Greater Sudbury Hydro Inc.

Conservation and Demand Management

2013 Annual Report

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Ontario Energy Board

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Executive Summary

This annual report is submitted by GSHI in accordance with the filing requirements set out in the CDM Code (Board File No. EB-2010-0215), specifically Appendix C Annual Report Template, as a progress report and modification to GSHI Strategy. Accordingly, this report outlines GSHI CDM activities for the period of January 1, 2013 to December 31, 2013. It includes net peak demand and net energy savings achieved from 2011, 2012 and 2013, with discussion of the current/future CDM framework, CDM program activities, successes and challenges, as well as forecasted savings to the end of 2014.

GSHI did not apply for any Board-Approved CDM Programs during 2013; however, as noted in the CDM guidelines, released April 26, 2012, the Ontario Energy Board (OEB) has deemed Time-of-Use (TOU) pricing a Province-wide Board-Approved CDM Program. The OPA reached out to GSHI to participate in the second year of TOU evaluation. The Ontario Power Authority (OPA) is to provide measurement and verification on TOU. At the time of this report the OPA has not released any verified results of TOU savings to GSHI.

In 2011, GSHI contracted with the Ontario Power Authority (OPA) to deliver a portfolio of OPA-Contracted Province-Wide CDM Programs to all customer segments including residential, commercial, institutional, industrial and low income. These programs were rolled-out by the OPA in June 2011. In addition, GSHI delivered a suite of pre-2011 programs that have achieved incremental savings within the 2011-2014 period. In 2011 Program activities were centered on building a foundation for full program execution over the next three years of the program term, including staffing, procurement, and program delivery.

In 2012 GSHI focused on reaching out to the business sector to achieve a higher proportion of savings from these customers and worked towards wrapping up its OEB Approved pre-2011 program portfolio. GSHI's programs provided customers with a regional alternative to the Province-Wide programs. GSHI staff focused on customer support, providing one-on-one assistance with the application processes of both GSHI OEB-Approved programs and OPA programs. Surveys completed received very positive feedback on this support and attention to customers. GSHI has also focused on cross-promoting GSHI OEB-Approved programs and OPA programs to help its customers save electricity in as many ways as possible.

In 2013, GSHI continued to heavily promote ERII, Small Business Lighting, Commercial Parking Lot Plug Controller and Vending Machine Efficiency programs to its Commercial and Institutional customers through direct outreach and other media. GSHI focused on the Energy Audit initiative and saw a significant uptake in 2013 relative to 2012. In the Residential sector, 2013 saw the launch of the Home Assistance program in GSHI's territory and over 470 projects were completed and, the Electric Thermal Storage Program saw 170 installations. GSHI continued to cross-promote GSHI OEB-Approved programs and OPA programs to help its customers save electricity in as many ways as possible. Through GSHI OEB-Approved programs, GSHI has more control and is able to better connect and communicate with customers. GSHI hosted or participated 22 community events, funded 15 advertising activities, and leveraged social media to keep customers informed of opportunities to participate in CDM programs. GSHI's Twitter followers increased by 30% over 5 months and Facebook "Likes" increased by 10% over the same period.

In 2013, GSHI achieved 1.1 MW of net incremental peak demand savings and 4.9 GWh of net incremental energy savings in 2013. A summary of the achievements towards the CDM targets for all program years is shown below:

Table 1 – Net Annual Peak Demand Savings Achieved Towards Target

Implementation Period	Annual			
	2011	2012	2013	2014
2011	0.89	0.73	0.73	0.70
2012†	-0.05	0.88	0.79	0.79
2013†		0.08	1.10	1.01
2014				
Verified Net Annual Peak Demand Savings Persisting in 2014:				2.5
Greater Sudbury Hydro Inc. 2014 Annual CDM Capacity Target:				8.2
Verified Portion of Peak Demand Savings Target Achieved in 2014 (%):				30.5%

†Includes adjustments to previous years' verified results

Table 2 – Net Cumulative Energy Savings Achieved Towards Target

Implementation Period	Annual				Cumulative
	2011	2012	2013	2014	2011-2014
2011	3.4	3.4	3.4	3.3	13.4
2012†	-0.3	4.7	4.7	4.7	13.7
2013†		-0.3	4.9	4.9	9.5
2014					
Verified Net Cumulative Energy Savings 2011 2014:					36.6
Greater Sudbury Hydro Inc. 2011-2014 Annual CDM Energy Target:					43.7
Verified Portion of Cumulative Energy Target Achieved in 2014 (%):					83.7%

†Includes adjustments to previous years' verified results

The updated forecast prepared for this report shows that there will be a shortfall of approximately 5 MW versus GSHI's 2014 peak demand reduction target. Although, the peak demand savings are below target, GSHI expects to achieve the 2014 energy savings target. Given the expected shortfall, GSHI continues to work actively on participant engagement. In addition GSHI has partnered with other LDCs, and has been working with the Ontario Power Authority ("OPA") and the Electrical Distribution Association ("EDA") to improve program effectiveness. However, it is GSHI's position that it will not fully overcome the forecasted peak demand savings shortfall.

1 Background

On March 31, 2010, the Minister of Energy and Infrastructure of Ontario, under the guidance of sections 27.1 and 27.2 of the *Ontario Energy Board Act, 1998*, directed the Ontario Energy Board (OEB) to establish Conservation and Demand Management (CDM) targets to be met by electricity distributors. Accordingly, on November 12, 2010, the OEB amended the distribution license of GSHI to require GSHI, as a condition of its license, to achieve 43.7 GWh of energy savings and 8.2 MW of summer peak demand savings, over the period beginning January 1, 2011 through December 31, 2014.

In accordance with the same Minister's directive, the OEB issued the Conservation and Demand Management Code for Electricity Distributors (the Code) on September 16, 2010. The code sets out the obligations and requirements with which electricity distributors must comply in relation to the CDM targets set out in their licenses. To comply with the Code requirements, GSHI submitted its CDM Strategy on November 1, 2010 which provided a high level of description of how GSHI intended to achieve its CDM targets. The Code also requires a distributor to file annual reports with the Board. This is the third Annual Report by GSHI and has been prepared in accordance with the Code requirement and covers the period from January 1, 2013 to December 31, 2013.

GSHI submitted its 2011 Annual Report on September 30, 2012 which summarized the CDM activities, successes and challenges experienced by GSHI for the January 1, 2011 to December 31, 2011 period. The OEB's 2011 CDM Results report identified that the delay in the full suite of CDM Programs being made available by the OPA, and the absence of some programs negatively impacted the final 2011 results for the LDCs. This issue was also highlighted in Volumes I & II of the Environmental Commissioner's Report on Ontario's Annual Energy Conservation Progress.

On December 21, 2012, the Minister of Energy directed the Ontario Power Authority (OPA) to fund CDM programs which meet the definition and criteria for OPA-Contracted Province-Wide CDM Programs for an additional one-year period from January 1, 2015 to December 31, 2015.The Ministerial Directive did not amend the timelines for LDCs to achieve their energy savings and demand savings targets. Therefore, the main focus of the LDCs remains the achievement of CDM targets by December 31, 2014.

GSHI submitted its 2012 Annual Report on September 30, 2013 which summarized the CDM activities undertaken by GSHI for the January 1, 2012 to December 31, 2012 period. The OEB's 2012 CDM Results report identified that the majority of LDCs achieved close to 20% of their net peak demand (MW) target from their 2012 results. However, LDCs generally advised the Board that meeting their peak demand (MW) target is not likely and that a shortfall is expected.

LDCs collectively achieved approximately 8% of the energy savings (GWh) target, which is slightly below the 10% incremental annual savings needed each year to achieve the energy savings target. Overall the cumulative results represent approximately 65% of the net energy target of 6,000 GWh.

The report identified that although there have been improvements to programs there still remains some shortcoming to the design and delivery of certain initiatives that have resulted in a negative impact to some programs. In particular, the change management process still requires improvements to expedite enhancements to initiatives. The report also noted that certain initiatives may be reaching the point of market saturation and that new initiatives may need to be developed in order to take the place of the existing initiatives.

2 Board-Approved CDM Programs

2.1 Introduction

In its Decision and Order dated November 12 2010 (**EB-2010-0215 & EB-2010-0216**), the OEB ordered that, (to meet its mandatory CDM targets), "Each licensed electricity distributor must, as a condition of its license, deliver Board-Approved CDM Programs, OPA-Contracted Province-Wide CDM Programs, or a combination of the two".

At this time, the implementation of Time-of-Use ("TOU") Pricing has been deemed as a Board-Approved Conservation and Demand Management ("CDM") program that is being offered in GSHI's service area.

2.2 TOU Pricing

2.2.1 Background

In its April 26, 2012 CDM Guidelines, the OEB recognizes that a portion of the aggregate electricity demand target was intended to be attributable to savings achieved through the implementation of TOU Pricing. The OEB establishes TOU prices and has made the implementation of this pricing mechanism mandatory for distributors. On this basis, the OEB has determined that distributors will not have to file a Board-Approved CDM program application regarding TOU pricing. The OEB has deemed the implementation of TOU pricing to be a Board-Approved CDM program for the purposes of achieving the CDM targets. The costs associated with the implementation of TOU pricing are recoverable through distribution rates, and not through the Global Adjustment Mechanism ("GAM").

In accordance with a Directive dated March 31, 2010 by the Minister of Energy and Infrastructure, the OEB is of the view that any evaluations of savings from TOU pricing should be conducted by the OPA for the province, and then allocated to distributors. GSHI will report these results upon receipt from the OPA.

The OPA had retained The Brattle Group as the evaluation contractor and has been working with an expert panel convened to provide ongoing advice on methodology, data collection, models, savings allocation, etc. The initial evaluations were conducted in 2013 with five LDCs – Hydro One, THESL, Ottawa Hydro, Thunder Bay and Newmarket. Preliminary results from these five LDCs were issued to the five LDCs involved in the study in August 2013 and are now publically available on the OPA website. Preliminary results demonstrated load shifting behaviours from the residential customer class.

Three additional LDCs were added to the study in 2014 – Cambridge-North Dumphries, Powerstream and Sudbury. Preliminary results from this study are planned to be issued to the eight LDCs in September 2014. The OPA advised that the TOU study will be complete in the summer of 2015 and final verified savings will be available for LDCs to include in the 2014 Annual Report.

As of September 30, 2014, the OPA has not released any verified results of TOU savings to GSHI. Therefore GSHI is not able to provide any verified savings related to LDC's TOU program at this time.

2.2.2 TOU Program Description

Target Customer Type(s): Residential and small business customers (up to 250,000 kWh per year)

Initiative Frequency: Year-Round

Objectives: TOU pricing is designed to incent the shifting of energy usage. Therefore peak demand reductions are expected, and energy conservation benefits may also be realized.

Description: In August of 2010, the OEB issued a final determination to mandate TOU pricing for Regulated Price Plan ("RPP") customers by June 2011, in order to support the Government's expectation for 3.6 million RPP consumers to be on TOU pricing by June 2011, and to ensure that smart meters funded at ratepayer expense are being used for their intended purpose.

The RPP TOU price is adjusted twice annually by the OEB. A summary of the RPP TOU pricing is provided below:

RPP TOU		Rates (cents/kWh)	
Effective Date	On Peak	Mid Peak	Off Peak
November 1, 2010	9.9	8.1	5.1
May 1, 2011	10.7	8.9	5.9
November 1, 2011	10.8	9.2	6.2
May 1, 2012	11.7	10.0	6.5
November 1, 2012	11.8	9.9	6.3
May 1, 2013	12.4	10.4	6.7
November 1, 2013	12.9	10.9	7.2
May 1, 2014	13.5	11.2	7.5

Delivery: The OEB set the rates; LDCs install and maintain the smart meters and convert customers to TOU billing.

Initiative Activities/Progress:

GSHI's original intent was to implement TOU rates in July 2011. This date was deferred due to Measurement Canada's legislation. Measurement Canada legislated that by January 2012, register reads must appear on the customer's bill. However, the provincial data management system (MDMR) required an upgrade to its software to enable this. The upgrade was expected to be completed in 2011, but was deferred by the Province. On April 16, 2012 the province went live with the upgrade.

GSHI was in the process of converting to TOU rates effective May 1, 2012. Since GSHI bills bi-monthly, it took two months to convert all our customers. Depending on when the area was billed, billing began between May 1, 2012 and June 30, 2012.

GSHI began transitioning its RPP customers to TOU billing on (May 1, 2012). At December 31st, 2013, 39,793 Residential Class and 3,538 General Service Less Than 50kW Class for a grand total of 43,331 RPP customers were on TOU billing. 46,551 TOU meters were installed servicing 42,654 Residential Class customers and 3,897 General Service Less Than 50kW Class. All GSHI customers with TOU meters were on TOU billing with the exception of those customers signed with Retailers.

GSHI takes education and outreach very seriously and as such, used several mediums to educate customers about TOU rates including public engagements, print material, television campaigns, corporate web site and social media.

3 GSHI's Application with the OEB

GSHI did not submit a CDM program application to the OEB in 2013.

4 GSHI's Application with the OPA's Conservation Fund

In 2013, the OPA introduced the Conservation Fund to help meet LDC's interest in the development and launch of new local, regional and province-wide initiatives. The Conservation Fund's LDC Program Innovation Stream fast-tracks LDC-led program design and the launch of successfully piloted initiatives prior to full scale deployment. By driving program innovation through the Conservation Fund, LDCs have the opportunity to both realize additional savings through the piloting and implementation of initiatives not currently addressed by the OPA portfolio and the means to test concepts for future local or province wide programs post 2014. As per the OPA, as of March 2014, three pilots have been contracted and are underway with Toronto Hydro and Niagara Peninsula Energy and ten others are in various stages of the contracting and development process.

In addition, building on LDC interest in social benchmarking services for the residential sector, in 2013 the Conservation Fund in collaboration with Hydro One, Milton Hydro and Horizon Utilities completed the procurement of three social benchmarking pilot projects. Beginning in 2014 these services will be offered to more than 100,000 customers for a one year period, with evaluation reports published shortly thereafter.

GSHI submitted a CDM program application to the OPA's Conservation Fund in 2013 - Winter and Summer Residential Peak Load Feedback Programs.

The program follows the approach of the successful pilot program deployed by GSHI and delivered by Ecotagious Inc. in early 2014. The program, delivered through Ecotagious' Software-as-a-Service based smart meter data analytics, drives conservation by providing tailored load-specific feedback and recommendations to an LDC's target residential accounts. The solution analyzes each residential customer's smart meter data history to identify their electric space heating (ESH), air conditioning (AC) and pool pump loads (kWh and $). The software selects the target residential accounts for each of the Summer and Winter Residential Peak Load Feedback Program and generates and delivers the Winter (ESH) and Summer (AC and/or Pool Pump) feedback reports to each targeted residential account (identified above) by mail throughout their respective seasons.

The Winter and Summer Residential Peak Load Feedback Programs aim to significantly reduce GSHI's projected shortfall against its CDM targets, yielding a combined 1.3 MW and 3.5 GWh by the end of 2014 from these programs. These savings represent 16% and 8% of Greater Sudbury Hydro's 2011-2014 demand and energy targets, respectively.

5 GSHI CDM Programs (EB-2008-0147)

5.1 Introduction

GSHI confirms that, in addition to the generic TOU Pricing program noted earlier in this report, it did not have any Board-Approved CDM Programs up to and including December 31, 2013. However, there are pre-2011 programs approved by the Board prior to the current 2011-2014 cycle that were still delivering incremental savings in 2011, 2012, and 2013. These were approved by the Board in 2008 (EB-2008-0147) and are detailed in subsequent sections.

5.2 Background

On June 18, 2008 GSHI applied to the OEB to deliver a suite of custom programs from 2008 to 2010 (EB-2008-0147). The OEB issued a decision on November 4, 2008. On March 23, 2012 GSHI filed a motion to, among several other items, extend the funding through the end of 2012 (EB-2012-0186). GSHI was granted this extension by the Board on April 11, 2012.

On April 26, 2012 the OEB issued Guidelines for Electricity Distributor Conservation and Demand Management (EB-2012-0003). Section 3 acknowledges initiatives from programs prior to 2011 that will be completed after 2011 and states:

> *"The Board is of the opinion that it is reasonable to allow distributors to count the new savings arising from the initiatives completed pursuant to the terms of the program in or after 2011 against their CDM targets. Distributors must still follow the OPA's EM&V Protocols in evaluating and verifying these savings, as outlined in the CDM Code. The Board will not consider any savings that persist from initiatives completed prior to 2011 against an LDC's CDM target."*

With the extension in funding granted by the Board (EB-2012-0186), customers were able to participate in the GSHI custom programs and achieve incremental savings within the 2011-2014 period. An evaluation of the savings resulting from these programs is complete. As such, GSHI has included the incremental savings from installations occurring in 2011, 2012, and 2013 in this report. Savings resulting from installations prior to 2011 are not included in this report.

