

OEB STAFF SUBMISSION

OEB Staff Submission on Union Gas Limited's
Application for Clearance of the
2013 Demand Side Management Deferral and Variance Accounts

EB-2014-0273

April 16, 2015

INTRODUCTION

Union Gas Limited (Union) filed an application with the Ontario Energy Board (OEB) dated December 9, 2014 seeking approval to clear the balances in certain 2013 Demand Side Management (DSM) deferral and variance accounts. A corrected application and evidence was filed on January 28, 2015. Union is seeking the final disposition of the balances in these accounts into rates within the next available Quarterly Rate Adjustment Mechanism.

The accounts which are the subject of the application and the balances recorded are as follows:

DSM Incentive Deferral Account	\$7,784,000 (to shareholder)
Lost Revenue Adjustment Mechanism Variance Account	\$1,311,000 (to shareholder)
DSM Variance Account	\$1,198,000 (to shareholder)

The net balance of the DSM Accounts is \$10,293,000 to be collected from ratepayers.

DSM FRAMEWORK

The deferral and variance accounts for which Union seeks approval and disposition in this application are related to Union's 2013 DSM activities. The 2013 DSM activities were for the second year of Union's 2012-2014 multi-year DSM plan (EB-2011-0327) and for the first year of Union's 2013-2014 DSM plan for large volume customers (EB-2012-0337) which were premised on the 2011 DSM Guidelines (EB-2008-0346).

The DSM Guidelines and Union's 2012-2014 DSM Plan outlined the required process Union should undertake with respect to stakeholder consultation and monitoring and evaluation for each year of the plan. OEB staff submits that Union met expectations set out in the DSM Guidelines regarding stakeholder consultation and verification of the results through the engagement of Custom Project Savings Verification Contractors (CPSV Contractors) and an auditor.

Specifically, stakeholders selected representatives for Union's audit committee for 2013, which included the Consumers Council of Canada (CCC), Canadian Manufacturers and Exporters (CME) and Green Energy Coalition (GEC).

With input from the Technical Evaluation Committee (TEC), Union retained Michaels Energy, Bryon Landry & Associates and Diamond Engineering as CPSV Contractors to evaluate the 2013 custom project savings, and Beslin Communications Group and Seeline Group to conduct impact evaluations for Union's residential and low-income programs. The impact evaluations were filed with the 2013 DSM results in accordance with Section 15 of the DSM Guidelines.

Consistent with the DSM Guidelines, Union consulted with the audit committee on the terms of reference and the audit work plan for the audit of the 2013 DSM results. Union prepared its 2013 Draft Evaluation Report which included the results of the review of custom projects by CPSV Contractors and the audit committee. Union retained Evergreen Economics (Evergreen) as the 2013 DSM Auditor who worked with SBW Consulting Inc. and PWP Inc. to provide an independent opinion on the reasonableness of the DSMVA, LRAM and DSMIDA calculations.

The Association of Power Producers of Ontario (APPrO) did not endorse Union's 2013 audited DSM results. The Industrial Gas Users Association (IGUA) took no position.

OEB STAFF SUBMISSION

The OEB set out certain expectations in the Decision and Order for Union's 2012 clearance of DSM accounts (EB-2013-0109) and provided guidance on how these issues could be addressed in Sections 6 and 7 of the 2011 DSM Guidelines.

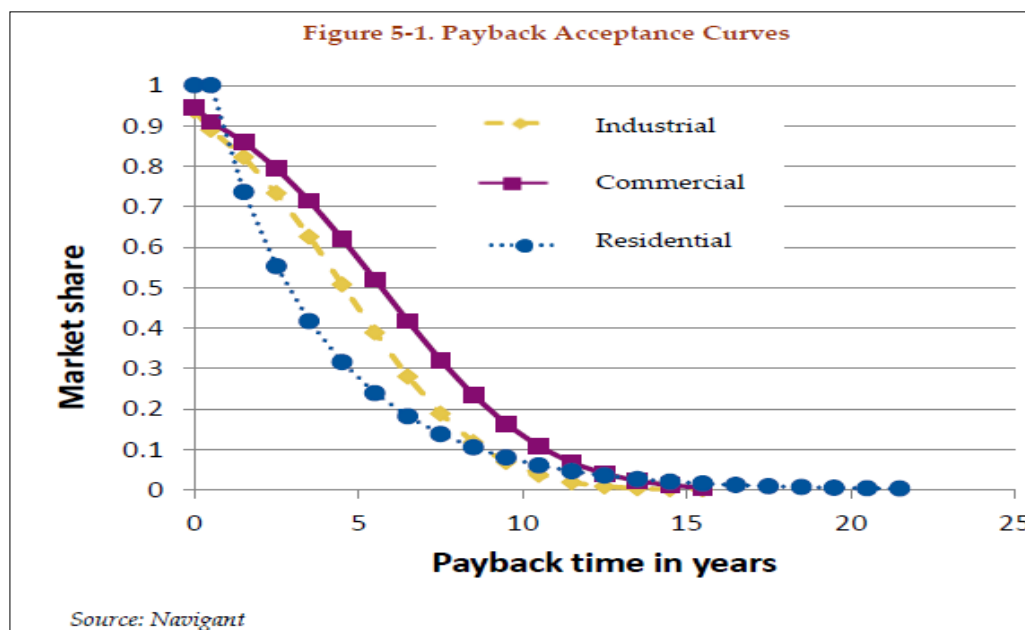
OEB staff submits that the major issues raised by School Energy Coalition (SEC) in the review of Union's 2012 DSM results (EB-2013-0109) remain the same for the assessment of the 2013 DSM results. These issues relate to the appropriate consideration of free ridership, base case, persistence of savings and the calculation of cumulative savings of the custom programs.

