m³ natural gas combustion		

For example, using Enbridge's 2012 annual natural gas savings = 60.14 million m³ x 1,875 tonnes CO₂e/million m³ = 112,703 tonnes CO₂e.

- Ontario Energy Board, *Union Gas Limited and Enbridge Gas Distribution Inc., Applications for Approval of 2015 – 2020 demand side management plans*, Decision and Order, EB-2015-0029/EB-2015-0049 (20 January 2016) at 56.
- Does not include spending on demand response.
- Spending of \$35,779,972 for Enbridge and \$32,392,645 for Union. This spending includes all direct and indirect costs associated with DSM, but does not include shareholder incentives earned by Enbridge and Union.
- Cumulative net gas savings from 2015 programs of 1,568,083,000 m³ for Union and 865,616,754 m³ for Enbridge.
- Calculation: utility cost to acquire conservation = 2.8¢/m³; 1 m³ = 1.87 kg CO₂e; (0.028/1.87) x1000 = \$14.98.
- Union Gas, *2015 Demand Side Management Draft Annual Report* (22 April 2016) at 27.