5.3 GSHI Program Descriptions

The targeted customer types, objectives, and individual descriptions for each Program Initiative are detailed in Appendix B.

5.3.1 Community Awareness Program

Target Customer Type(s): Residential customers

Initiative Frequency: Year round

Objective: To change customer behavior through education, promote energy conservation efforts occurring throughout the city, and build awareness of GSHI and energy efficiency through community outreach.

Description: The Community Awareness Program included working with local schools to develop action plans for promoting energy conservation, providing energy information and "Kill-A-Watt" monitors to consumers,

attending public events and a pilot Smart Meter education program. This program is not designed to achieve savings and is only intended to build awareness.

Targeted End Uses: Residential end uses

Delivery: GSHI delivered

5.3.2 Electric Thermal Storage (ETS) Program

Target Customer Type(s): Residential electrically heated customers

Initiative Frequency: Year round

Objective: Reduce distribution system peak load by shifting electrical home heating energy use to off-peak hours. Utilities of the north experience a much higher peak in winter than summer (opposite of the trend in the south). Diverting and/or shifting electrical usage to off peak periods has long term potential that will ultimately help transmission assets remain in service.

Description: ETS heating is an off-peak electric heating system that stores low cost electricity in the form of heat for use in heating needs throughout 24 hours a day. ETS equipment utilizes a storage medium to store heat during off-peak hours, as defined in the OEB Regulated Price Plan, and releasing it consistently throughout the day during the mid-peak and on-peak hours. In addition thereto, ETS also has the ability to control electric water heaters off-peak. The benefits of the project were significant in terms of: (i) reducing energy demand at critical peak periods when Ontario's electricity system is most strained; and, (ii) providing the customer with considerable savings on their heating bill.

Targeted End Uses: Conventional electric heat in residential applications

Delivery: GSHI delivered

Initiative Activities/Progress:

The program was approved by the Board in late 2008 and has technically been in-market since 2009. There were 283 ETS units installed in between the years 2009 and 2012. 170 ETS units were installed in 2013.

Full roll-out of this program was significantly delayed from original plans. The program is premised on TOU rates providing a direct financial incentive for participants with electrically-heated homes to want to time-shift their heating load. TOU rates did not come into effect during 2011 in the GSHI service territory as originally planned. Once TOU rates were in place, participation began to climb. From 2009 until 2011 there were only 103 ETS units installed, but after TOU rates were in place, participation averaged about 175 units in each year (180 ETS units in 2012 and an additional 170 ETS units in 2013). In 2013, Greater Sudbury Hydro's funding for this program reached its maximum and, therefore, the program concluded.

Additional Comments:

- TOU rates were/are an essential driver of this program.
- Initial feedback from prospective customers suggests some negative reaction to the aesthetics of the ETS units (that must be positioned in the rooms/areas affected).

- On the upside, consumers who did install ETS and were placed on TOU rates in a pilot exercise realized considerable energy shifts, using 70% to 80% of energy off-peak. Once these results were learned and bill savings apparent, customers were further motivated to shift more load through behavioural change (e.g., laundry and dishwasher use off-peak).

- There remains a huge demand for this program to continue. Customers are looking for some reprieve from their high heating costs.

5.3.3 Commercial Parking Lot Plug Controller Program

Target Customer Type(s): Commercial and multi-unit residential facilities that contain parking lots that provide plugs for block heaters

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by allowing building and property managers to effectively manage their electricity usage for block heaters in outdoor parking lots during the winter months.

Description: Parking lot controllers are electronic devices that control the amount of electricity used by an outdoor plug, allowing building and property managers to effectively manage their electricity usage for block heaters in outdoor parking lots during the winter months. Studies have shown that block heater plug load could be reduced by as much as 50% with no adverse effect on vehicle starts for users through intelligent control.

This program offers a $175 financial incentive per device to encourage building and property managers to install controllers at their sites. The participant purchases the unit directly from GSHI and then arranges installation with a certified electrical contractor. Once the units are installed and operating, the participant calls GSHI to arrange an installation inspection. If the unit has been correctly installed the participant is rebated the full cost of the unit, plus a portion of the installation costs. The participant will receive actual costs of material and labour up to a maximum of $175.00.

Targeted End Uses: Commercial and multi-unit residential facilities that contain parking lots that provide plugs for block heaters.

Delivery: GSHI delivered

Initiative Activities/Progress:

The program was approved by the Board in late 2008 and has been actively in-market since 2009. After two successful years with about 400 participants per year, the program, as-designed, likely reached market saturation. There were 1,723 parking lot controllers installed in between the years 2009 and 2012. 200 parking lot controllers installed in 2013.

In 2013 GSHI cross promoted this program with ERII. Consideration will be given to promoting these controllers as part of broader retrofit projects sponsored under the Province-Wide program.

Additional Comments:

- Retrofit installations are significantly more challenging than new additions where older technology did not already exist
- Multi-residential and construction/transportation were the primary sectors interested in this program

5.3.4 Vending Machine and Self Service Coolers Efficiency Program

Target Customer Type(s): Commercial Customers with vending machines and self-serve coolers

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by monitoring usage of vending machines and self-serve coolers and curtailing operation when customers are not present.

Description:

Vending machines and self-serve coolers present an excellent opportunity for energy conservation. They operate 24/7 and consume six times the amount of energy of a household refrigerator. By installing power controllers, energy savings in the 20% - 40% range can be achieved. The vending machine or cooler is plugged into a power controller, which consists of a passive infrared motion sensor and control unit. The device monitors the presence of people in the room using infrared technology. If no one is present for 15 minutes, the device automatically powers off the vending machine, but maintains the temperature of the product. Once powered off, the device monitors the temperature of the room and will power the machine on in 1.5 to 3 hour intervals. The device allows the machine to run a complete cycle before shutting down.

This program offers program participants a $175 financial incentive per device. Participants can purchase the devices directly from GSHI. Once installed the participant call GSHI to arrange an installation inspection. If installed correctly, the participant receives an incentive.

Targeted End Uses: Vending machines and self-service coolers

Delivery: GSHI delivered

Initiative Activities/Progress:

The program was approved by the Board in late 2008 and has been actively in-market since 2009. The program has slowly gained traction. There were 378 units installed in between the years 2009 and 2012. 39 units installed in 2013. GSHI has stock remaining and will continue to offer the devices to customers until the stock has run out. Thus, there will be additional participation in 2014 and potentially in 2015

Additional Comments:

- Leased equipment presents two problems for this type of program:
    - Operators are not sure if they are permitted to install a controller within their lease agreement with the vendor

- Reluctance to invest in a piece of equipment to be attached to an item not owned, which indicates a misunderstanding regarding the operating cost of electricity not being part of the lease

- Business owners in this sector are generally very busy but are highly focused on saving electricity but have little time to seek out opportunities. Because significant potential exists to provide opportunities to save energy with low free-ridership levels, Greater Sudbury Hydro staff has worked closely to assist this sector with education and installs.

5.3.5 LED Traffic Light Conversion Program

Target Customer Type(s): Municipalities

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by converting traffic lights to LED technology.

Description: Besides being more energy efficient, LED heads are more durable, require less maintenance once installed, are brighter and eliminate the need for coloured lenses. However, costs are still substantially higher and municipalities are often unable to justify the capital expenditure to council members with many other competing priorities on budgets.

Targeted End Uses: Traffic lighting

Delivery: GSHI delivered

Initiative Activities/Progress: The City of Greater Sudbury began installations in 2009. Over the life of the program (2009 – 2012) 1,458 street lights were converted

Additional Comments:

- Energy efficiency projects in smaller municipalities often do not move pass the council approval process as capital costs are often high and without an incentive energy efficiency projects of this scale would not occur

5.3.6 LED Street Light Conversion Program

Target Customer Type(s): Municipalities

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by converting street lights to LED technology.

Description: Municipalities typically use high pressure sodium (HPS) street light fixtures ranging in size from 100W to 400W. The maintenance and operating costs for these inefficient fixtures are much higher their efficient counterpart, however budget constraints have delayed the conversion to more efficient lighting. This program has been designed to encourage more efficient purchase decisions.

Street light technology is changing at a rapid pace; and, the overall performance of LED luminaries is quickly advancing in efficiency. Conversions are not as straightforward as with some other lighting applications, so

GSHI has been conducting studies on LED street and roadway lighting to determine the applicability of the technology by monitoring light level output, energy and power usage as well as economic factors. Preliminary tests indicated that the light output was lower than minimum operating requirements. A breakthrough occurred in late 2010, with municipal agreement to proceed with a pilot of 11 fixtures to enable the monitoring of light levels.

Targeted End Uses: Street lighting

Delivery: GSHI delivered

Initiative Activities/Progress: The program was approved by the Board in late 2008 and has been actively in-market since 2009. Significant time and resources for technology testing and courting the municipality were invested by GSHI in 2009 and 2010. Installations began in 2011 with the majority of the activity not happening until 2012. 63 installations occurred in 2011 and an additional 1,199 installations occurred in 2012. There were 211 installations in 2013 completing the project.

Additional Comments:

- LED lighting economics and technology is still evolving rapidly, so it is challenging for utilities to time market opportunities optimally—the trends have to be monitored and the right incentive offered at the right time to influence decision-making before LED eventually becomes the market standard
- Energy efficiency projects in smaller municipalities often do not move pass the council approval process as capital costs are often high and without an incentive energy efficiency projects of this scale would not occur

6 OPA-Contracted Province-Wide CDM Programs

6.1 Introduction

Effective February 2, 2011, GSHI entered into an agreement with the OPA to deliver CDM programs extending from January 1, 2011 to December 31, 2014, which are listed below. Program details are included in Appendix A. In addition, results include projects started pre 2011 which were completed in 2011:

Initiative	Schedule	Date schedule posted	GSHI in Market
Residential Programs			
Appliance Retirement	Schedule B-1, Exhibit D	*Jan 26,2011*	*Yes*
Appliance Exchange	Schedule B-1, Exhibit E	*Jan 26, 2011*	*Yes*
HVAC Incentives	Schedule B-1, Exhibit B	*Jan 26, 2011*	*Yes*
Conservation Instant Coupon Booklet	Schedule B-1, Exhibit A	*Jan 26, 2011*	*Yes*
Bi-Annual Retailer Event	Schedule B-1, Exhibit C	*Jan 26, 2011*	*Yes*
Retailer Co-op	n/a	*n/a*	*Yes*
Residential Demand Response	Schedule B-3	*Aug 22, 2011*	*Not in market due to technical issues with Sensus Meter Technology*
New Construction Program	Schedule B-2	*Jan 26, 2011*	*Yes*
Home Assistance Program	Schedule E-1	*May 9, 2011*	*Yes*
Commercial & Institutional Programs			
Efficiency: Equipment Replacement	Schedule C-2	*Jan 26, 2011*	*Yes*
Direct Install Lighting • *General Service <50 kW*	Schedule C-3	*Jan 26, 2011*	*Yes*
Existing Building Commissioning Incentive	Schedule C-6	*Feb 2011*	*Yes*
New Construction and Major Renovation Initiative	Schedule C-4	*Feb 2011*	*Yes*
Energy Audit	Schedule C-1	*Jan 26, 2011*	*Yes*
Commercial Demand Response • *General Service <50 kW*	Schedule B-3	*Jan 26, 2011*	*Yes*
Industrial Programs - General Service 50 kW & above			
Process & System Upgrades	Schedule D-1	*May 31, 2011*	*Yes*
Monitoring & Targeting	Schedule D-2	*May 31, 2011*	*Yes*
Energy Manager	Schedule D-3	*May 31, 2011*	*No Assignment*
Key Account Manager ("KAM")	Schedule D-4	*May 31,2011*	*No Assignment*
Efficiency Equipment Replacement Incentive • (part of the C&I program schedule)	Schedule C-2	*May 31, 2011*	*Yes*
Demand Response 3	Schedule D-6	*May 31, 2011*	*Yes*

As per the table below, several program initiatives are no longer available to customer or have not been launched in 2013.

Not in Market	Objective	Status
Residential Program		
Midstream Electronics	Encourages retailers to promote and sell high efficency televisions, and for distributors to distribute high efficiency set top boxes.	Did not launch and removed from Schedule in Q2, 2013.
Midstream Pool Equipment	Encourage pool installers to sell and install efficient pool pump equipment in residential in-ground pools.	Did not launch and removed from Schedule in Q2, 2013.
Home Energy Audit Tool	This is a provincial online audit tool to engage customers in conservation and help drive customer participation to CDM programs.	Did not launch and removed from Schedule in Q2, 2013.
Commercial & Institutional Program		
Direct Service Space Cooling	Offers free servicing of air conditioning systems and refrigeration units for the purpose of achieving energy savings and demand reduction.	Did not launch in 2011/2012. As per the OPA there no plans to launch this Initiative in 2013.
Demand Response 1 ("DR1")	This initiative allows distribution customers to voluntarily reduce electricity demand during certain periods of the year pursuant to the DR 1 contract. The initiative provides DR payment for service for the actual electricity reduction provided during a demand response event.	No customer uptake for this initiative. As a result this Initiative was removed from the Schedule in Q4, 2012.
Industrial Program		
DR1	As above	No customer uptake for this initiative. Removed in Q4, 2012.

The Master CDM Program Agreement includes program change management provision in Article 3. Collaboration between the OPA and the Local Distribution Companies (LDCs) commenced in 2011, and continues in 2013, as the change management process was implemented to enhance the saveONenergy program suite. The change management process allows for modifications to the Master Service Agreement and initiative Schedules. The program enhancements give LDCs additional tools and greater flexibility to deliver programs in a way that meets the needs of customers and further drives participation in the Initiatives.

6.2 Program Descriptions

Full OPA-Contracted Province-Wide CDM Program descriptions are available on the OPA's website at http://www.powerauthority.on.ca/ldc-province-wide-program-documents and additional initiative information can be found on the saveONenergy website at https://saveonenergy.ca. The targeted customer types, objectives, and individual descriptions for each Program Initiative are detailed in Appendix A.

6.2.1 Residential Program

Description: Provides residential customers with programs and tools to help them understand and manage the amount of energy they use throughout their entire home and help the environment.

Objective: To provide incentives to both existing homeowners and developers/builders to motivate the installation of energy efficiency measures in both existing and new home construction.

Discussion:

GSHI has promoted the residential program offerings through in-store events, social media, television, print media, and local events, such as the Sudbury Home Builders Home Show. Through these efforts, GSHI has influenced approximately 30,000 potential participants. Through the strategic selection of events and promotion efforts, GSHI has significantly increased its reach compared to 2012 which only reached 5,300 potential participants. In addition, GSHI continues to deliver custom pre-2011 programs, as inventory allows, providing educational energy efficiency technology and behavior information to customers and leveraging the contact with customers as an opportunity to cross-promote OPA programs.

The addition of LED measures to the Bi-Annual Retailer Event and in the Annual Coupon initiative in July 2013 has had a positive impact on customer participation. There was the added benefit of three LDC custom coded coupon options for LDCs to utilize in 2013. The Residential Demand Response program continues to be the largest contributor to demand savings in the Residential Program and has been generally well received by consumers. Unfortunately, there were no savings associated with the Energy Display attributed to LDCs in the OPA's 2013 verified results.

The Residential Program Portfolio is predominately a carryover of Initiatives from previous programs. It is mostly driven by retailers and contractors who many not have fully delivered what was anticipated. Three new initiatives (Midstream Electronics, Midstream Pool Equipment and Home Energy Audit Tool) were not launched and subsequently removed from the schedule in 2013 with no new additions. Delays in communication with regards to Initiative offerings and results reporting have hampered LDCs abilities to engage customers and promote participation.

Province-wide advertising was re-introduced in Q3 2013. This provided limited value due to the late market entry, especially for *peaksaver*PLUS. In 2013, GSHI was unable to launch peaksaverPLUS due to the many incompatible technical issues found with the Sensus meter technology and the IHD (in home display).

GSHI recognized the lack of energy conservation programs to the Residential Sector, thus, seeing the need to provide behavioural based initiatives:

- In fall of 2013, GSHI partnered with Ecotagious, a smart meter analytical company, to run a small pilot, engaging approximately 1100 electric space heating customers. GSHI provided these customers with

reports about their usage and tips on how to conserve - the results of which will be determined in the first quarter of 2014.

- In late 2012, GSHI, in collaboration with other LDCs, developed a Conservation Booklet for the purpose of distributing to consumers in order to aid them with energy conservation by providing tips and methods to conserve. These booklets were distributed at such events as the Annual Spring Home Show, the Active Living Information Fair, the Regional Fall Energy Conservation Blitz, the Annual Garden Show and all Retailer Events and Retailer Exchange Events.