OEB staff has taken into consideration the Decision and Order for Enbridge's 2013 clearance of DSM variance accounts (EB-2014-0277) and makes its observations and recommendations as follows.

OEB Staff Observations and Recommendations

The Role of Payback Period in the Adoption of Energy Efficient Technologies

Studies over the last few years have shown that a key factor in the adoption of energy efficient measures is the payback period through which the energy savings associated with energy efficient measures can repay the project's incremental costs. Below are the findings from the payback analysis used in recent natural gas and electricity conservation potential studies for Enbridge and the Ontario Power Authority (OPA) (now the Independent Electricity System Operator).¹



Source: Navigant's payback acceptance analysis used in Enbridge's DSM Potential Study ²

In Figure 5-1 of Enbridge's 2013 Potential Study, the empirical evidence based on 950 customer surveys confirmed a high level of market adoption of energy efficient measures with short payback periods. In particular, more than 80% of commercial and industrial customers will have undertaken DSM measures, without the influence of a utility's financial incentive, if the technology's payback period is fewer than two years. In other words, these participants could be considered free riders and would accordingly describe the behaviour of commercial and industrial customers.

¹ Studies discussed include Enbridge's 2013 potential study conducted by Navigant and the OPA's 2014 achievable potential study conducted by ICF.

² A detailed discussion of the methodology and findings of this research are contained in "Demand Side Resource Potential Study," prepared for Kansas City Power and Light, August 2013.

Exhibit 37 Example of Payback Sensitivity Table		
SENSITIVENESS TO SIMPLE PAYBACK PERIOD - % OF YOUR CLIENTS WHO WOULD DO IT?		
Would Not Do It	20%	Barriers preventing from happening
Less than 1 year	80%	
Less than 2 yr	70%	
Less than 3 yr	60%	
Less than 4 yr	30%	
Less than 5 yr	20%	
Greater than 5 years	10%	Participants have other drivers.

Source: ICF's payback acceptance analysis used in the OPA's Achievable Potential Study

In Exhibit 37 of the OPA's 2014 Achievable Potential Study, the payback periods used by ICF demonstrate the same findings as Navigant. As shown above, 80% of the customers would undertake electricity conservation measures if the payback period was less than a year. If the payback period were within the first four years of a project's implementation, around half the customers would be observed to undertake conservation measures on their own.³

OEB staff acknowledges that the payback period is not the only criterion used in the customer's investment decisions. The empirical evidence has, however, indicated that payback analysis could play a significant role in energy efficiency investment decisions. As a result, OEB staff's observations on the reasonableness of the free ridership assumption used in calculating Union's program savings have been guided by the empirical evidence shown in the payback curves.

Free Ridership

Section 7.1 of the DSM Guidelines states that free ridership should be assessed for reasonableness prior to the implementation of the multi-year plan and annually thereafter, as part of each natural gas utility's ongoing program evaluation and audit process.

The filing of the 2012-2014 multi-year DSM plan used the free ridership rate established by Summit Blue's 2008 study for Union and Enbridge. Additional free ridership studies were not undertaken during the first two years of the DSM Framework. However, a review was done by Navigant in 2013 confirming that the free ridership rate of 54% for

³ ICF used this analysis in interviewing residential, commercial, industrial customers to determine the participation rates of the conservation technologies.