Work to revitalize and increase the effectiveness and breadth of the Initiatives through the Residential Program continue to be a high priority. Opportunities within the Residential marketplace need to be identified, developed and offered to customers. The Version 5 Schedule changes implemented in Q1/Q2 2014 have increased the number of LDC coded coupons available and added new installations to the Heating and Cooling Incentive.

6.2.1.1 *Appliance Retirement Initiative (Exhibit D)*

Initiative Activities/Progress:

- GSHI has been offering this OPA Initiative to its customers since 2007. GSHI has effectively no control over the pick-up scheduling and operations of this initiative. In 2013, 1,100 appliances were retired through the program. Given the market saturation trend, year-over-year declines in savings are expected to continue to the end of 2014.

- GSHI marketed this Initiative at many local community events that took place in the service territory in 2012. This initiative was cross-promoted at exchange events and promoted to customers during five community events including: Sudbury Home Builders Home Show and the Greater Sudbury Earth Day Festival.

- GSHI continued its working relationship with Sears. A 10% discount coupon on the purchase of an EnergyStar® refrigerator was offered to those customers who used the saveONenergy program to have their energy inefficient appliance picked up and disposed of.

- Through the months of May 2013 to August 2013, GSHI focused on social networking using Twitter and Facebook to highlight this program in its energy conservation messages.

Additional Comments:

- Due to the duration of the program, and the revised eligibility requirements to a minimum of 20 years old, this Initiative appears to have reached market saturation and has been under consideration for removal from the Portfolio.

- Rather than strictly remove this Initiative from the schedules, the OPA and LDCs could review what opportunities there are to include other measures such as stoves, dishwashers, washers and dryers. The framework of this Initiative may be a suitable foundation for a more holistic residential appliance retirement program. As such, the Residential portfolio could be straightened through program evolution rather than weakened through diminished program offerings.

- As participation is very responsive to province wide advertising, OPA province-wide advertising should continue to play a key role if the initiative continues.

- Better relationships with retailers may play a role in increasing participation in this Initiative. Retailers can provide opportunities to capture replacement appliances and have them decommissioned after a sale has been committed.

- In an effort to capture additional savings in the perceived last year of the Initiative, the eligibility requirement for refrigerators was revised from 20 years old to 15 years old in Q2 2014.

6.2.1.2 *Appliance Exchange Initiative (Exhibit E)*

Initiative Activities/Progress:

- GSHI participated in the promotion of the Appliance Exchange Initiative during the Retailer Event at Canadian Tire and Retailer Fall Dehumidifier Exchange at Canadian Tire.

- GSHI has effectively no control over this initiative. GSHI assures their presence at all retailer events of eligible retailer locations.

Additional Comments:

- The design of the Initiatives, including eligible measures and incentives amounts are developed through the Residential Working Group. Retail Partner(s) are contracted by the OPA to deliver the initiatives province-wide. Individual LDCs have the opportunity to stage in-store events to drive the distribution of LDC coded Coupons and promotion of other programs in the portfolio

- The restrictive, limited and sometimes non-participation of local stores can diminish the savings potential for this Initiative.

- To date there has only been one retailer participant in the Appliance Exchange Initiative.

- In 2013, the uptake on window air conditioners and dehumidifiers being received through this program was consistent with that of 2011 but increased over 2012. This increase was largely due to GSHI's focus on social media – using Twitter and Facebook to announce the event. That said, however, the overall participation remains relatively low. A review of eligible measures in the Appliance Exchange program was conducted, and as these units are not cost effective on their own it was determined that they be removed from the program in order to improve the overall cost effectiveness of the Initiative

- Notification to LDCs regarding retailer participation and eligible measures continues to be delayed. Improved communications will aid in appropriate resource allocation and marketing of the Initiative.

- This Initiative may benefit from the disengagement of the retailer and allowing LDCs to conduct these events, possibly as part of a larger community engagement effort, with the backing of ARCA for appliance removal.

- The initiative appears to require more promotion from retailers and LDCs.

6.2.1.3 *HVAC Incentives Initiative (Exhibit B)*

Initiative Activities/Progress:

- GSHI effectively has no control over this initiative. The OPA contracts centrally for the delivery of the program and LDCs are encouraged to convince local contractors to participate in the Initiative.
- GSHI shares joint jurisdiction with Hydro One. It has been found that the HVAC Contractors are identifying the incorrect LDC for GSHI customers. LDCs have no means to verify/confirm the savings attributable to GSHI with the OPA, but would be open to working towards correcting any attribution challenges. In 2013, GSHI was credited with 645 incentives offered through this program.
- GSHI continues to work with the HVAC contractors to promote this initiative and build both contractor and customer awareness.

Additional Comments:

- Incentive levels appear to be insufficient to prompt customers to upgrade HVAC equipment prior to end of useful life. An Air Miles incentive was introduced in 2013 to try and encourage early replacement.
- This Initiative is contractor driven with LDCs responsible for marketing efforts to customers. More engagement with the HVAC contractor channel should be undertaken to drive a higher proportion of furnace and CAC sales to eligible units.
- In an effort to build capability, mandatory training has been instituted for all participating HVAC contractors. This could present too much of a barrier for participation for some contractors as the application process already presents a restriction to contractor sales. It has been noted that there are approximately 4500-5000 HVAC contractors in the Province, however in 2013, only a total of 1,587 contractors completed the mandatory HVAC training and can participate in the program.
- There are cases where non-participating contractors are offering their own incentives (by discounting their installations to match value of the OPA incentive). As this occurs outside of the Initiative, savings are not credited to LDCs. OPA should consider this in future program impact evaluation studies.
- Changes to the Schedule in 2014 to allow for incentives for new installations, rather than strictly replacement units, may provide greater Initiative results.

6.2.1.4 *Conservation Instant Coupon Initiative (Exhibit A)*

Initiative Activities/Progress:

- GSHI leveraged social media including Facebook and Twitter to promote the Coupon Initiative to customers.
- GSHI was present at the bi-annual Retailer Events and other events as named in Section 6.2.1 of this Report to promote energy conservation and distribute copies of coupons to consumers; and, drive consumers to the saveONenergy site. LDCs had no control over this initiative as the Coupon Booklets were a direct mail out from the OPA.

- The OPA contracts centrally for the distribution of the coupon booklets. The LDC effectively has no control over this initiative. However, GSHI worked towards making coupon booklets available to customers and promoting the initiative wherever possible.

Additional Comments:

- The timeframe for retailer submission of redeemed coupons varies depending on the retailer and in some cases has been lengthy. The delays and incomplete results reporting limits the ability to react and respond to Initiative performance or changes in consumer behaviour.

- Coupon booklets were not printed and mailed out in 2013 so were not widely available to consumers without the ability to download and print online coupons. In addition, consumers may not have been aware of the online coupons. The Initiative may benefit from province-wide marketing as a substitute to a mail out campaign.

- The product list could be distinctive from the Bi-Annual Retailer Event Initiative in order to gain more consumer interest and uptake.

- Program evolution, including new products and review of incentive pricing for the coupon Initiatives, should be a regular activity to ensure continued consumer interest.

- In 2013, LDCs were provided with 3 custom coded coupons. All coupons have been provided with LDC custom coding in 2014 which allows LDCs to promote coupons based on local preferences.

- Consumer experience varies amongst retailers offering Coupon discounts which can limit redemptions. For example, a particular high volume 'participating retailer' does not accept coupons and have their own procedure. In addition, some retailers have static lists of eligible products and will not discount eligible products unless the product on the list.

- The saveONenergy programs would benefit from specific end cap displays, aisle product stands and product-specific areas. Having products throughout a retail environment weakens the impact.

6.2.1.5 *Bi-Annual Retailer Event Initiative (Exhibit C)*

Initiative Activities/Progress:

- GSHI leveraged social media including Facebook and Twitter to promote the Retailer Event Initiative to customers.

- As in prior years, for 2013, events took place in the spring and the fall. LDCs effectively had no control over this Initiative. Uptake depends on the type of coupons available and the number of events held and the marketing of the Initiative. In 2013, 9,708 coupons were credit to GSHI.

- GSHI had an opportunity to directly promote the coupon program to customers by participating in several in-store retailer events and other outreach activities throughout 2013.

Additional Comments:

- This Initiative is strongly influenced by the retail participants and has no direct involvement from the LDCs.
- LDCs have the opportunity to stage in-store events to drive the distribution of LDC coded Coupons and promotion of other programs in the portfolio however this requires cooperation from the local retailer and LDC staff bandwidth.
- Limited engagement of local retailers can restrict the savings potential for this Initiative.
- The Product list has changed very little over the past five years.
- Program evolution, including new products and review of incentive pricing for the coupon Initiatives, must be a regular activity to ensure continued consumer interest.
- The Product list could be distinctive from the Conservation Instant Coupon Initiative in order to gain more consumer interest and uptake.
- A review conducted by the Residential Working Group identified three areas of need for Initiative evolution: 1) introduction of product focused marketing; 2) enhanced product selection and 3) improved training for retailers as retail staff tend not to be knowledgeable regarding the products or promotion.
- This Initiative may benefit from a more exclusive relationship with a retailer appropriate to the program. There should be a value proposition for both the retailer and LDC.
- Independently the Retailer Co-op and Bi-Annual Retailer Event Initiative may not present a value for the investment of LDC resources to support these events and should be backed by a strong Residential portfolio.

6.2.1.6 *Retailer Co-op*

Initiative Activities/Progress:

- GSHI effectively has no control over this initiative.

Additional Comments:

- This is a retailer Initiative with no direct benefit to the LDCs
- Limited engagement of local retailers can restrict the savings potential for this Initiative.
- The availability of retailer and/or LDC staff with product knowledge and the ability to conduct demonstration in store during the events would be an asset. This could be a valuable role for LDCs, however many LDCs are limited by available resources and unable to participate.

6.2.1.7 *New Construction Program (Schedule B-2)*

Initiative Activities/Progress:

Due to technical difficulty with mandatory TRC calculations required for custom applications, GSHI has had no uptake on custom applications where much of the opportunity for customers exists. In fact, GSHI still has an outstanding custom application with a GSHI customer from 2011 that is pending OPA assistance for resolution. GSHI had minimal uptake (two applications) in 2013 on prescriptive applications.

Additional Comments:

- This Initiative provides incentives to home builders for incorporating energy efficiency into their buildings. To support this, LDCs need to provide education to the consumers regarding the importance of choosing the energy efficient builder upgrade options without an immediate benefit to the consumer.
- In 2012 the application process was streamlined, however continues to be too cumbersome for builders. This combined with limited return has resulted in this Initiative to continue to under-achieve.
- Administrative requirements, in particular individual home modeling, must align with perceived stakeholder payback.
- Performance applications are expected to increase in 2014 due to some industry players interest in the Initiative. However, it is anticipated that the performance track will be the primary track used in applications, which provides low savings for the incentive provided. Savings and associated incentives may need to be revised to an appropriate level.
- The addition of LED light fixtures, application process improvement and moving the incentive from the builder to the home-owner may increase participation.
- This Initiative may benefit from collaboration with the Natural Gas utilities.

6.2.1.8 *Residential Demand Response Program (Schedule B-3)*

Initiative Activities/Progress:

- GSHI promoted the peaksaverPLUS Initiative to customers during three community events including: Sudbury Home Builders Home Show and the Greater Sudbury Earth Day Festival.
- GSHI used Twitter and Facebook to highlight peaksaverPLUS on a hot day in July.
- GSHI's decision is to offer this Initiative using the AMI technology. Due to the technical issues related to the compatibility between the smart meter technology selected by GSHI and the IHDs currently available in the marketplace, GSHI cannot yet offer this Initiative as the IHD is an integral component thereof. As such, GSHI is not in market with the program and continues, along with other LDCs, to work through these technical issues.

Additional Comments:

- In Home Energy Display units that communicate with installed smart meter technology continue to mostly be in the development phase and are not ready for market deployment. There continues to be a lack of Energy Display selection in the marketplace.

- GSHI in collaboration with other LDCs is undertaking extensive testing on the Sensus RNI (Regional Network Interface) to establish compatibility with the in-market IHDs.

- Smart Meters installed by most LDCs do not have the capability to communicate directly to an In Home Display and any mass replacement of newly installed meters with communicating abilities would not be fiscally responsible. When proposing technical Initiatives that rely on existing LDC hardware or technology there should be an extensive consultative process.

- Introduction of new technology requires incentives for the development of such technology. Appropriate lead times for LDC analysis and assessment, product procurement, and testing and integration into the Smart Meter environment are also required. Making seemingly minor changes to provincial technical specifications can create significant issues when all LDCs attempt to implement the solution in their individual environments.

- The variable funding associated with installing a load controllable thermostat is not sufficient unless it is combined with an In Home Display (IHD) which might not be possible all the time and when IHD is optional.

- Given the different LDC environments, and needs, each LDC is positioning the Initiative slightly differently. While a Thermostat has high marketability, it also carries a higher maintenance liability due to no-heat and no-AC calls. A switch with an independent IHD is seen as a lower liability option but also has a much lower marketability.

- This is the main Initiative within the Residential portfolio that was to drive savings for LDC, however the 2012 evaluation indicated savings realized from the IHD were not statistically significant. LDCs were advised that the evaluation of the IHDs would continue with 2013 data.

- Verified demand savings in 2012 from the load control devices were less than originally anticipated. This prompted an increase to the load cycling strategy in 2013 in order to increase savings closer to the original business case.

6.2.2 Commercial and Institutional Program

Description: Provides commercial, institutional, agricultural and industrial organizations with energy-efficiency programs to help reduce their electrical costs while helping Ontario defer the need to build new generation and reduce its environmental footprint. Programs to help fund energy audits, to replace energy-wasting equipment or to pursue new construction that exceed our existing codes and standards. Businesses can also pursue incentives for controlling and reducing their electricity demand at specific times.

Targeted Customer Type(s): Commercial, Institutional, Agricultural, Multi-family buildings, Industrial

Objective: Designed to assist building owners and operators as well as tenants and occupants in achieving demand and energy savings, and to facilitate a culture of conservation among these communities as well as the supply chains which serve them.

Discussion:

GSHI has continued to successfully deliver the current suite of C&I programs amidst the challenges that the programs may face. In 2013, GSHI utilized its own technical staff to directly contact and engage customers in commercial programs. Through the previous years' experience, GSHI learned that the most entrusted figure before a customer is GSHI and its staff. It was found that customers in northern Ontario prefer to interact with GSHI's engineers and technologists as opposed to a 3rd party.

Throughout 2011 to 2013 the Commercial and Institutional (C&I) Working Group has strived to enhance the existing C&I programs and rectify identified program and system deficiencies. This has proven to be a challenging undertaking. Overbuilt governance, numerous initiative requirements, complex program structure and lengthy change management have restricted growth without providing the anticipated improved Measurement and Verification results. In addition, Evaluation, Measurement and Verification (EM&V) has not yet achieved transparency. LDCs are held accountable for these results yet are mostly completely removed from the process.

LDC program management has been hampered by varying rule interpretation, limited marketing ability, a somewhat inflexible online system of checks and balances and revolving OPA support personnel.

Despite these challenges the C&I Working Group, working in cooperation with the OPA, have managed to iron out many of the issues which could be rectified. In particular, an accomplishment of 2012 was the advent of the expedited change management as means to accelerate certain program changes. 2013 saw the benefits of expedited change management process.

Looking ahead there is minimal opportunity to make valuable changes to the current program suite and have these changes reflected in LDC 2014 results. LDCs and the OPA should look beyond the current Initiatives and work to launch new programs, built on the strengths of the 2011-2014 programs, which will meet the needs of the industry and consumers.

6.2.2.1 *Efficiency: Equipment Replacement Incentive (ERII) (Schedule C-2)*

Initiative Activities/Progress:

- GSHI promoted the ERII program to customers through six community events including a Business Luncheon at Science North featuring David Suzuki as keynote speaker. In addition to these events, GSHI attended a number on contractor trade shows that were attended.
- Customer testimony for Weston Bakery Sudbury Plant was highlighted provincially.
- There is expectedly significant conservation potential remaining to be tapped in the commercial and institutional sectors in GSHI service territory. The greatest opportunities for kW and kWh are in LED lighting, compressed air, motors, refrigeration and HVAC.

- Because of the importance of this Initiative to achieving the energy and demand savings required to meet the CDM targets, in 2013 GSHI continued to increase its marketing strategies to tap this market and will continue to increase exposure throughout 2014.

Additional Comments:

- A large proportion of LDC savings are attributed to ERII.
- Capability building programs from Industrial programs have had very positive contributions to ERII program.
- This Initiative is limited by the state of the economy and the ability of commercial/institutional facility to complete capital upgrades.
- Applicants and Applicant Representatives continue to express dissatisfaction and difficulty with the online application system. This issue has been addressed by LDCs through application training workshops, Key Account Managers, channel partner/contractor training and LDC staff acting as customer Application Representatives. Although this has been an effective method of overcoming these issues and encouraging submissions, it also reflects on the complexity and time consuming nature of the application process. As such, Applicant Representatives continue to influence the majority of applications submitted. Continued development of Channel Partners is essential to program success.
- Prescriptive and Engineered worksheets provide a much needed simplified application process for customers. However, the eligible measures need to be updated and expanded in both technology and incentive amounts to address changing product costs and evolution of the marketplace.
- A focus on demand incentives has limited some kWh project opportunities. In particular, night lighting projects have significant savings potential for customers but tend to have incentives of 10% of project cost or less.
- The requirement to have a customer invoice the LDC for their incentive is very burdensome for the customer and results in a negative customer experience and another barrier to participation.
- There is redundancy in the application process as customers may need to complete a worksheet and then enter most of that information over to the online application form. This can be cumbersome.
- Processing Head Office application became much easier for the Lead LDC after Schedule changes came into effect in August 2013. The changes implemented allowed the Lead LDC to review and approve all facilities in a Head Office application on behalf of all satellite LDCs under certain circumstances.
- The application process for Head Office projects remains a significant barrier. Applicants need to manually enter one application per facility associated with the project can be extremely onerous, often requiring a dedicated resource.
- Streamlining of the settlements systems resulted in significant improvement in the payment process in 2013.

6.2.2.2 *Direct Install Initiative (DIL) (Schedule C-3)*

Initiative Activities/Progress:

- Despite the eligible cost increase effective December 4, 2012, GSHI saw a decrease in projects relative to 2012. This observation reinforces the need for significant changes to refresh customer interest in the program.
- GSHI had a media event to highlight a local project at "Stop Restaurant" and promote small business initiatives.
- GSHI leveraged social media including Facebook and Twitter to promote the DIL Initiative to small businesses.

Additional Comments:

- LED lighting was introduced in 2013 as a new measure and has been well received by customers who may not have previously qualified for DIL eligible upgrades. This is an efficient product with a long estimate useful life.
- Cold start high output lighting was removed from the program. This particularly affected the farming customers who now have limited options within the program to utilize.
- The inclusion of a standard incentive for additional measures increased project size and drove higher energy and demand savings results in some situations. However, LDCs are unable to offer these standard incentives to prior participants. The ability to return to prior participants and offer a standard incentive on the remaining upgrades has potential to provide additional energy and demand savings
- Many customers are not taking advantage of any additional measures, which may present an opportunity to for future savings with a new program offering.
- Electrical contractor's margins have been reduced due to no labour rate increase, increase cost of materials, greater distances between retrofit and more door knocking required before a successful sale. This has led to a reduction in vendor channel participation in some regions.
- Measure incentives and additional funding for fork lifts were introduced in September 2013 and were well received by installers. However, adjustments like these require longer lead times. As such, many customers were not able to benefit from this change in late 2013. Consideration should be given to providing advanced notification to LDCs and contractors of the upcoming changes to allow for planning.

6.2.2.3 *Existing Building Commissioning Incentive Initiative (Schedule C-6)*

Initiative Activities/Progress:

- There was no up-take of the Initiative in 2013, but GSHI continues to market and identify any building commissioning opportunities through its ERII program.
- GSHI received one application in 2013 but due to the rigid program restrictions placed upon the applicant, in this case the building square footage, the customer was deemed to not qualify.

Additional Comments:

- Initiative name does not properly describe the Initiative.
- There was minimal participation for this Initiative. It is suspected that the lack of participation in the program is a result of the Initiative being limited to space cooling and a limited window of opportunity (cooling season) for participation.
- Participation is mainly channel partner driven, however the particulars of the Initiative have presented a significant for many channel partners to participate.
- The customer expectation is that the program be expanded to include a broader range of measures for a more holistic approach to building recommissioning and chilled water systems used for other purposes should be made eligible and considered through Change Management.
- This initiative should be reviewed for incentive alignment with ERII, as currently a participant will not receive an incentive if the overall payback is less than 2 years.

6.2.2.4 *New Construction and Major Renovation Initiative (HPNC) (Schedule C-4)*

Initiative Activities/Progress:

- GSHI entertained four applications in the 3rd quarter of 2012 but no further development transpired on any of them. GSHI had no uptake on this Initiative in 2013. The reasons for such are related to the requirements of the program such as:
    - ability to meet with the contractor / consultant prior to the issuance of a building permit
    - the lengthy lead time from the application to the completion date of the project
    - the relatively low incentive levels

Additional Comments

- With the Ministerial Directive issued December 21, 2012, facilities with a completion date near the end of 2014 currently have some security that they will be compensated for choosing efficient measures. However, buildings that are in the planning phase with completion dates post-2015 may not participate due to funding uncertainty.
- Participants estimated completion dates tend to be inaccurate and are usually six months longer. This could result in diminished savings towards target when facilities are not substantially completed by December 31, 2014.
- The custom application process requires considerable customer support and skilled LDC staff. The effort required to participate through the custom stream exceeds the value of the incentive for many customers.
- There are no custom measure options for items that do not qualify under the prescriptive or engineered track as the custom path does not allow for individual measures, only whole building modelling.

- This Initiative has a very low net-to-gross ratio, which results in half the proposed target savings being 'lost'.

- The requirement to have a customer invoice the LDC for their incentive is very burdensome for the customer and results in a negative customer experience and a potential barrier to participation.

6.2.2.5 *Energy Audit Initiative*

Initiative Activities/Progress:

- GSHI marketing of this Initiative includes an outreach approach.

- GSHI saw a significant year over year increase in audits from only 3 in 2012 to 23 in 2013. As a result of GSHI's effort on this initiative, the Energy Audit was a top performing initiative in GSHI's portfolio in 2013.

- The impacts of the tremendous amount of work undertaken by the LDC to ensure that the Audit report meets the requirements set forth in the OPA schedule was evident with the increased participation in 2013.

Additional Comments

- The introduction of the new audit component for one system (i.e. compressed air), has increased customer participation.

- The energy audit Initiative is considered an 'enabling' Initiative and 'feeds into' other saveONenergy Initiatives.

- Evaluators in 2012 and 2013 recognized savings towards LDCs targets as a result of customers implementing low/no cost recommendations from their energy audits.

- Audit reports from consultants vary considerably and in some cases, while they adhere to the Initiative requirements, do not provide value for the Participant. A standard template with specific energy saving calculation requirements should be considered.

- Customers look to the LDCs to recommend audit companies. A centralized prequalified list provided by the OPA may be beneficial.

- Participation has been limited to one energy audit per customer which has restricted enabling and direction to the other Initiatives. This has been revised in 2014 and LDCs are now able to consider additional customer participation when presented with a new scope of work.

- Consideration should be given to allowing a building owner to undertake an audit limited to their lighting system. This way they may receive valuable information from neutral third party regarding the appropriate lighting solution for their facility instead of what a local supplier wants to sell.

- The requirement to have a customer invoice the LDC for their incentive is very burdensome for the customer and results in a negative customer experience and another barrier to participation.

6.2.3 Industrial Program

Description: Large facilities are discovering the benefits of energy efficiency through the Industrial Programs which are designed to help identify and promote energy saving opportunities. It includes financial incentives and technical expertise to help organizations modernize systems for enhanced productivity and product quality, as wells as provide a substantial boost to energy productivity. This allows facilities to take control of their energy so they can create long-term competitive energy advantages which reach across the organization.

Targeted Customer Type(s): Industrial, Commercial, Institutional, Agricultural

Objective: To provide incentives to both existing and new industrial customers to motivate the installation of energy efficient measures and to promote participation in demand management.

Discussion:

The Industrial Program Portfolio has been able to provide significant incentives and valuable resources to large facilities to help them with energy efficiency upgrades and process system improvements. The Engineering Studies in particular as well as the Monitoring and Targeting initiative provide a unique opportunity for a customer to complete a comprehensive analysis of an energy intensive process that they otherwise may not undertake. The Energy Manager Initiative provides customers with a skilled individual whose only role is to assist them with conservation initiatives. To date these Energy Managers have played a key role in customer participation.

Due to the size, scope and long lead time of these Initiatives and associated projects, the Ministerial Directive provides some security for the continuation of the conservation programs and associated compensation for the participant; however the subsequent savings would not be attributed to an LDC's current target for projects that go into service after 2014.

Extensive legal documents, complex program structure and lengthy change management have restricted the change and growth of this Portfolio. While the expedited change management has benefited the Commercial Portfolio, the Industrial Portfolio has not seen the same results due to the narrow scope of the process. For 2013 the change to the threshold for small capital projects and the new small capital project agreement are expected to improve the number of projects and savings achieved within PSUI. Likewise, a decision to proceed with 2012 natural gas load displacement generation projects applications will also increase uptake although the limited time to bring new projects into service is a barrier.

6.2.3.1 *Process & Systems Upgrades Initiative (PSUI) (Schedule D-1)*

Initiative Activities/Progress:

- There are effectively no industrial customers in GSHI territory that would be able to achieve the savings mandated by the program. In late 2012, GSHI commenced discussions with the Municipality about preliminary engineering studies and detailed engineering studies of their main wastewater treatment plant. As a result, the Municipality proceeded with the studies in 2013.
- GSHI will continue to work with the Municipality and other larger organizations in 2014 to identify any potential opportunities.

Additional Comments:

- Numerous energy studies have been submitted and completed. This is a strong indication that there is the potential for large projects with corresponding energy savings. Most of these studies have been initiated through the Energy Manager and KAM resources.

- This Initiative is limited by the state of the economy and the ability of a facility to complete large capital upgrades.

- There is typically a long sales cycle for these projects, and then a long project development cycle. As such, limited results are expected to be generated in 2013. The majority of the results are expected in 2014 with a much reduced benefit to cumulative energy savings targets.

- Delays with processing funding payments have caused delayed payments to Participants beyond contract requirements. In some cases, LDCs have developed a separate side agreement between the LDC and Participant acknowledging that the Participant cannot be paid until the funds are received.

- The contract required for PSUI is a lengthy and complicated document. A key to making PSUI successful is a new agreement which is a simplified with less onerous conditions for the customer.

- To partially address this, changes were made to the ERII Initiative which allowed smaller projects to be directed to the Commercial stream. Most industrial projects to-date have been submitted as ERII projects due to less onerous contract and M&V requirements.

- A business case was submitted by the Industrial Working Group in July 2012 which would change the upper limit for a small project from 700 MWh to 1 million dollars in incentives. This would allow more projects to be eligible for the new small capital project agreement and increase participant uptake, while still protecting the ratepayer. This small capital project agreement was finalized in August 2013.

- While there is considerable customer interest in on-site Load Displacement (Co-Generation) projects, in 2012 the OPA was accepting waste heat/waste fuel projects only. Natural gas generation projects were on hold awaiting a decision on whether PSUI will fund these types of projects. In June 2013, a decision was made to allow natural gas load displacement generation projects to proceed under PSUI. It is expected that a number of projects will proceed although results may not be counted towards LDC targets due to in-service dates beyond 2014.

- The requirement to have a customer invoice the LDC for their incentive is very burdensome for the customer and results in a negative customer experience and another barrier to participation.

6.2.3.2 *Monitoring & Targeting Initiative (Schedule D-2)*

Initiative Activities/Progress:

- There are effectively no industrial customers in GSHI territory that would be eligible for this Initiative. Only the Municipality and other larger organizations could possibly qualify.

- As a result of GSHI's discussions with the Municipality about preliminary engineering studies and detailed engineering studies of their main waste water treatment plant under the PSUI Initiative, there may be opportunity for monitoring and targeting under this Initiative in 2013.

Additional Comments:

- The M&T initiative is targeted at larger customers with the capacity to review the M&T data. This review requires the customer facility to employ an Energy Manager, or a person with equivalent qualifications, which has been a barrier for some customers. As such, a limited number of applications have been received to date.
- The savings target required for this Initiative can present a significant challenge for smaller customers.
- Changes were made to ERII in 2013 to allow smaller facilities to employ M&T systems.

6.2.3.3 *Energy Manager Initiative (Schedule D-3)*

Initiative Activities/Progress:

- GSHI only has two customers that qualify for this initiative both of which have their own Energy Manager/Supervisor on staff.

Additional Comments:

- The Energy Managers have proven to be a popular and useful resource for larger customers.
- LDCs that are too small to qualify for their own REM are teaming up with other utilities to hire an REM to be shared by the group of utilities.
- Some LDCs and Customers are reporting difficulties in hiring capable Roving and Embedded Energy Managers (REM/EEM), in some instances taking up to 7 months to have a resource in place.
- New energy managers require training, time to familiarize with facilities and staff and require time to establish "credibility". Energy Managers started filling their pipeline with projects in 2012 but few projects were implemented until 2013.

6.2.3.4 *Key Account Manager (Schedule D-4)*

Initiative Activities/Progress:

- GSHI has a limited and well-known set of large customers who remain in contact with GSHI staff regarding CDM programs and opportunities.

Additional Comments

- Customers appreciate dealing with a single contact to interface with an LDC, a resource that has both the technical and business background who can communicate easily with the customer and the LDC.
- Finding this type of skill set has been difficult. In addition, the short-term contract discourages some skilled applicants resulting in longer lead times to acquire the right resource.

6.2.3.5 *Demand Response 3 (D-6)*

Initiative Activities/Progress:

- GSHI's one C&I DR-3 customer continues to remain active in the program.
- GSHI continues to offer and market this Initiative at all events and on a one-on-one basis with its customers. However, this Initiative is delivered under contract by the OPA and there is no means for the LDC to confirm/verify enrollment and/or savings.

Additional Comments:

- To date customer data is not provided on an individual customer basis due to contractual requirements with the aggregators. This limited LDCs' ability to effectively market to prospective participants and verify savings. (GSHI requested data from the OPA but was subsequently denied).
- No program improvements were made in 2013 however, it was accepted that prior participants who renew their DR3 contract within the 2011-2014 term will contribute to LDC targets.
- As of 2013, Aggregators were able to enter into contracts beyond 2014 which has allowed them to offer a more competitive contract price (5 year) than if limited to 1 or 2 year contracts.
- Metering and settlement requirements are expensive and complicated and can reduce customer compensation amounts, and present a barrier to smaller customers.
- Compensation amounts for new contracts and renewals have been reduced from the initial launch of this program (premium zones and 200 hour option have been discontinued) and subsequently there has been a corresponding decrease in renewal revenue.

6.2.4 Low Income Initiative (Home Assistance Program) (Schedule E-1)

Initiative Activities/Progress:

- GSHI used social media including Facebook and Twitter to promote Home Assistance program events and communicate program contact information, GSHI used "#homeassistance" to help customers access information about the program on Twitter.
- GSHI held and/or attended 11 community events to support and promote the program including targeted events such as Agencies breakfast meeting, a mental health presentation to landlords, and Food Bank Northern Region presentation.
- GSHI mailed out letters containing program information to 664 pre-qualified customers.
- GSHI ran an extensive television media campaign throughout the months of March through May 2013 inclusive.

Additional Comments:

- The process for enrolling in social housing was complicated and time consuming. This was addressed in late 2012 and showed some benefits in 2013.

- The financial scope, complexity, and customer privacy requirements of this Initiative are challenging for LDCs and most have contracted this program out. This Initiative may benefit from an OPA contracted centralized delivery agent.

6.2.5 Pre-2011 Programs

Savings were realized towards LDC's 2011-2014 target through pre-2011 programs. The targeted customer types, objectives, descriptions, and activities of these programs are detailed in Appendix C.

7 2013 LDC CDM Results

7.1 OPA-Contracted Province-Wide Programs

7.1.1 Participation and Savings

Table 3, below provides a summary of gross and net incremental peak demand and energy savings from each OPA-Contracted Province-Wide program and the total contribution to targets for all program years (2011-2013). Please refer to Table 4 on the following page for detailed initiative by initiative results for all OPA-Contracted Province-Wide programs and initiatives.

In 2013 GSHI achieved approximately 20 to 25 percent of savings from residential programs, approximately 70 percent of savings from C&I programs, and approximately 2 to 5 percent of savings from the home assistance program. No incremental savings were achieved from Industrial programs. GSHI's achievement of peak demand savings to-date is in line with the majority of the LDC community (between 30 percent and 35 percent of target). GSHI's achievement of energy savings to-date, not including GSHI custom programs, is below the majority of the LDC community. GSHI achieves majority of its savings from the following initiatives: Retrofit, Direct Install Lighting, Energy Audit, Appliance Retirement, and HVAC Incentives.