Union's custom projects was significant and within the range of other jurisdictions.⁴ As a result, the free ridership rate of 54% was used in calculating program savings for commercial, industrial and large volume custom projects based on Summit Blue's 2008 study. A 5% free ridership rate for low-income custom projects was established based on the 2012 DSM plan negotiations as filed in EB-2012-0441. Subsequently, a 15% free ridership assumption for residential homes was based on consensus agreement of the TEC as filed in EB-2013-0430.

OEB staff is of the view that the free ridership assumptions based on the last study in 2008 has led to an overestimation of savings in the large volume custom projects. The free ridership rate for residential and low-income custom projects was not supported by empirical evidence, and there is evidence showing an overestimation of savings in low-income custom projects.

A significant number of large volume custom projects had relatively insignificant payback periods of less than a year. This suggests that incentives may have been provided to free riders, despite the fact that the 54% free ridership rate was already applied to reduce the cumulative savings claimed. Also, based on evidence submitted by Union in 2011, the capital incentives provided by Union to large volume customers were on average less than 5% of the total cost of the DSM project, which appear to be small to have an impact on the investment decision of large volume industrial customers.⁵

The 5% free ridership rate for low-income custom projects does not appear to reflect the potential free riding of incentives for projects with paybacks ranging from 55 to over 400 years. If social and assisted housing have ongoing government support for funding DSM projects, the 5% free ridership rate is likely understated. As the payback periods are so far into the future, it appears to OEB staff that the investment decisions for the majority of low-income custom projects were clearly not driven by natural gas savings but by other factors.

Neither the CPSV Contractors nor the Auditor appeared to assess the reasonableness of free ridership assumptions during the verification and audit of the custom program savings. OEB staff observed that Union has also not studied the motivation of customers' investment decisions (assessing whether the customer would have

⁴ Referenced to Navigant's 2013 Free Ridership and Participant Spillover Review and in Union's response to OEB staff interrogatory #11

⁵ Union's response to APPrO's interrogatory in EB-2012-0337, Exhibit B5.15, p. 1

undertaken DSM on their own) and how the customer may have been influenced to undertake DSM.⁶

Based on the observed behaviour of customers confirmed in the payback acceptance curves, OEB staff estimates that about 80% and 35% of the audited large volume custom and low-income custom savings, respectively, could have happened without the provision of any financial incentives.⁷ It should be noted that the savings attributed to all programs were accordingly reduced to reflect the custom program free ridership assumptions approved by the OEB.

OEB staff concludes that the savings from the large volume custom and low-income custom projects are overstated by about 25% and 30% respectively taking into account the free ridership assumptions already applied.

Specifically, OEB staff submits that the savings from the large volume custom projects should be reduced by about 25% in addition to the 54% free ridership included in the results, reflecting the fact that 80% of these projects (Figure 5-1 above) with a payback period of fewer than two years could have been implemented without the provision of any financial incentives.

OEB staff recommends that the savings from low-income custom projects be reduced by 30% in addition to the 5% free ridership included in the results, reflecting the fact that about 35% of the gas savings could have happened on their own. The payback periods for the majority of these projects are very long, in the order of 55 to over 400 years therefore the implementation of these projects is likely due to factors other than incentives.

The evidence confirms the need to conduct an updated free ridership study for all custom projects and other major programs to have updated free ridership assumptions used for the 2014 results. OEB staff's comments on free ridership with respect to specific programs follow in the sections below.

Base Case

Section 6.1.1 of the DSM Guidelines states that estimated savings and costs of DSM programs need to be defined relative to a frame of reference or "base case" that specifies what would happen in the absence of the DSM program. At a minimum, the

⁶ This argument is based on OEB staff's review of audited savings in the 2013 CPSV reports and independent audit report. The assessment of the customer's decision did not appear to be part of the scope of the CPSV's Terms of Reference (provided to OEB staff interrogatories #4, 5 and 6).

⁷ Figures are referenced to Tables 1 and 3 of this submission.

base case technology should be equal to or more efficient than the technology benchmarks mandated in energy efficiency standards, as updated from time to time.

Based on Evergreen's assessment of the appropriateness of the base case for Union's custom projects, OEB staff does not propose adjustments to the base case savings.

OEB staff considers a minimum threshold for the documentation of the base case to be necessary, in response to the auditor's discovery of the lack of base case documentation for 73% of low-income custom projects audited. The auditor should also be asked to explain any base case inadequacies in prospective audits.

OEB staff is also of the view that Union should not rely on adjustments to the realization rate⁸ to correct for any inadequate base case assessment. It appears that project specific realization rates have either been increased or decreased to adjust the savings for specific projects deemed to have an "inadequate" base case assessment.⁹ This subsequent correction should in principle not be required if a minimum acceptable level of documentation of the base case was established.