Table 3 - Summarized Results

Program	Gross Savings		Net Savings		Contribution to Targets	
	Incremental Peak Demand Savings (MW)	Incremental Energy Savings (GWh)	Incremental Peak Demand Savings (MW)	Incremental Energy Savings (GWh)	Program-to-Date: Net Annual Peak Demand Savings (MW) in 2014	Program-to-Date: 2011-2014 Net Cumulative Energy Savings (GWh)
Consumer Program Total	0.57	1.78	0.27	0.97	0.90	10.81
Business Program Total	0.94	4.29	0.73	3.18	1.47	19.23
Industrial Program Total	0.00	0.00	0.00	0.00	0.01	0.27
Home Assistance Program Total	0.02	0.24	0.02	0.24	0.00	0.00
Pre-2011 Programs completed in 2011 Total	0.00	0.00	0.00	0.00	0.05	1.02
Other Adjustments	0.10	0.43	0.08	0.34	0.03	0.78
Total OPA Contracted Province-Wide CDM Programs	**1.63**	**6.75**	**1.10**	**4.74**	**2.47**	**32.60**

Table 4 – Participation and Savings Results

Table 1: Greater Sudbury Hydro Inc. Initiative and Program Level Net Savings by Year (Scenario 1)

Initiative	Unit	Incremental Activity (new program activity occurring within the specified reporting period)				Net Incremental Peak Demand Savings (kW) (new peak demand savings from activity within the specified reporting period)				Net Incremental Energy Savings (kWh) (new energy savings from activity within the specified reporting period)				Program-to-Date Verified Progress to Target (excludes DR)	
														2014 Net Annual Peak Demand Savings (kW)	2011-2014 Net Cumulative Energy Savings (kWh)
		2011*	2012*	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2014	2014
Consumer Program															
Appliance Retirement	Appliances	1,070	1,175	1,100		75	86	90		427,371	404,997	407,931		241	3,731,155
Appliance Exchange	Appliances	41	29	42		4	4	9		5,209	7,429	15,516		15	71,916
HVAC Incentives	Equipment	663	556	645		279	142	154		555,312	266,601	286,238		575	3,593,525
Conservation Instant Coupon Booklet	Items	5,471	317	3,565		12	2	5		200,793	14,368	79,202		20	1,004,678
Bi-Annual Retailer Event	Items	9,784	10,902	9,708		17	15	12		301,981	275,204	176,537		45	2,386,611
Retailer Co-op	Items	0	0	0		0	0	0		0	0	0		0	0
Residential Demand Response	Devices	130	0	0		73	0	0		189	0	0		0	189
Residential Demand Response (IHD)	Devices	0	0	0		0	0	0		0	0	0		0	0
Residential New Construction	Homes	0	5	4		0	0	1		0	4,154	4,213		1	20,888
Consumer Program Total						**461**	**251**	**271**		**1,490,854**	**972,752**	**969,638**		**897**	**10,808,962**
Business Program															
Retrofit	Projects	84	41	53		198	303	198		1,080,286	1,684,769	1,257,283		695	11,868,065
Direct Install Lighting	Projects	92	433	313		82	238	246		207,531	828,976	810,410		554	4,905,556
Building Commissioning	Buildings	0	0	0		0	0	0		0	0	0		0	0
New Construction	Buildings	0	0	0		0	0	0		0	0	0		0	0
Energy Audit	Audits	0	3	23		0	16	203		0	75,529	1,114,368		218	2,455,322
Small Commercial Demand Response	Devices	1	0	0		1	0	0		2	0	0		0	2
Small Commercial Demand Response (IHD)	Devices	0	0	0		0	0	0		0	0	0		0	0
Demand Response 3	Facilities	1	1	1		86	87	88		3,376	1,261	1,174		0	5,811
Business Program Total						**367**	**643**	**735**		**1,291,195**	**2,590,534**	**3,183,236**		**1,467**	**19,234,755**
Industrial Program															
Process & System Upgrades	Projects	0	0	0		0	0	0		0	0	0		0	0
Monitoring & Targeting	Projects	0	0	0		0	0	0		0	0	0		0	0
Energy Manager	Projects	0	0	0		0	0	0		0	0	0		0	0
Retrofit	Projects	25	0	0		11	0	0		67,778	0	0		11	271,114
Demand Response 3	Facilities	0	0	0		0	0	0		0	0	0		0	0
Industrial Program Total						**11**	**0**	**0**		**67,778**	**0**	**0**		**11**	**271,114**
Home Assistance Program															
Home Assistance Program	Homes	0	0	471		0	0	17		0	0	243,405		16	478,586
Home Assistance Program Total						**0**	**0**	**17**		**0**	**0**	**243,405**		**16**	**478,586**
Aboriginal Program															
Home Assistance Program	Homes	0	0	0		0	0	0		0	0	0		0	0
Direct Install Lighting	Projects	0	0	0		0	0	0		0	0	0		0	0
Aboriginal Program Total						**0**	**0**	**0**		**0**	**0**	**0**		**0**	**0**
Pre-2011 Programs completed in 2011															
Electricity Retrofit Incentive Program	Projects	9	0	0		26	0	0		149,161	0	0		26	596,644
High Performance New Construction	Projects	1	1	0		11	14	0		55,641	68,381	0		25	427,706
Toronto Comprehensive	Projects	0	0	0		0	0	0		0	0	0		0	0
Multifamily Energy Efficiency Rebates	Projects	0	0	0		0	0	0		0	0	0		0	0
LDC Custom Programs	Projects	0	0	0		0	0	0		0	0	0		0	0
Pre-2011 Programs completed in 2011 Total						**37**	**14**	**0**		**204,802**	**68,381**	**0**		**51**	**1,024,350**
Other															
Program Enabled Savings	Projects	0	0	0		0	0	0		0	0	0		0	0
Time-of-Use Savings	Homes	0	0	0		0	0	0		0	0	0		0	0
Other Total						**0**	**0**	**0**		**0**	**0**	**0**		**0**	**0**
Adjustments to 2011 Verified Results							**-48**	**0**			**-60,061**	**0**		**-50**	**-244,772**
Adjustments to 2012 Verified Results								**80**				**343,121**		**80**	**1,029,362**
Energy Efficiency Total						**715**	**822**	**934**		**3,051,063**	**3,630,407**	**4,395,105**		**2,442**	**31,811,765**
Demand Response Total (Scenario 1)						**160**	**87**	**88**		**3,567**	**1,261**	**1,174**		**0**	**6,002**
Adjustments to Previous Years' Verified Results Total						**0**	**-48**	**80**		**0**	**-60,061**	**343,121**		**30**	**784,591**
OPA-Contracted LDC Portfolio Total (inc. Adjustments)						**875**	**860**	**1,103**		**3,054,630**	**3,571,606**	**4,739,400**		**2,472**	**32,602,357**
Activity and savings for Demand Response resources for each year represent the savings from all active facilities or devices contracted since January 1, 2011 (reported cumulatively).		The IHD line item on the 2013 annual report has been left blank pending a results update from evaluations; results will be updated once sufficient information is made available.											**Full OEB Target:**	**8,220**	**43,710,000**
													% of Full OEB Target Achieved to Date (Scenario 1):	**30.1%**	**74.6%**
*Includes adjustments after Final Reports were issued		Energy Manager, Aboriginal Program and Program Enabled Savings were not independently evaluated													

7.1.2 Evaluation Findings

The following section provides a summary of the 2013 EM&V findings for all of the evaluated saveONenergy initiatives. This information was provided by the OPA.

CONSUMER PROGRAM

Appliance Retirement Initiative
• Per unit savings increased for both energy (+15.4%) and demand (+4.0%) between 2012 and 2013 due to a greater proportion of refrigerators/freezers with large volumes and a manufacturer date before National Appliance Energy Conservation Act (NAECA) was implemented. Dehumidifiers also show a higher per unit savings related to the change in ENERGY STAR definitions. • Overall participation continues to decline with 20,952 appliances recycled in 2013, compared with 34,146 in 2012 and 56,110 in 2011. The program has experienced close to a 40% reduction (39.1% 2011 to 2012, 41.1% 2012 to 2013) in recycled appliances in each subsequent year of operation. • Net to gross ratio stayed constant at around 43% between 2012 and 2013

Appliance Exchange Initiative
• Increased per unit energy and demand savings due to an adjustment to the assumed consumption of "conventional" and Energy Star dehumidifiers. The calculated weighted average annual energy savings of a exchanged dehumidifier increased 36.6% • Of the participants surveyed who reported they had replaced the dehumidifiers they exchanged, 100% reported purchasing ENERGY STAR® models. • 21% increase in the number of eligible dehumidifiers collected in the program. In 2013, 5,337 dehumidifier units were collected compared to 3,617 dehumidifier units and 219 window air conditioners. • Net to Gross ratio (NTG) was 52.6% which is a slight increase of the 2012 NTG of 51.5%

Heating and Cooling Initiative
• Total participation (equipment) increased 7.5% from 2012 to 91,581. • Per unit furnace savings decreased from 1139 kWh/yr in 2012 to 1090 kWh/yr due to a slight shift in the number of participants who use their furnace fan non-continuously both before and after the retrofit as opposed to changing from continuous to non-continuous operation • Per unit energy and demand savings assumptions for central air conditioners did not change from 2012.

Annual Coupons
• Customers redeemed more than ten times as many annual coupons in 2013 as in 2012 because of new LED coupons and full year availability of all coupons. Customers redeemed 13% more annual coupons in 2013 than in 2011, the first full year of annual coupons due to the high volume of new LED coupons. • There was a significant reduction in savings specialty CFL related measures. In 2013, the findings showed around 30% of participants are replacing incandescent bulbs compared to 60% of participants replacing incandescent bulbs in 2012. • Despite the significant per unit savings reductions, the Net Annual Savings from Annual Coupons in 2013 was more than 5.5 times that in 2012. This is primarily because of higher participation due to the inclusion of LED coupons and full year availability of all coupons. • 93% of coupons redeemed in 2013 were for general purpose LEDS and specialty CFLs and LEDs, producing 89% of net annual energy savings and 84% of net demand savings. • Measure NTG ratio was approximately 8% higher in 2013 than in 2012 due to the inclusion of participant like spillover, i.e., purchase of additional coupon initiative measures without using coupons because of program influence.

Bi-Annual Coupon Events
• 19% increase in the number of coupons redeemed during the Spring and Fall Events in 2013 compared to 2012 because of substantial increase in LED purchases with event coupons. • 36% lower net annual savings in 2013 compared to 2012 primarily because of significant reductions in per unit savings estimates for standard and specialty CFLs. In 2013, findings showed a decrease in replacement rate of incandescent bulbs. Only 30% of 2013 participants are estimated to have replaced incandescent bulbs compared to 60% of participants replacing incandescent bulbs in 2012. This leads to a change in the baseline assumption for the savings calculations. • 87% of coupons redeemed were for general purpose and specialty CFLs and LEDs, producing 80% of net annual energy savings and 73% of net demand savings • Measure NTG ratio was approximately 8% higher in 2013 than in 2012 due to the inclusion of participant like spillover, i.e., purchase of additional coupon initiative measures without using coupons because of program influence.

***peaksaver*PLUS**
• The cycling strategy for CAC load control was changed from 50% simple cycling to 60% simple cycling. • Under 1-in-10 year weather conditions, the 2013 estimated impacts for load control devices are higher than the 2012 estimates in all months and are between 10 and 15% higher during the core summer months of June through August. • Load impact estimates for the average small and medium business and for electric water heaters among residential customers are also unchanged from the prior year's analysis • This year's IHD analysis has yielded an estimate of no statistically significant energy savings.

Residential New Construction
• Energy and demand savings for the Initiative increased by 300% compared to the combined 2011 and 2012 results ; number of projects also increased from 45 in 2011 and 2012 to 86 in 2013. • All projects are opting for the prescriptive or performance path. No custom project applications were received in 2013, similar to 2011-2012. • Net-to-gross ratio for the initiative was higher by 14% from 49% in 2012 to 63% in 2013.

HOME ASSISTANCE PROGRAM

Home Assistance Program
• Participation increased significantly to 26,756 participants in 2013 from 5,033 in 2012 • Realization rates were slightly lower in 2013 (0.88 for kWh and 0.26 for kW) than in 2012 (0.98 for kWh and 0.32 for kW) primarily due to updated verified per unit assumptions . • Realization rate for demand savings remained low as FAST Tool calculated kW savings for certain insulation measures remained very high and recommended revisions to kW savings factors were not yet in use in 2013 (changes to the FAST Tool to address these issues were made in early 2014)

BUSINESS PROGRAM

Retrofit
• A total of 8,785 projects completed in 2013. Reported energy savings for individual projects ranged from 1 kWh to over 5,000,000 kWh • Net to Gross ratio (NTG) for energy was 72.8%, consistent with prior years • NTG for demand was 72.0%, consistent with prior years • NTG ratios are comparable to similar programs across North America

Small Business Lighting
• In 2013 the initiative introduced: a) an increase in the incentive to $1500 from $1000, b) new LED measures c) Agribusiness eligibility, resulting in the stabilization of participation and an increase in savings. • 17,782 projects completed in 2013 (3.8% decrease from 2012) • However, 12.2% increase in Net Verified Energy Savings relative to 2012. • The average incentive per project and savings per project both increased between 2012 to 2013 • Net to Gross ratio (NTG) for 2013 remained unchanged at 94%

Audit Funding
• 319 audits were completed in 2013 • 2013 sample saw more recommended measures implemented without incentives (33% in 2013 vs. 13% in 2012) • The average per audit summer peak demands savings is estimated to be 13 kW.

Existing Building Commissioning
• 29 unique participants in the 2013 population • No Commissioning projects completed the hand-off/completion phase in 2013 • Improvements to the chilled water system controls were the most commonly targeted measure. • Large variation in estimated savings results between preliminary investigation phase and actual implementation phase

High Performance New Construction
• Number of projects increased by 25% from 69 in 2012 to 86 in 2013. • Custom projects, representing only about 8% of the total number of projects, account for 67% of verified demand savings and 54% of verified energy savings. • A realization rate of 72% for energy savings is low due to the low realization rate of the Agribusiness high ventilation, low speed fans which comprised of 15 % of the HPNC prescriptive project energy savings. • Net-to-gross ratio for the initiative was higher by 5% from 49% in 2012 to 54% in 2013.

INDUSTRIAL PROGRAM

Process and Systems Upgrade Initiative
• In 2013, three PSUI projects were put into service. Projects were very well documented and technical reviews were thorough. Most projects are delivering the level of energy savings expected or more (realization rates of 87% for energy savings and 86% for summer demand savings) • Good level of quality on M&V conducted in each project. The level of free-ridership was found to be very low, at only 7% for energy savings and 6% for demand savings, and no spillover was identified. • Energy Managers are seen as important drivers of program enabled savings projects. Almost a 300% increase vs. 2012 in the amount of energy savings from program enabled savings projects.

DR-3
• The largest 20 contributors account for 60% of the contractual demand reduction – in other words, less than 5% of contributors account for the majority of the load reductions. • In 2013, DR-3 was successfully dispatched locally for the first time in order to provide assistance in restoring power after a prolonged power outage due to substation flooding.

Note: The Key Evaluation findings are derived from the 2013 evaluations of the saveONenergy programs. These findings were developed by 3rd party evaluation contractors. Complete findings are detailed in the contractors' full evaluation reports, which will be available publicly in Q4 2014.

7.1.3 Spending

Table 5 and Table 6 summarize the total spending by initiative that GSHI has incurred in 2013 and cumulatively since 2011, respectively. Each table is detailed by the Program Administration Budget (PAB), Participant Based Funding (PBF), Participant Incentives (PI) and Capability Building Funding (CBF).

Table 5 – 2013 Spending

Initiative	PAB	PBF	PI	CBF	TOTAL
Consumer Program	***$112,744***				***$112,744***
Appliance Retirement	*$33,696*				*$33,696*
Appliance Exchange	*$4,585*				*$4,585*
HVAC Incentives	*$6,158*				*$6,158*
Annual Coupons	*$6,158*				*$6,158*
Bi-Annual Retailer Event	*$7,517*				*$7,517*
Retailer Co-op	*$0*				*$0*
Residential Demand Response	*$40,631*				*$40,631*
New Construction Program	*$13,998*				*$13,998*
Business Program	***$263,610***				***$263,610***
Equipment Replacement	*$163,915*				*$163,915*
Direct Installed Lighting	*$62,458*				*$62,458*
Existing Building Commissioning Incentive	*$2,496*				*$2,496*
New Construction and Major Renovation Initiative	*$13,204*				*$13,204*
Energy Audit	*$21,536*				*$21,536*
Small Commercial Demand Response	*$0*				*$0*
Demand Response 3	*$0*				*$0*
Industrial Program	***$29,414***				***$29,414***
Process & System Upgrades	*$0*				*$0*
a) preliminary engineering study	*$8,037*				*$8,037*
b) detailed engineering study	*$2,496*				*$2,496*
c) program incentive	*$2,496*				*$2,496*
Monitoring & Targeting	*$2,496*				*$2,496*
Energy Manager	*$6,099*				*$6,099*
Key Account Manager ("KAM")	*$2,496*				*$2,496*
Equipment Replacement	*$0*				*$0*
Demand Response 3	*$5,293*				*$5,293*
Home Assistance Program	***$85,890***				***$85,890***
Initiatives Not In Market	***$7,489***				***$12,489***
Midstream Electronics	*$0*				*$0*
Midstream Pool Equipment	*$0*				*$0*
Direct Service Space Cooling	*$2,496*				*$4,163*
Demand Response 1	*$0*				*$8,326*
Home Energy Audit Tool	*$4,993*				*$0*
TOTAL SPENDING	***$499,147***				***$499,147***

Table 6 - Cumulative Spending (2011-2014)

Initiative	PAB	PBI	PI	CBF	TOTAL
Consumer Program	***$260,921***				***$260,921***
Appliance Retirement	*$80,232*				*$80,232*
Appliance Exchange	*$7,278*				*$7,278*
HVAC Incentives	*$11,728*				*$11,728*
Annual Coupons	*$11,149*				*$11,149*
Bi-Annual Retailer Event	*$20,982*				*$20,982*
Retailer Co-op	*$0*				*$0*
Residential Demand Response	*$104,284*				*$104,284*
New Construction Program	*$25,269*				*$25,269*
Business Program	***$497,958***				
Equipment Replacement	*$296,949*				*$296,949*
Direct Installed Lighting	*$138,995*				*$138,995*
Existing Building Commissioning Incentive	*$4,163*				*$4,163*
New Construction and Major Renovation Initiative	*$26,696*				*$26,696*
Energy Audit	*$31,155*				*$31,155*
Small Commercial Demand Response	*$0*				*$0*
Demand Response	*$0*				*$0*
Industrial Program	***$48,611***				***$48,611***
Process & System Upgrades	*$0*				*$0*
a) preliminary engineering study	*$12,917*				*$12,917*
b) detailed engineering study	*$4,163*				*$4,163*
c) program incentive	*$4,163*				*$4,163*
Monitoring & Targeting	*$4,163*				*$4,163*
Energy Manager	*$8,879*				*$8,879*
Key Account Manager (“KAM”)	*$4,163*				*$4,163*
Equipment Replacement Incentive	*$0*				*$0*
Demand Response 3	*$10,163*				*$10,163*
Home Assistance Program	***$109,850***				***$109,850***
Home Assistance Program	*$109,850*				*$109,850*
Pre 2011 Programs	***$0***				***$0***
Electricity Retrofit Incentive Program	*$0*				*$0*
High Performance New Construction	*$0*				*$0*
Toronto Comprehensive	*$0*				*$0*
Multifamily Energy Efficiency Rebates	*$0*				*$0*
Data Centre Incentive Program	*$0*				*$0*
EnWin Green Suites	*$0*				*$0*
Initiatives Not In Market	***$12,489***				***$12,489***
Midstream Electronics	*$0*				*$0*
Midstream Pool Equipment	*$0*				*$0*
Direct Service Space Cooling	*$4,163*				*$4,163*
Demand Response 1	*$0*				*$8,326*
Home Energy Audit Tool	*$8,326*				*$0*
TOTAL SPENDING	***$929,828***				***$929,828***

7.2 GSHI Programs

7.2.1 Participation and Savings

Table 7, Table 8, and Table 9 below outline the participation, net summer peak demand, and energy savings achieved through GSHI programs 2011, 2012, and 2013. In 2012, GSHI achieved approximately 20 percent of incremental energy savings from GSHI programs. In 2013, GSHI achieved approximately 3 percent of incremental energy savings from GSHI programs. Most programs did not achieve summer peak demand savings because the measures were winter peaking to better reflect the needs of the region. GSHI's achievement of energy savings to-date, including the GSHI programs, is in line with the majority of the LDC community.

Verified 2011 and 2012 results were adjusted to reflect any additional installations, removals, and/or updated data.

Table 7 - Participation GSHI Programs

Program	Unit	Incremental Activity			
		2011	2012	2013	2014
GSHI Programs					
Electric Thermal Storage	Units	40	180	170	
Parking Lot Conversion (diesel)	Devices	4	117	63	
Parking Lot Conversion (gas)	Devices	326	435	137	
Street Lighting	Lamps	63	1,199	211	
Traffic Light Conversion	Lamps	128	269	0	
CoolerMiser	Devices	33	64	37	
VendorMiser	Devices	136	92	2	

Table 8 - Net Summer Peak Demand Savings GSHI Programs

Program	Net Incremental Summer Peak Demand Savings (kW)				2014 Net Annual Peak Demand Savings (kW)
	2011	2012	2013	2014	
GSHI Programs					
Electric Thermal Storage	n/a	n/a	n/a		n/a
Parking Lot Conversion (diesel)	n/a	n/a	n/a		n/a
Parking Lot Conversion (gas)	n/a	n/a	n/a		n/a
Street Lighting	n/a	n/a	n/a		n/a
Traffic Light Conversion	10	22	0		32
CoolerMiser	n/a	n/a	n/a		n/a
VendorMiser	n/a	n/a	n/a		n/a
Adjustments to 2011 Verified Results	0	0	0		0
Adjustments to 2012 Verified Results		0	0		0
Total	**10**	**22**	**0**		**32**

Table 9 - Net Energy Savings GSHI Programs

Program	Net Incremental Energy Savings (kWh)				2011-2014 Net Cumulative Energy Savings (kWh)
	2011	2012	2013	2014	
GSHI Programs					
Electric Thermal Storage	0	0	0		0
Parking Lot Conversion (diesel)	3,455	89,475	20,302		322,849
Parking Lot Conversion (gas)	133,162	270,296	26,085		1,395,706
Street Lighting	29,407	459,404	86,694		1,669,228
Traffic Light Conversion	45,404	144,557	0		615,287
CoolerMiser	14,595	28,305	16,364		176,023
VendorMiser	93,934	63,543	1,382		569,129
Adjustments to 2011 Verified Results	-71,091				-284,364
Adjustments to 2012 Verified Results		-157,227			-471,680
Total	**248,866**	**898,353**	**150,826**		**3,992,178**

7.2.2 Evaluation Findings

A third party evaluation was completed for the GSHI programs. The following section provides a summary of the 2012 EM&V findings for all of the evaluated GSHI programs. Additional insights, methodologies, and results can be found in the evaluation report in Appendix D of this report.

Electric Thermal Storage

- Over half of the participants cited cost savings as their primary motivation for their initial interest in participating in the program
- Participants mentioned the demonstration at Greater Sudbury Hydro as a good way for them to understand what they were purchasing

Commercial Parking Lot Plug Controller Program

- Majority of diesel units were installed by business customers, while the majority of gas controllers were installed at multi-residential sites
- Many of the sampled companies were actively looking for incentive programs to save electricity and had participated in other rebate programs in Ontario, specifically lighting programs

LED Street Lighting

- Respondent indicated that the lead time for such projects is fairly long given the need for consideration and approval by City Council; which often has many competing budget priorities

LED Street Lighting
• Participant noted that it is often difficult for a municipality to undertake these types of high capital cost projects and that upgrades are often not done unless there is a significant financial motivation

Vending Machine and Self Service Coolers Efficiency Program
• Participants were very happy with this program, but found it difficult to assess whether it had resulted in an actual reduction on their utility bills • Over 60 percent of the participants initially heard about the program on television, these participants were typically small businesses with half of the sampled participants having less than 20 employees

7.2.3 Spending

Details on the program costs and incentive costs for these programs for all years will be provided in the full report provided to the OEB.

7.3 Additional Comments

GSHI has included results of GSHI Programs within this report and has considered progress towards target to include both OPA Programs and GSHI Programs. GSHI has based this assumption on the Guidelines for Electricity Distributor Conservation and Demand Management (EB-2012-0003) issued by the OEB on April 26, 2012. Section 3 acknowledges initiatives from programs prior to 2011 that will be completed after 2011 and states:

> *"The Board is of the opinion that it is reasonable to allow distributors to count the new savings arising from the initiatives completed pursuant to the terms of the program in or after 2011 against their CDM targets. Distributors must still follow the OPA's EM&V Protocols in evaluating and verifying these savings, as outlined in the CDM Code. The Board will not consider any savings that persist from initiatives completed prior to 2011 against an LDC's CDM target."*

The OPA has made the same assumption when considering and aggregating to target results attributable to the following programs:

- Electricity Retrofit Incentive Program
- High Performance New Construction
- Toronto Comprehensive
- Multifamily Energy Efficiency Rebates
- Data Centre Incentive Program
- EnWin Green Suites

Three programs within this list are limited to one to three LDC territories, including Toronto Comprehensive, Data Centre Incentive Program, and EnWin Green Suites. Based on the treatment of these programs and the guidelines stated by the OEB on April 26, 2012, GSHI believes that this report accurately reflects its progress to targets and both OPA programs and GSHI programs can reasonably be considered.

8 Combined CDM Reporting Elements

8.1 Progress Towards CDM Targets

GSHI continues to be concerned about the declining contribution expected from 2013 and onward from several previously solid performers due to the maturity of the markets for these Initiatives. In particular, the Appliance Retirement, HVAC Incentives and Direct Install Lighting Initiatives are all in precarious positions due mostly to past success. GSHI achieves majority of its savings from these initiatives and is concerned about the future potential in the coming years.

In addition, the lack of a large distribution-connected industrial customer base in GSHI places increased reliance on the Business Program to achieve the savings required to meet the CDM targets. Given this situation, the burden of most of the savings achievement in the final years of the framework resides with the Efficiency: Equipment Replacement Initiative, ERII, unless new and effective programs are brought on-stream very quickly.

Based upon the inclusion of other pre-2011 programs with savings delivered within the 2011 to 2014 period, including provincial programs such as Electricity Retrofit Incentive Program and Multi-family Energy Efficiency Retrofits, and LDC custom programs such as Toronto Comprehensive and EnWin GreenSuites, GSHI has included verified results from its OEB-Approved custom programs with incremental savings within the 2011 to 2014 period. It is essential that GSHI receives the same treatment as other LDCs on this matter as GSHI programs contribute 1.3% towards progress to its 2014 peak demand target and 10.9% towards progress to its 2011-2014 energy savings target.

Table 10 – Net Annual Peak Demand Savings Achieved Towards Target

Implementation Period	Annual			
	2011	2012	2013	2014
2011 - Verified	0.88	0.72	0.72	0.69
2011 - GSHI	0.01	0.01	0.01	0.01
2012 - Verified†	-0.05	0.86	0.77	0.77
2012 - GSHI†		0.02	0.02	0.02
2013 - Verified†	0.00	0.08	1.10	1.01
2013 - GSHI†			0.00	0.00
2014				
Verified Net Annual Peak Demand Savings Persisting in 2014:				2.5
Greater Sudbury Hydro Inc. 2014 Annual CDM Capacity Target:				8.2
Verified Portion of Peak Demand Savings Target Achieved in 2014 (%):				30.5%

†Includes adjustments to previous years' verified results

Table 11 – Net Cumulative Energy Savings Achieved Towards Target

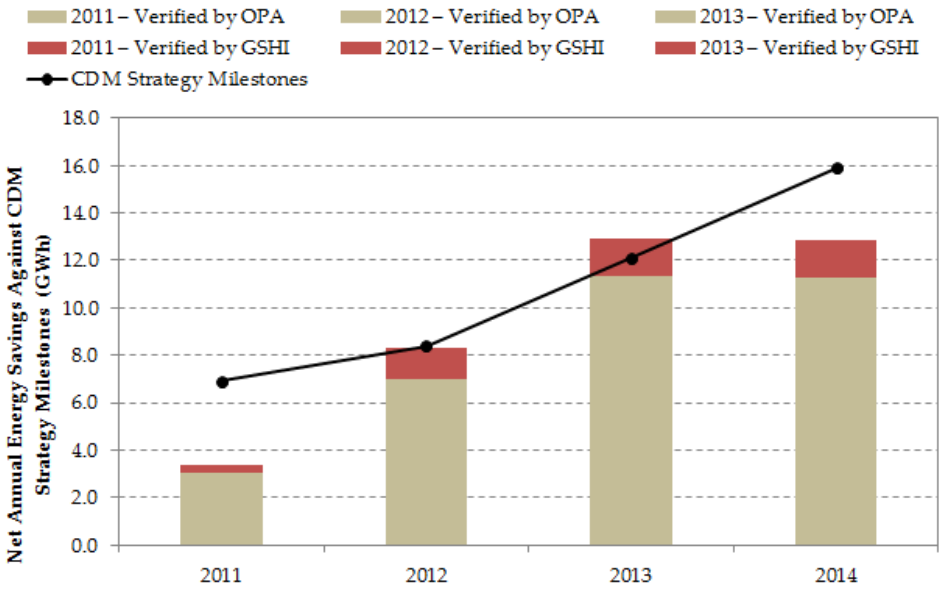
Implementation Period	Annual				Cumulative
	2011	2012	2013	2014	2011-2014
2011 - Verified	3.1	3.1	3.1	3.0	12.2
2011 - GSHI	0.3	0.3	0.3	0.3	1.2
2012 - Verified†	-0.1	3.6	3.6	3.6	10.6
2012 - GSHI†	-0.2	1.1	1.1	1.1	3.1
2013 - Verified†	0.0	0.3	4.7	4.7	9.8
2013 - GSHI†	0.0	-0.6	0.2	0.2	-0.3
2014					0.0
Verified Net Cumulative Energy Savings 2011 2014:					**36.6**
Greater Sudbury Hydro Inc. 2011-2014 Annual CDM Energy Target:					**43.7**
Verified Portion of Cumulative Energy Target Achieved in 2014 (%):					**83.7%**

†Includes adjustments to previous years' verified results

8.2 Variance from Strategy

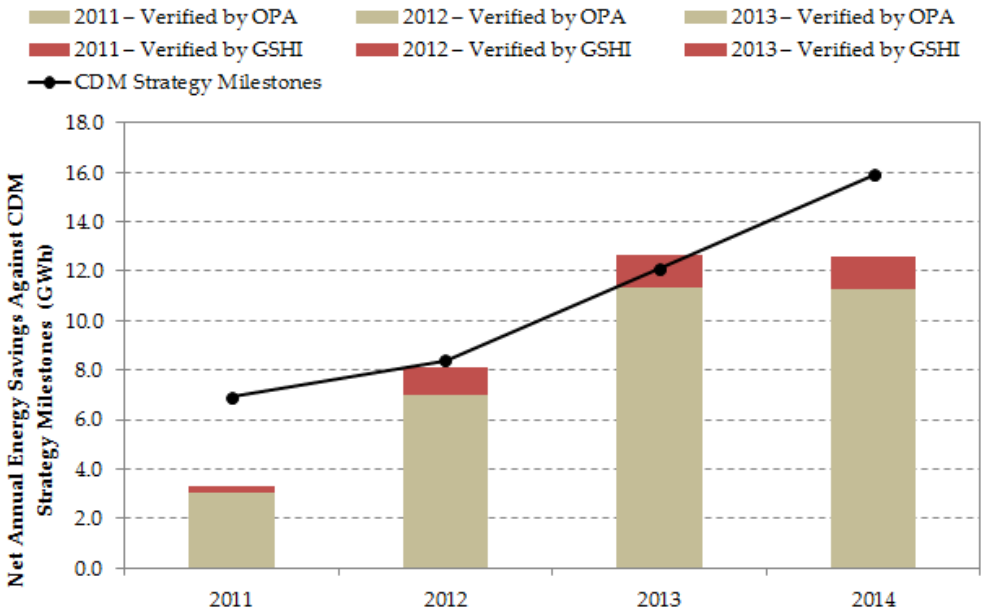
As Figure 1 illustrates, with almost all programs in-market and the verified results from GSHI's regionally focused programs, GSHI recovered from its 2011 shortfall, was back on-track towards the milestones put forth in its CDM strategy, and is now exceeding the 2013 annual milestone. The value of the additional regionally focused, custom designed initiatives for GSHI is evident in the figure below. Without these custom programs tailored to fit the needs of GSHI customers, GSHI would not be on track towards its CDM Strategy.

Figure 1 - GSHI Progress to Energy Target



As Figure 2 illustrates, GSHI's is well below peak demand savings milestones. GSHI anticipated from the beginning of the framework that the peak demand target would not be attainable. GSHI initially set annual milestones that did not meet the peak demand target. It is unlikely that GSHI will have the ability to meet its peak demand targets with the current program suite.

Figure 2 - GSHI Progress to Peak Demand Target



8.3 Outlook to 2014 and Strategy Modifications

GSHI is currently projecting to achieve within 10 percent of its cumulative energy target and within 40 to 50 percent of its peak demand target. GSHI remains committed to delivering CDM and a variety of programs. GSHI will continue to reach out to customers through social media, community events, and direct sales.

GSHI's key risks in the final years of program delivery will be:

- Improvements to the ERII program, which will require forward-looking and sometimes difficult changes to be implemented.
- The availability of Board-Approved Programs to GSHI, either on its own and in collaboration with other LDCs.
- The decision of the OEB regarding the inclusion of all pre-2011 programs with incremental savings in 2011, 2012, and 2013 (including GSHI's programs).