Similar to Enbridge, the base case assumptions for Union's heating boilers may be outdated since the base case efficiency assumptions were based on the commercial boiler efficiency study in 2011.¹⁰ Although there were a small number of boiler projects in the 2013 commercial and industrial custom project sample, uncertainties with the base case of some boiler projects were raised in 2012.¹¹

Consistent with the Decision and Order for Enbridge's 2013 clearance of DSM accounts (EB-2014-0277), OEB staff suggests that Union collaborate with Enbridge in the commercial boiler efficiency base case study to develop up-to-date assumptions for use in the 2014 results.

Persistence of Savings

Section 7.3 of the DSM Guidelines provides a discussion on how persistence should be considered when assessing project savings in light of potential changes in usage pattern. Usage pattern can be affected if businesses, such as industrial customers, operate at lower levels or close down their processes before the expected savings of a DSM project have fully materialized. It appears that these issues were not considered during the delivery of Union's custom programs, nor at the time the cumulative savings

⁸ The realization rate is an adjustment factor to extrapolate the audited savings from the custom project sample to the population of all custom projects in order to estimate the cumulative savings at the portfolio level that would incorporate the results of the audit process.

⁹ OEB staff's comment in reply to Union's response to Staff interrogatory #12

¹⁰ EB-2013-0430, Exhibit B, Tab 1, Schedule 2, pp.13 of 14, footnote 7

¹¹ Exhibit B, Tab 1, Status Update to 2012 Auditor's Recommendations #6 and 10, pp. 101-102

were calculated for the custom projects. The results of a persistence study will determine whether any persistence adjustment to the project savings is warranted on a go-forward basis.

Persistence studies were not conducted by Union during the first two years of the 2012-2014 multi-year DSM plan.¹² OEB staff recommends that Union, in cooperation with Enbridge, consider undertaking a formal persistence study that is given priority to provide support for the persistence of savings in the evaluation of the 2014 programs.

Cumulative Savings

Although OEB staff acknowledges that reductions to the custom programs were already made as a result of the CPSV and audit processes, OEB staff is of the view that the corrections are the result of a technical evaluation of the savings.

OEB staff is concerned about the mechanistic approach to calculating cumulative savings for all custom projects without the consideration of the persistence of cumulative savings, which will account for the economic (or remaining useful life) of the existing equipment that was retrofitted.

OEB staff expects that a persistence study proposed above will address the concerns on the reasonableness of cumulative savings.

SUMMARY OF OEB STAFF RECOMMENDATIONS

- a) As discussed above, OEB staff recommends that the savings from the large volume custom projects be reduced by about 25% in addition to the 54% free ridership included in the results, reflecting the fact that 80% of these projects with a payback period of fewer than two years could have been implemented without the provision of any financial incentives. This reflects the observed behaviour of customers based on empirically derived payback curves.
- b) Based on very high payback periods in the order of 55 to over 400 years identified for the majority of the low-income custom projects, OEB staff recommends that the savings from low-income custom projects be reduced by 30% in addition to the 5% free ridership included in the results, reflecting the fact that about 35% of the gas savings could have happened on their own. The implementation of these projects appeared to be driven by other factors and not by the financial incentives provided by Union.

¹² Union's response to Staff interrogatory #11

- c) Both of the recommendations (a) and (b) suggest that free ridership studies need to be conducted for all custom projects and other major programs going forward to update the existing free ridership estimates.
- d) A persistence study should be undertaken to assess the persistence of cumulative savings achieved from Union's commercial/industrial and large volume custom projects implemented over the last few years. The results from this study should be incorporated into the evaluation of the 2014 results.
- e) Consistent with the Decision and Order for Enbridge (EB-2014-0277), Union should conduct a commercial boiler efficiency base case study in cooperation with Enbridge and apply any updated base case assumptions to the 2014 results.
- f) A minimum threshold should be established setting the required level of a project's base case documentation to be considered adequate for the 2014 results.

OEB STAFF COMMENTS BY PROGRAM

Residential Programs

Union offers the Home Reno Rebate and Energy Savings Kit (ESK) Programs in the residential sector. The cumulative net gas savings from both programs totalled 35,725,799 m³ representing 1% of total savings in 2013.

The Home Reno Rebate Program

The Home Reno Rebate program aimed to achieve deep residential savings in the installation of building envelope, space heating and water heating upgrades. The cumulative net savings from Home Reno Rebate was 6,073,437 m³. A free ridership of 15% for the residential program was established in 2013 by the TEC.

OEB staff reviewed the results for this program and has concerns that neither the savings nor the free ridership estimates are based on empirical research.