8.3.1 Peak Demand Savings Target

It will be extremely difficult for GSHI to achieve its peak demand savings target. GSHI has projected that even if 2011, 2012, and 2013 savings are maintained for 2014 and growth continues on its current trajectory, GSHI will fall well short of achieving its peak demand savings targets by approximately 5 MW.

GSHI's largest contributor to peak demand savings is ERII at approximately 25% of peak demand savings achieved to date. However, the average peak demand savings achieved per ERII project has declined from 5.8 kW per

project in 2011 to 3.7 kW per project in 2013. Assuming 2013 average project sizes, GSHI would need to procure over 250 ERII projects in 2014 to achieve just one net MW of peak demand savings. This would represent a 500% increase in the number of projects acquired in one year.

GSHI's second largest contributor to peak demand savings life to date is the HVAC Incentives program at approximately 20% of peak demand savings achieved. The average peak demand savings achieved per installation declined sharply in 2012 (40% decline in average kW per installation). Assuming 2013 average peak demand per installation, GSHI would need to facilitate over 4,000 installations. This would require over 600% jump in installations in one year.

The DR3 Initiative is a significant contributor to helping LDCs achieve their demands savings target. In a discounted Demand Response 3 zone, it is difficult to attract large demand savings without a significant amount of sales efforts and resources. GSHI only has one DR3 customer that contributes to less than 10% of total peak demand savings. On March 31st, 2014 the Minister of Energy issued a directive entitled "Continuance of the OPA's Demand Response Program under IESO management" which effectively halts new customer enrollments in the DR3 program until the IESO has a program in market. This is estimated to be some time in 2015. Based on these factors, GSHI has made the decision not to focus working with aggregators to acquire additional DR3 customers to meet its peak demand target.

With no Board-Approved Programs available in GSHI's territory and a drop-off in savings expected for several traditionally solid Initiatives and declining savings per project, the situation is serious. GSHI's own programs, only due to unforeseen delays from their original timetables, have achieved savings from 2011 to 2013 that are expected to contribute towards GSHI's targets. However, GSHI programs are mainly winter peaking programs and thus cannot contribute to peak demand targets with the exception of the LED Traffic Light Conversion Program which provides summer peak demand savings.

8.3.2 Energy Savings Target

GSHI is currently projecting to achieve within 10 percent of its cumulative energy target. Building on the momentum gained in 2012, GSHI has recovered its progress towards the 2013 annual milestone. If GSHI is able to double the average amount of net incremental savings growth from OPA programs in 2014, GSHI could exceed its cumulative energy target. However, there is a significant amount of incremental effort that GSHI will need to put forth to reach this goal. If GSHI is able to achieve the same average amount of incremental net energy savings and growth from OPA programs in 2014, GSHI will meet approximately 94 percent of its energy target.

GSHI's own programs, only due to unforeseen delays from their original timetables, have contributed significant energy savings from 2011 to 2013 towards energy savings targets will contribute minimal energy savings in 2014 as GSHI continues to clear out existing inventory. GSHI's projected achievement assumes that GSHI's programs will be given the same treatment as other provincial and regional pre-2011 programs with incremental savings within the 2011 to 2014 period (E.g., ERIP, Toronto's regional custom programs, PowerStream and EnWin's custom programs, etc.). GSHI's custom programs contributed to 9 percent of total incremental energy savings in 2011, 23 percent of total incremental energy savings in 2012, and 3.5 percent of total incremental energy savings in 2013.

In the last year of the framework, GSHI will continue to focus efforts and sales on the Business Program to achieve even greater savings through ERII. As part of the focus on ERII, GSHI will continue outreach to its largest customers and focus on deeper savings. GSHI will continue to work with existing customers and potential customers, helping them better understand their businesses' energy use and work through the OPA program administration process.

The OPA must work with the CDM community to quickly address well known participation barriers that prevent a significant proportion of comprehensive, non-lighting projects from proceeding. As mentioned, larger projects must continue to be found or the performance of this foundation initiative may also slip downward in coming months and years. Lighting-based savings are at increasing risk as the market transforms in anticipation of new standards that affect most of the technologies incentivized in the OPA Programs.

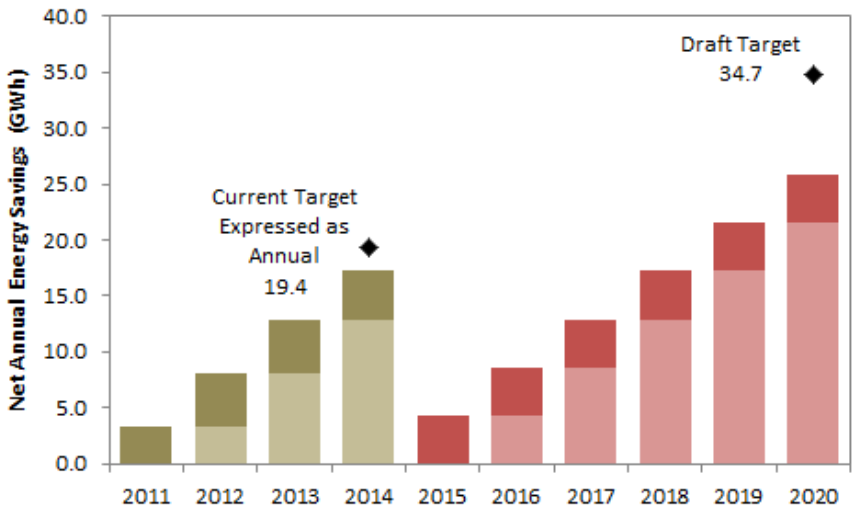
9 Conclusion

Over the course of 2013, GSHI has achieved 1.1 MW in incremental peak demand savings and 4.9 GWh in incremental energy savings, which represents 12% and 23% of GSHI 2014 peak demand and energy targets, respectively. Since 2011, GSHI has achieved 2.5 MW of annual peak demand savings and 36.6 GWh of cumulative energy savings, which represents 30.5% and 83.7% of GSHI 2014 peak demand and energy savings targets, respectively. These results are representative of a considerable effort expended by GSHI, in cooperation with other LDCs, customers, channel partners and stakeholders to overcome many operational and structural issues that limited program effectiveness across all market sectors. This achievement is a success and the relationships built within the 2011-2014 CDM program term will aid results in a subsequent CDM term.

However, despite continuing improvements to existing programs GSHI faces challenges in the remaining years of the current CDM framework. With the current slate of available OPA Programs, and the current forecast of implementation and projected savings, GSHI expects to meet its cumulative energy target but will struggle to meet its peak demand savings target. GSHI expects a 5 MW shortfall to its 8.2 MW peak demand savings target by the end of 2014.

GSHI will continue to engage customers, investigate new and regional program opportunities, and work with the OPA and other LDCs to improve the current OPA Programs. In the new framework, based on draft budgets and targets released in summer 2014, GSHI is concerned about the significantly higher targets (illustrated in the figure below using average performance over the 2011 to 2014 period) and lower budget per kWh compared to the funding in the current framework.

Figure 3 – Comparison of Current and Future CDM Frameworks



Looking ahead there is limited opportunity to make valuable changes to the current program portfolios and have these changes reflected in LDC 2014 results. However, LDCs and the OPA can build on the strengths and key successes of the 2011-2014 programs to launch new programs which will meet the needs of the industry and consumers.

Appendix A Province-Wide Initiative Descriptions

A.1 Residential Program

A.1.1 Appliance Retirement Initiative (Exhibit D)

Target Customer Type(s): Residential Customers

Initiative Frequency: Year round

Objectives: Achieve energy and demand savings by permanently decommissioning certain older, inefficient refrigeration appliances.

Description: This is an energy efficiency Initiative that offers individuals and businesses free pick-up and decommissioning of old large refrigerators and freezers. Window air conditioners and portable dehumidifiers will also be picked up if a refrigerator or a freezer is being collected.

Targeted End Uses: Large refrigerators, large freezers, window air conditioners and portable dehumidifiers.

Delivery: OPA centrally contracts for the province-wide marketing, call centre, appliance pick-up and decommissioning process. LDC's provides local marketing and coordination with municipal pick-up where available.

Additional Detail: Schedule B-1, Exhibit D on the OPA extranet and SaveONenergy website

A.1.2 Appliance Exchange Initiative (Exhibit E)

Target Customer Type(s): Residential Customers

Initiative Frequency: Spring and Fall

Objective: The objective of this Initiative is to remove and permanently decommission older, inefficient window air conditioners and portable dehumidifiers that are in Ontario.

Description: This Initiative involves appliance exchange events. Exchange events are held at local retail locations and customers are encouraged to bring in their old room air conditioners (AC) and dehumidifiers in exchange for coupons/discounts towards the purchase of new energy efficient equipment. Window ACs were discontinued from the program in 2013.

Targeted End Uses: Window air conditioners and portable dehumidifiers

Delivery: OPA contracts with participating retailers for collection of eligible units. LDCs provide local marketing.

Additional Detail: Schedule B-1, Exhibit C on the OPA extranet and SaveONenergy website

A.1.3 HVAC Incentives Initiative (Exhibit B)

Target Customer Type(s): Residential Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to encourage the replacement of existing heating systems with high efficiency furnaces equipped with Electronically Commutated Motors (ECM), and to replace existing central air conditioners with ENERGY STAR qualified systems and products**.**

Description: This is an energy efficiency Initiative that provides rebates for the replacement of old heating or cooling systems with high efficiency furnaces (equipped with ECM) and ENERGY STAR® qualified central air conditioners by approved Heating, Refrigeration, and Air Conditioning Institute (HRAI) qualified contractors.

Targeted End Uses: Central air conditioners and furnaces

Delivery: OPA contracts centrally for delivery of the program. LDCs provide local marketing and encourage local contractors to participate in the Initiative.

Additional Detail: Schedule B-1, Exhibit B on the OPA extranet and SaveONenergy website

A.1.4 Conservation Instant Coupon Initiative (Exhibit A)

Target Customer Type(s): Residential Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to encourage households to purchase energy efficient products by offering discounts.

Description: This Initiative provides customers with year round coupons. The coupons offer instant rebates towards the purchase of a variety of low cost, easy to install energy efficient measures and can be redeemed at participating retailers. Booklets were directly mailed to customers and were also available at point-of-purchase. Downloadable coupons were also available at www.saveoneenergy.ca.

Targeted End Uses: ENERGY STAR® qualified Standard Compact Flourescent Lights ("CFLs"),ENERGY STAR® qualified Light Fixtures lighting control products, weather-stripping, hot water pipe wrap, electric water heater blanket, heavy duty plug-in Timers, Advanced power bars, clothesline, baseboard programmable thermostats.

Delivery: The OPA develops the electronic version of the coupons and posts them online for download. Three LDC specific coupons were made available for local marketing and utilization by LDCs. The OPA enters into agreements with retailers to honour the coupons.

Additional Detail: Schedule B-1, Exhibit A on the OPA extranet and SaveONenergy website

A.1.5 Bi-Annual Retailer Event Initiative (Exhibit C)

Target Customer Type(s): Residential Customers

Initiative Frequency: Bi-annual events

Objective: The objective of this Initiative is to provide instant point of purchase discounts to individuals at participating retailers for a variety of energy efficient products.

Description: Twice a year (Spring and Fall), participating retailers host month-long rebate events. During the months of April and October, customers are encouraged to visit participating retailers where they can find coupons redeemable for instant rebates towards a variety of low cost, easy to install energy efficient measures.

Targeted End Uses: As per the Conservation Instant Coupon Initiative

Delivery: The OPA enters into arrangements with participating retailers to promote the discounted products, and to post and honour related coupons. LDCs also refer retailers to the OPA and market this initiative locally.

Additional Detail: Schedule B-1, Exhibit C on the OPA extranet and saveONenergy website

A.1.6 Retailer Co-Op

Target Customer Type(s): Residential Customers

Initiative Frequency: Year Round

Objective: Hold promotional events to encourage customers to purchase energy efficiency measures (and go above-and-beyond the traditional Bi-Annual Coupon Events).

Description: The Retailer Co-op Initiative provides LDCs with the opportunity to work with retailers in their service area by holding special events at retail locations. These events are typically special promotions that encourage customers to purchase energy efficiency measures (and go above-and-beyond the traditional Bi-Annual Coupon Events).

Targeted End Uses: As per the Conservation Instant Coupon Initiative

Delivery: Retailers apply to the OPA for co-op funding to run special promotions that promote energy efficiency to customers in their stores. LDCs can refer retailers to the OPA. The OPA provides each LDC with a list of retailers who have qualified for Co-Op Funding as well as details of the proposed special events.

A.1.7 New Construction Program (Schedule B-2)

Target Customer Type(s): Residential Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to provide incentives to participants for the purpose of promoting the construction of energy efficient residential homes in the Province of Ontario.

Description: This is an energy efficiency Initiative that provides incentives to homebuilders for constructing new homes that are efficient, smart, and integrated (applicable to new single family dwellings). Incentives are provided in two key categories as follows:

- Incentives for homebuilders who install electricity efficiency measures as determined by a prescriptive list or via a custom option.
- Incentives for homebuilders who meet or exceed aggressive efficiency standards using the EnerGuide performance rating system.

Targeted End Uses: All off switch, ECM motors, ENERGY STAR® qualified central a/c, lighting control products, lighting fixtures, Energuide 83 whole home, Energuide 85 whole homes

Delivery: Local engagement of builders will be the responsibility of the LDC and will be supported by OPA air coverage driving builders to their LDC for additional information.

Additional Detail: Schedule B-1, Exhibit C on the OPA extranet and SaveONenergy website

A.1.8 Residential Demand Response Program (Schedule B-3)

Target Customer Type(s): Residential and Small Commercial Customers

Initiative Frequency: Year round

Objective: The objectives of this Initiative are to enhance the reliability of the IESO-controlled grid by accessing and aggregating specified residential and small commercial end uses for the purpose of load reduction, increasing consumer awareness of the importance of reducing summer demand and providing consumers their current electricity consumption and associated costs.

Description: In ***peaksaver***PLUS™ participants are eligible to receive a free programmable thermostat or switch, including installation. Participants also receive access to price and real-time consumption information on an In Home Display (IHD).

Targeted End Uses: central air conditioning, electric hot water heaters and pool pumps

Delivery: LDC's recruit customers and procure technology

Additional Detail: Schedule B-1, Exhibit C on the OPA extranet and SaveONenergy website

A.2 C&I Program

A.2.1 Efficiency: Equipment Replacement Incentive (ERII) (Schedule C-2)

Target Customer Type(s): Commercial, Institutional, Agricultural and Industrial Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to offer incentives to non-residential distribution customers to achieve reductions in electricity demand and consumption by upgrading to more energy efficient equipment for lighting, space cooling, ventilation and other measures.

Description: The Equipment Replacement Incentive Initiative (ERII) offers financial incentives to customers for the upgrade of existing equipment to energy efficient equipment. Upgrade projects can be classified into either: 1) prescriptive projects where prescribed measures replace associated required base case equipment; 2) engineered projects where energy and demand savings and incentives are calculated for associated measures; or 3) custom projects for other energy efficiency upgrades.

Targeted End Uses: lighting, space cooling, ventilation and other measures

Delivery: LDC delivered.

Additional Detail: Schedule C-2 on the OPA extranet and saveONenergy website

A.2.2 Direct Install Initiative (DIL) (Schedule C-3)

Target Customer Type(s): Small Commercial, Institutional, Agricultural facilities and multi-family buildings

Initiative Frequency: Year round

Objective: The objective of this Initiative is to offer a free installation of eligible lighting and water heating measures of up to $1,000 to eligible owners and tenants of small commercial, institutional and agricultural facilities and multi-family buildings, for the purpose of achieving electricity and peak demand savings.

Description: The Direct Installed Lighting Initiative targets customers in the General Service <50kW account category. This Initiative offers turnkey lighting and electric hot water heater measures with a value up to $1,000 at no cost to qualifying small businesses. In addition, standard prescriptive incentives are available for eligible equipment beyond the initial $1,000 limit.

Target End Uses: Lighting and electric water heating measures

Delivery: Participants can enroll directly with the LDC, or would be contacted by the LDC/LDC-designated representative.

Additional Detail: Schedule C-3 on the OPA extranet and SaveONenergy website

A.2.3 Existing Building Commissioning Incentive Initiative (Schedule C-6)

Target Customer Type(s): Commercial, Institutional, and Agricultural Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to offer incentives for optimizing (but not replacing) existing chilled water systems for space cooling in non-residential facilities for the purpose of achieving implementation phase energy savings, implementation phase demand savings, or both.

Description: This Initiative offers Participants incentives for the following:

- scoping study phase
- investigation phase
- implementation phase
- hand off/completion phase

Targeted End Uses: Chilled water systems for space cooling

Delivery: LDC delivered.