Although the HOT2000 model could play an important role in the estimation of gas savings during the delivery of the program, model simulations cannot provide an objective estimation of the actual savings associated with the residential program retrofit measures. Consistent with the DSM Guidelines, an objective estimation of savings can be achieved by:

- a) Analyzing actual billing data before and after participation in the program for a sample of participants; or
- b) Analyzing billing data for a sample of participants (control group) and non-participants (non-control group) in the program.

The advantage of the second method, over the first, is the provision of estimated savings net of free riders.

OEB staff is of the view that this type of analysis should be conducted to produce an estimation of savings based on empirical evidence, rather than basing the results on HOT2000 model simulations. OEB staff recommends that this analysis be performed as part of the evaluation of the 2014 results.

Although the 15% free ridership assumption for residential homes was based on consensus agreement of the TEC, there was no rationale provided in the input assumptions (EB-2013-0430) submitted to the OEB.

OEB staff is of the view that a free ridership study should be required to reliably determine the free ridership rate used for the Home Reno Rebate Program.

The ESK Program

The ESK Program aimed to achieve savings in the residential sector with the installation of a pre-packaged set of measures that included an energy efficient showerhead, a kitchen aerator, a bathroom aerator and pipe wrap designed to reduce a customer's energy demand and water consumption. The cumulative net savings from the ESK program was 29,652,362 m³. The free ridership rate for the ESK Program was established by measure and approved by the OEB in EB-2013-0430.

Union conducted four impact evaluations on the ESK Program in 2013 to ensure that the prescriptive measure savings were based on accurate participation and installation rates. OEB staff has no comments on the results of this program, and notes that the evaluation process appeared to be more rigorous than other programs like the Home Reno Rebate Program.

Low-Income Program

Union's low-income program includes the Helping Homes Conserve (HHC) and Affordable Housing Conservation (AHC) programs. The HHC program is directed towards single-family low-income customers and includes a free home energy audit along with building envelope upgrades. The AHC program is directed towards multi-

family low-income social and assisted housing that includes prescriptive measures and custom projects with incentives for boilers, gas water heaters and ventilation improvements.

The cumulative net gas savings from low-income programs totalled 55,504,533 m³ and represented 2% of total savings in 2013. A free ridership of 5% for the low-income custom program was established in 2013 based on the 2012 DSM plan negotiations.

Table 1 below lists the low-income custom projects based on the payback period provided by Union.

Table 1: Low-Income Custom Projects

Project ID	Project Description	Audited m3 Annual Gas Savings (m ³ /Yr) a.	Annual Savings as % of total	Incentive f.	Contribution of incentive to project	Simple Payback* g.	Adequate baseline (Yes/No)	Studies conducted
Less than 50 years payback								
2013-COM-0130	ERV	9,665	7.7%	\$ 4,860	50%	1.4	Yes	None
2013-COM-0271	Temperature Controls	20,428	16.3%	\$ 34,050	48%	16.1	No	None
2013-COM-0013	High Efficiency Building	28,720	22.9%	\$ 55,341	22%	17.5	No	Engineering feasibility
2013-COM-0014	High Efficiency Building	20,757	16.5%	\$ 57,378	22%	34.5	No	Engineering feasibility
Sub-total		79,570	63.4%					
50-100 years payback								
2013-COM-0263	Windows	673	0.5%	\$ 1,241	16%	55.5	No	None
2013-COM-0218	Windows and doors	17,935	14.3%	\$ 25,083	7%	90.9	No	None
2013-COM-0128	Windows	4,614	3.7%	\$ 8,748	10%	91.5	Yes	None
Sub-total		23,222	18.5%					
More than 100 years payback								
2013-COM-0172	Windows	5,998	4.8%	\$ 14,611	10%	114.2	Yes	None
2013-COM-0239	Windows	5,995	4.8%	\$ 17,813	5%	295.4	No	None
2013-COM-0016	Pipe Insulation	1,098	0.9%	\$ 4,828	4%	436.0	No	None
2013-COM-0240	Pipe Insulation	9,554	7.6%	\$ 10,266	21%	NA ³	No	None
Sub-total		22,645	18.1%					
Grand total		125,437	100%	\$ 234,218				

Source: Evidence provided to OEB staff interrogatories #7 and 12

OEB staff reviewed the projects and identified issues below related to free ridership and establishment of the base case for some projects.

Free ridership

OEB staff observed that the first four projects have payback periods ranging between 1.4 and 34.5 years and provided about 63% of the savings for this program. These projects included building ventilation, controls, and building optimization systems with incentives contributing 20% to 50% of project costs. The results from these projects appear to be reasonable given the nature of the investment.

Two-thirds of the low-income projects (seven out of eleven audited) had very high payback periods. For three of the projects, the payback periods ranged between 55

and 91 years and provided 18.5% of the program savings. The remaining four projects had payback periods ranging between 114 and 436 years and contributed 18.1% of the program savings. These seven projects included mainly window installations and pipe insulation measures, which received incentives contributing 5% to 20% of project costs. The payback periods for these projects appeared to far exceed the expected life of the measures, which raises the question of whether customers invested in measures for reasons other than the potential energy savings. As a result, OEB staff concludes that the incentives did not appear to have played a significant role in the customer's investment decision.

The free ridership rate of 5% for the low-income custom program was established based on the 2012 DSM plan negotiations as filed in EB-2012-0441. Assuming that social and assisted housing will have continued access to funding from different levels of government to undertake DSM, OEB staff is of the view that the low-income custom free ridership rate of 5% may be understated. Based on the analysis above, it appears that about 35% of the savings¹³ associated with these projects would have happened on their own. As a result, it may be concluded that the free ridership for the low-income custom sector could be as high as 35%.

Although the free ridership rate of 5% was already applied to low-income custom savings, OEB staff is of the view that the savings from this program should be reduced by an additional 30% (i.e. 35% minus 5%) to account for those projects whose payback periods far exceeded the life of the measure.

Base case

As shown in Table 1 above, the auditor determined that the base case was not adequately documented for seven out of eleven (or 73%) low-income custom projects.¹⁴ These projects represented more than 80% of the low-income custom program savings.

OEB staff finds this lack of documentation troublesome and suggests that a minimum threshold for adequate base case documentation be considered for the evaluation of the 2014 results. This is consistent with the auditor's recommendation for increased documentation of the base case conditions for the 2014 results.

¹³ A summation of the percent of savings with payback periods of over 50 years. Although the payback period for 2013-COM-0240 was not estimated by Union, OEB staff assumes that the payback would be similar to 2013-COM-0016.

¹⁴ Evidence provided for low-income custom projects for OEB staff interrogatory #12

Commercial/Industrial Programs

Union's commercial/industrial program includes prescriptive and custom projects. The commercial/industrial custom projects are branded under the EnerSmart Business to promote the adoption of high efficiency natural gas technologies, process improvements, and the conducting of energy audits, surveys and studies. The cumulative net gas savings from these projects totalled 885,049,151 m³ and represented 31% of total savings in 2013. A free ridership of 54% for custom projects was based on the Summit Blue's 2008 study.

Table 2 below lists the commercial and industrial custom projects based on the payback period provided by Union.

Table 2: Commercial/Industrial Custom Projects

Project ID	Project Description	Audited m3 Annual Gas Savings (m ³ /Yr) a.	Annual Savings as % of total	Incentive £	Contribution of incentive to project	Simple Payback* g.	Adequate baseline (Yes/No)	Studies conducted
2013-IND-0196	Gas leak repairs	0	0.0%	\$ 1,500	50%	N/A ³	Yes	None
2013-IND-0045	Starch dryer steam preheater	0	0.0%	\$ 20,000	21%	N/A ⁴	Yes	Process improvement
Less than 5 years payback								
2013-IND-0064	Steam trap replacement	172,935	0.9%	\$ 1,562	50%	0.1	No	Steam trap survey
2013-IND-0185	HVAC improvement - space heating	1,741,055	8.8%	\$ 40,000	48%	0.2	Yes	None
2013-IND-0042	Steam leak repairs	158,733	0.8%	\$ 4,395	50%	0.3	Yes	None
2013-IND-0455	HVAC improvement	5,927,716	29.9%	\$ 120,000	24%	0.4	Yes	None
2013-IND-0046	Spray dryer steam coil preheat	402,543	2.0%	\$ 20,000	21%	1.0	Yes	Process improvement
2013-COM-0149	Heat transfer improvement	25,660	0.1%	\$ 2,566	17%	2.7	No	None
2013-COM-0162	Dock door seals	342,886	1.7%	\$ 34,973	12%	2.9	No	None
2013-IND-0177	5.2 acre expansion to an existing 4.6 acre greenhouse.	567,304	2.9%	\$ 40,000	12%	3.1	Yes	None
2013-IND-0083	New greenhouse - multiple measures	1,531,967	7.7%	\$ 50,000	4%	4.0	Yes	None
Sub-total		10,870,799	55%					
5-10 years payback								
2013-IND-0013	"B" deodorizer project	2,864,979	14.5%	\$ 80,000	3%	5.2	Yes	Engineering feasibility
2013-IND-0256	5.1 acre expansion to an existing 4.6 acre greenhouse.	321,899	1.6%	\$ 32,190	9%	5.5	Yes	None
2013-IND-0037	Tank & hot oil pipe insulation	667,000	3.4%	\$ 40,000	5%	5.9	No	None
2013-IND-0055	Pipe & vessel insulation	286,100	1.4%	\$ 38,140	11%	6.3	No	Engineering feasibility
2013-IND-0267	Greenhouse expansion (22.5 acres)	3,085,122	15.6%	\$ 85,000	2%	6.4	Yes	Engineering feasibility
Sub-total		7,225,100	37%					
More than 10 years payback								
2013-COM-0026	Grain dryer replacement	11,633	0.1%	\$ 7,977	14%	23.2	Yes	None
2013-COM-0101	New construction warehouse with roof insulation (R-30) exceeding code (R-27)	13,924	0.1%	\$ 1,392	2%	30.1	Yes	None
2013-IND-0457	Newly constructed asphalt plant to replace 2 nearby aging plants	544,277	2.7%	\$ 40,000	1%	30.3	Yes	None
2013-IND-0186	Line speed improvements	1,112,600	5.6%	\$ 40,000	0%	41.4	Yes	None
2013-COM-0069	Window & door replacements	14,480	0.1%	\$ 1,448	1%	53.7	Yes	None
Sub-total		1,696,914	8.6%					
Grand total		19,792,813	100%	\$ 679,643				

Source: Evidence provided to OEB staff interrogatories #8 and 12

OEB staff reviewed the projects and provides comments below related to free ridership and establishment of the base case.

Free ridership

With the exception of 2013-IND-0196 and 2013-IND-0045 projects whose savings were removed after the audit, four out of the twenty-one customers audited received an incentive that contributed 25% to 50% of project costs, but had payback periods between one month (0.1 year) and five months (0.4 years). These four projects (2013-IND-0064, 2013-IND-0185, 2013-IND-0042, 2013-IND-0455) represented about 40% of the audited savings from this program. It should be noted that one of these projects (2013-IND-0455) contributed 30% of the savings.

Table 2 also shows that 55% of the savings from the first nine projects had a payback period of fewer than four years. OEB staff finds this to be consistent with the findings from Figure 5-1 and Exhibit 37 above. Based on the customer payback acceptance curves discussed earlier, around half of the commercial and industrial customers can be expected to undertake conservation measures without any financial incentives when a payback period occurs within four years of a project's implementation.

The free ridership rate assumed for this program is 54% appears to be consistent with the free ridership level of the savings for the first nine projects. OEB staff does not propose any further adjustments to the savings in this program.

Base case

Although there were a small number of boiler projects in the 2013 commercial and industrial custom sample, uncertainties with the base case of some heating boiler projects were raised in 2012.¹⁵ Similar to Enbridge, the base case assumptions for Union's heating boilers may be outdated as it is based on the commercial boiler study in 2011.¹⁶

Consistent with the Decision and Order for Enbridge's 2013 clearance of DSM accounts (EB-2014-0277), OEB staff suggests that Union collaborate with Enbridge to conduct a commercial boiler efficiency base case study to have up-to-date estimates applied to the 2014 results.

¹⁵ Exhibit B, Tab 1, Status Update to 2012 Auditor's Recommendations #6 and 10, pp. 101 and 102

¹⁶ EB-2013-0430, Exhibit B, Tab 1, Schedule 2, p. 13 of 14, footnote 7

Large Volume Custom Program

Union's large volume custom program is branded under the EnerSmart Business to achieve savings in process-specific energy applications. The cumulative net gas savings from this program totalled 1,844,554,921 m³ and represented 66% of total savings in 2013. The free ridership of 54% used in the estimation of savings was based on Summit Blue's 2008 study.

Table 3 below lists the large volume custom projects based on the payback period provided by Union.

Table 3: Large Volume Custom Projects

Project ID	Project Description	Audited m3 Annual Gas Savings (m ³ /Yr) a.	Annual Savings as % of total	Incentive £	Contribution of incentive to project	Simple Payback* g.	Adequate baseline (Yes/No)	Studies conducted
Less than 1 year payback								
2013-IND-0074	Steam leak repairs	2,206,000	2.4%	\$ 10,625	50%	0.05	Yes	None
2013-IND-0240	Steam leak repairs	1,934,000	2.1%	\$ 8,855	50%	0.05	Yes	None
2013-IND-0157	Shut down AHUs, including steam lines, in abandoned portion of plant	2,998,000	3.3%	\$ 17,641	50%	0.1	Yes	Process improvement
2013-IND-0273	Condensate heat recovery	1,239,000	1.4%	\$ 20,000	67%	0.1	Yes	Process improvement
2013-IND-0469	Coke oven gas burners installed in an existing boiler	6,940,000	7.6%	\$ 40,000	15%	0.2	Yes	None
2013-IND-0120	Steam leak repairs	4,097,000	4.5%	\$ 20,000	11%	0.2	Yes	None
2013-IND-0123	Steam trap repairs	1,116,000	1.2%	\$ 20,000	30%	0.3	No	Steam trap survey
2013-IND-0229	Heat recovery from equipment cooling to boiler feed water	1,707,000	1.9%	\$ 40,000	30%	0.4	Yes	None
2013-IND-0450	Replacement of pipe insulation	7,343,000	8.0%	\$ 73,646	13%	0.4	No	None
2013-IND-0451	Replacement of pipe insulation	4,895,000	5.3%	\$ 49,098	13%	0.4	No	None
2013-IND-0072	Replacement of pipe insulation	477,000	0.5%	\$ 19,841	50%	0.4	No	None
2013-IND-0179	Replacement of pipe insulation	7,180,000	7.8%	\$ 10,000	2%	0.5	No	None
2013-IND-0121	Steam leak repairs	1,678,000	1.8%	\$ 20,000	13%	0.5	Yes	None
2013-IND-0124	Re-commission existing 3rd reaction tower previously bypassed due to worn out screens	32,310,000	35.2%	\$ 41,091	1%	0.7	Yes	Process improvement
2013-IND-0348	Coke oven gas pipe replacement	5,820,000	6.3%	\$ 170,000	14%	0.9	Yes	None
Sub-total		81,940,000	89.3%					
1-2 years payback								
2013-IND-0230	Turbine inlet fogging	236,500	0.3%	\$ 18,609	33%	1.1	No	Engineering feasibility
2013-IND-0542	Burner metering equipment upgrades on heat treating furnace	98,580	0.1%	\$ 9,771	50%	1.1	Yes	None
2013-IND-0205	Implementation of more precise product trimming equipment	2,324,000	2.5%	\$ 40,000	7%	1.3	Yes	None
2013-IND-0101	Install heat recovery steam generator (HRSG) on an existing gas turbine generator to offset boiler-generated steam usage; savings claimed for proposed replacement of electric chillers with turbo-chillers which provide for more annual hours of use	3,405,000	3.7%	\$ 40,000	3%	1.9	No	None
Sub-total		6,064,080	6.6%					
More than 2 years payback								
2013-IND-0416	Steam leak repairs	1,247,000	1.4%	\$ 15,000	2%	3.2	Yes	None
2013-IND-0117	Greenhouse expansion with efficient materials and heating equipment	2,085,000	2.3%	\$ 55,000	3%	5.6	Yes	None
2013-IND-0204	Replacement of pipe insulation	155,000	0.2%	\$ 20,000	12%	5.8	No	None
2013-IND-0159	Replacement of steam-heated AHUs with indirect gas-fired units	233,000	0.3%	\$ 20,837	1%	44.0	Yes	None
Sub-total		3,720,000	4.1%					
Grand total		91,724,080	100%	\$ 780,013				

Source: Evidence provided to OEB staff interrogatories #9 and 12

OEB staff reviewed the projects and provides comments below pertaining to the issues on free ridership.

Free ridership

Over 65% of large volume custom projects (15 of 23 audited) provided about 89% of the program savings, but had a payback period of less than a year. Consistent with the Auditor's finding, the large volume custom projects were behavioural and maintenance projects that included steam leak repairs, steam trap tests, pipe insulations and heat recovery improvements.¹⁷ The incentives provided to these projects contributed 1% to 50% of project costs. OEB staff noticed that project 2013-IND-0124 contributed more than 35% of the total program savings and the payback period of the investment was only eight months (0.7 years).

Table 3 also shows that 19 of the 23 projects audited provided about 95% of the savings, but had payback periods of fewer than two years. Based on the customer payback acceptance curve discussed earlier, it is expected that more than 80% of the DSM projects will be adopted by industrial customers if the payback period were fewer than two years.

It appears to OEB staff that a significant number of projects included on this list could have been implemented by the customer due to their short payback periods without any financial incentives from Union. OEB staff is of the view that the free ridership assumption of 54% appears to be underestimated.

In the absence of an updated free ridership study, OEB staff recommends that large volume custom program savings be reduced by an additional 25% (i.e. 80% minus 54%) to reflect the projects that could have been implemented on their own in two years, as supported by empirical evidence in the payback curves.

All of which is respectfully submitted.

¹⁷ Referenced to Exhibit B, Tab 2, 2013 DSM Audit Report, p. 9