Additional Detail: Schedule C-6 on the OPA extranet and SaveONenergy website Additional detail is available:

A.2.4 New Construction And Major Renovation Initiative (HPNC) (Schedule C-4)

Target Customer Type(s): Commercial, Institutional, Agricultural and Industrial Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to encourage builders/major renovators of commercial, institutional, and industrial buildings (including multi-family buildings and agricultural facilities) to reduce electricity demand and/or consumption by designing and building new buildings with more energy-efficient equipment and systems for lighting, space cooling, ventilation and other Measures.

Description: The New Construction initiative provides incentives for new buildings to exceed existing codes and standards for energy efficiency. The initiative uses both a prescriptive and custom approach.

Targeted End Uses: New building construction, building modeling, lighting, space cooling, ventilation and other Measures

Delivery: LDC delivers to customers and design decision makers.

Additional Detail: Schedule C-4 on the OPA extranet and SaveONenergy website

A.2.5 Energy Audit Initiative (Schedule C-1)

Target Customer Type(s): Commercial, Institutional, Agricultural and Industrial Customers

Initiative Frequency: Year round

Objective: The objective of this Initiative is to offer incentives to owners and lessees of commercial, institutional, multi-family buildings and agricultural facilities for the purpose of undertaking assessments to identify all possible opportunities to reduce electricity demand and consumption within their buildings or premises.

Description: This Initiative provides participants incentives for the completion of energy audits of electricity consuming equipment located in the facility. Energy audits include development of energy baselines, use assessments and performance monitoring and reporting.

Targeted End Uses: Various

Delivery: LDC delivered.

Additional Detail: Schedule C-1 on the OPA extranet Schedule C-1 and SaveONenergy website https://saveonenergy.ca/Business/Program-Overviews/Audit-Funding.aspx

A.3 Industrial Program

A.3.1 Process & Systems Upgrades Initiative (PSUI) (Schedule D-1)

Target Customer Type(s): Industrial, Commercial, Institutional and Agricultural Customers

Initiative Frequency: Year round

Objectives: The objectives of this Initiative are to:

- Offer distribution customers capital incentives and enabling initiatives to assist with the implementation of large projects and project portfolios;
- Implement system optimization project in systems which are intrinsically complex and capital intensive; and

- Increase the capability of distribution customers to implement energy management and system optimization projects.

Description: PSUI is an energy management Initiative that includes three Initiatives: (preliminary engineering study, detailed engineering study, and project incentive Initiative). The incentives are available to large distribution connected customers with projects or portfolio projects that are expected to generate at least 350 MWh of annualized electricity savings or, in the case of Micro-Projects, 100 MWh of annualized electricity savings. The capital incentive for this Initiative is the lowest of:

a) $200/MWh of annualized electricity savings

b) 70% of projects costs

c) A one year pay back

Targeted End Uses: Process and systems

Delivery: LDC delivered with Key Account Management support, in some cases.

Additional Detail: Schedule D-1 on the OPA extranet and saveONenergy website https://saveonenergy.ca/Business.aspx

A.3.2 Monitoring & Targeting Initiative (Schedule D-2)

Target Customer Type(s): Industrial, Commercial, Institutional and Agricultural Customers

Initiative Frequency: Year round

Objective: This Initiative offers access to funding for the installation of Monitoring and Targeting systems in order to deliver a minimum savings target at the end of 24 months and sustained for the term of the M&T Agreement.

Description: This Initiative offers customers funding for the installation of a Monitoring and Targeting system to help them understand how their energy consumption might be reduced. A facility energy manager, who regularly oversees energy usage, will now be able to use historical energy consumption performance to analyze and set targets.

Targeted End Uses: Process and systems

Delivery: LDC delivered with Key Account Management support, in some cases.

Additional Detail: Schedule D-2 on the OPA extranet and saveONenergy website https://saveonenergy.ca/Business.aspx

A.3.3 Energy Manager Initiative (Schedule D-3)

Target Customer Type(s): Industrial, Commercial, Institutional and Agricultural Customers

Initiative Frequency: Year round

Objective: The objective of this initiative is to provide customers and LDCs the opportunity to access funding for the engagement of energy managers in order to deliver a minimum annual savings target.

Description: This Initiative provides customers the opportunity to access funding to engage an on-site, full time embedded energy manager, or an off-site roving energy manager who is engaged by the LDC. The role of the energy manager is to take control of the facility's energy use by monitoring performance, leading awareness programs, and identifying opportunities for energy consumption improvement, and spearheading projects. Participants are funded 80% of the embedded energy manager's salary up to $100,000 plus 80% of the energy manager's actual reasonable expenses incurred up to $8,000 per year. Each embedded energy manager has a target of 300 kW/year of energy savings from one or more facilities. LDCs receive funding of up to $120,000 for a Roving Energy Manager plus $8,000 for expenses.

Targeted End Uses: Process and systems

Delivery: LDC delivered with Key Account Management support, in some cases.

Additional Detail: Schedule D-3 on the OPA extranet and SaveONenergy website https://saveonenergy.ca/Business.aspx

A.3.4 Key Account Manager (KAM) (Schedule D-4)

Target Customer Type(s): Industrial, Commercial, Institutional and Agricultural Customers

Initiative Frequency: Year round

Objective: This initiative offers LDCs the opportunity to access funding for the employment of a KAM in order to support them in fulfilling their obligations related to the PSUI.

Description: This Initiative provides LDCs the opportunity to utilize a KAM to assist their customers. The KAM is considered to be a key element in assisting the consumer in overcoming traditional barriers related to energy management and help them achieve savings since the KAM can build relationships and become a significant resource of knowledge to the customer.

Targeted End Uses: Process and systems

Delivery: LDC delivered

Additional Detail: ScheduleD-4 on the OPA extranet.

A.3.5 Demand Response 3 (Schedule D-6)

Target Customer Type(s): Industrial, Commercial, Institutional and Agricultural Customers

Initiative Frequency: Year round

Objective: This Initiative provides for Demand Response ("DR") payments to contracted participants to compensate them for reducing their electricity consumption by a pre-defined amount during a DR event.

Description: Demand Response 3 ("DR3") is a demand response Initiative for commercial and industrial customers, of 50 kW or greater to reduce the amount of power being used during certain periods of the year. The DR3 Initiative is a contractual resource that is an economic alternative to procurement of new generation capacity. DR3 comes with specific contractual obligations requiring participants to reduce their use of electricity relative to a baseline when called upon. This Initiative makes payments for participants to be on standby and payments for the

actual electricity reduction provided during a demand response event. Participants are scheduled to be on standby approximately 1,600 hours per calendar year for possible dispatch of up to 100 hours or 200 hours within that year depending on the contract.

Targeted End Uses: Commercial and Industrial Operations

Delivery: DR3 is delivered by Demand Response Providers ("DRPs"), under contract to the OPA. The OPA administers contracts with all DRPs and Direct Participants (who provide in excess of 5 MW of demand response capacity). OPA provides administration including settlement, measurement and verification, and dispatch. LDCs are responsible for local customer outreach and marketing efforts.

Additional Detail: Schedule D-6 available on the OPA and SaveONenergy website
https://saveonenergy.ca/Business.aspx

It is noted that while the Schedule for this Initiative was not posted until May 2011, the Aggregators reported that they were able to enroll customers as of January 2011.

A.4 Low Income Initiative (Home Assistance Program) (Schedule E-1)

Target Customer Type(s): Income Qualified Residential Customers

Initiative Frequency: Year Round

Objective: The objective of this Initiative is to offer free installation of energy efficiency measures to income qualified households for the purpose of achieving electricity and peak demand savings.

Description: This is a turnkey Initiative for income qualified customers. It offers residents the opportunity to take advantage of free installation of energy efficient measures that improve the comfort of their home, increase efficiency, and help them save money. All eligible customers receive a Basic and Extended Measures Audit, while customers with electric heat also receive a Weatherization Audit. The Initiative is designed to coordinate efforts with gas utilities.

Targeted End Uses: End use measures based on results of audit (i.e. compact fluorescent light bulbs)

Delivery: LDC delivered.

Additional Detail: Schedule E available on the OPA extranet.

Initiative Activities/Progress:

BPI took the lead on a group RFP for Home Assistance Program provider in 2011. Due to the delay in schedule release, and the time required for the RFP process, BPI was not in market in 2011, however launched in early 2012.

Appendix B GSHI Program Descriptions

B.1 Community Awareness Program

Target Customer Type(s): Residential customers

Initiative Frequency: Year round

Objective: To change customer behavior through education, promote energy conservation efforts occurring throughout the city, and build awareness of GSHI and energy efficiency through community outreach.

Description: The Community Awareness Program included working with local schools to develop action plans for promoting energy conservation, providing energy information and "Kill-A-Watt" monitors to consumers, attending public events and a pilot Smart Meter education program. This program is not designed to achieve savings and is only intended to build awareness.

Targeted End Uses: Residential end uses

Delivery: GSHI delivered

B.2 Electric Thermal Storage (ETS) Program

Target Customer Type(s): Residential electrically heated customers

Initiative Frequency: Year round

Objective: Reduce distribution system peak load by shifting electrical home heating energy use to off-peak hours. Utilities of the north experience a much higher peak in winter than summer (opposite of the trend in the south). Diverting and/or shifting electrical usage to off peak periods has long term potential that will ultimately help transmission assets remain in service.

Description: ETS heating is an off-peak electric heating system that stores low cost electricity in the form of heat for use in heating needs throughout 24 hours a day. ETS equipment utilizes a storage medium to store heat during off-peak hours, as defined in the OEB Regulated Price Plan, and releasing it consistently throughout the day during the mid-peak and on-peak hours. In addition thereto, ETS also has the ability to control electric water heaters off-peak. The benefits of the project were significant in terms of: (i) reducing energy demand at critical peak periods when Ontario's electricity system is most strained; and, (ii) providing the customer with considerable savings on their heating bill.

Targeted End Uses: Conventional electric heat in residential applications

Delivery: GSHI delivered

B.3 Commercial Parking Lot Plug Controller Program

Target Customer Type(s): Commercial and multi-unit residential facilities that contain parking lots that provide plugs for block heaters

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by allowing building and property managers to effectively manage their electricity usage for block heaters in outdoor parking lots during the winter months.

Description: Parking lot controllers are electronic devices that control the amount of electricity used by an outdoor plug, allowing building and property managers to effectively manage their electricity usage for block heaters in outdoor parking lots during the winter months. Studies have shown that block heater plug load could be reduced by as much as 50% with no adverse effect on vehicle starts for users through intelligent control.

This program offers a $175 financial incentive per device to encourage building and property managers to install controllers at their sites. The participant purchases the unit directly from GSHI and then arranges installation with a certified electrical contractor. Once the units are installed and operating, the participant calls GSHI to arrange an installation inspection. If the unit has been correctly installed the participant is rebated the full cost of the unit, plus a portion of the installation costs. The participant will receive actual costs of material and labour up to a maximum of $175.00.

Targeted End Uses: Commercial and multi-unit residential facilities that contain parking lots that provide plugs for block heaters.

Delivery: GSHI delivered

B.4 Vending Machine And Self Service Coolers Efficiency Program

Target Customer Type(s): Commercial Customers with vending machines and self-serve coolers

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by monitoring usage of vending machines and self-serve coolers and curtailing operation when customers are not present.

Description:

Vending machines and self-serve coolers present an excellent opportunity for energy conservation. They operate 24/7 and consume six times the amount of energy of a household refrigerator. By installing power controllers, energy savings in the 20% - 40% range can be achieved. The vending machine or cooler is plugged into a power controller, which consists of a passive infrared motion sensor and control unit. The device monitors the presence of people in the room using infrared technology. If no one is present for 15 minutes, the device automatically powers off the vending machine, but maintains the temperature of the product. Once powered off, the device monitors the temperature of the room and will power the machine on in 1.5 to 3 hour intervals. The device allows the machine to run a complete cycle before shutting down.

This program offers program participants a $175 financial incentive per device. Participants can purchase the devices directly from GSHI. Once installed the participant call GSHI to arrange an installation inspection. If installed correctly, the participant receives an incentive.

Targeted End Uses: Vending machines and self-service coolers

Delivery: GSHI delivered

B.5 LED Traffic Light Conversion Program

Target Customer Type(s): Municipalities

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by converting traffic lights to LED technology.

Description: Besides being more energy efficient, LED heads are more durable, require less maintenance once installed, are brighter and eliminate the need for coloured lenses. However, costs are still substantially higher and municipalities are often unable to justify the capital expenditure to council members with many other competing priorities on budgets.

Targeted End Uses: Traffic lighting

Delivery: GSHI delivered

B.6 LED Street Light Conversion Program

Target Customer Type(s): Municipalities

Initiative Frequency: Year round

Objective: Achieve energy and demand savings by converting street lights to LED technology.

Description: Municipalities typically use high pressure sodium (HPS) street light fixtures ranging in size from 100W to 400W. The maintenance and operating costs for these inefficient fixtures are much higher their efficient counterpart, however budget constraints have delayed the conversion to more efficient lighting. This program has been designed to encourage more efficient purchase decisions.

Street light technology is changing at a rapid pace; and, the overall performance of LED luminaries is quickly advancing in efficiency. Conversions are not as straightforward as with some other lighting applications, so GSHI has been conducting studies on LED street and roadway lighting to determine the applicability of the technology by monitoring light level output, energy and power usage as well as economic factors. Preliminary tests indicated that the light output was lower than minimum operating requirements. A breakthrough occurred in late 2010, with municipal agreement to proceed with a pilot of 11 fixtures to enable the monitoring of light levels.

Targeted End Uses: Street lighting

Delivery: GSHI delivered

Appendix C Pre-2011 Program Descriptions

C.1 Electricity Retrofit Incentive Program

Target Customer Type(s): Commercial, Institutional, and Agricultural Customers

Initiative Frequency: Year Round

Objective: The objective of this Initiative is to offer incentives to non-residential distribution customers to achieve reductions in electricity demand and consumption by upgrading to more energy efficient equipment for lighting, space cooling, ventilation and other measures.

Description: The Equipment Replacement Incentive Program (ERIP) offered financial incentives to customers for the upgrade of existing equipment to energy efficient equipment. This program was available in 2010 and allowed customers up to 11 months following Pre-Approval to complete their projects. As a result, a number of projects Pre-Approved in 2010 were not completed and in-service until 2011. The electricity savings associated with these projects are attributed to 2011.

Targeted End Uses: Electricity savings measures

Delivery: LDC Delivered

C.2 High Performance New Construction

Target Customer Type(s): Commercial, Institutional, and Agricultural Customers

Initiative Frequency: Year round

Objective: The High Performance New Construction Initiative provided incentives for new buildings to exceed existing codes and standards for energy efficiency. The Initiative uses both a prescriptive and custom approach and was delivered by Enbridge Gas under contract with the OPA (and subcontracted to Union Gas), which ran until December 2010.

Description: The objective of this Initiative is to encourage builders of commercial, institutional, and industrial buildings (including multi-family buildings and agricultural facilities) to reduce electricity demand and/or consumption by designing and building new buildings with more energy-efficient equipment and systems for lighting, space cooling, ventilation and other Measures.

Targeted End Uses: New Building construction, building modeling, lighting, space cooling, ventilation and other measures

Delivery: Through Enbridge Gas (and subcontracted to Union Gas)

C.3 Multifamily Energy Efficiency Rebates

Target Customer Type(s): Residential Multi-unit buildings

Initiative Frequency: Year round

Objective: Improve energy efficiency of Multi-unit building

Description: OPA's Multifamily Energy Efficiency Rebates (MEER) Initiative applies to multifamily buildings of six units or more, including rental buildings, condominiums, and assisted social housing. The OPA contracted with GreenSaver to deliver the MEER Initiative outside of the Toronto Hydro service territory. Activities delivered in Toronto were contracted with the City.

Similar to ERII and ERIP, MEER provides financial incentives for prescriptive and custom measures, but also funds resident education. Unlike ERII, where incentives are paid by the LDC, all incentives through MEER are paid through the contracted partner (i.e. GreenSaver).

Targeted End Uses: Electricity saving measures

Delivery: OPA contracted with Greensaver

Appendix D GSHI Programs Evaluation Report (2012)

NAVIGANT

Evaluation Report

Conservation & Demand Management Programs (EB2008-0147)

Presented to

Greater Sudbury Hydro Inc
Hydro du Grand Sudbury Inc
empowering communities
le pouvoir aux communautés
A GSU company

September 20, 2013

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Executive Summary

E.1 Program Summary

Greater Sudbury Hydro Incorporated (GSHI) obtained approval from the Ontario Energy Board to operate the six conservation and demand management (CDM) programs.

- Community Awareness Program
- Electric Thermal Storage Program
- Commercial Parking Lot Plug Controller Program
- Vending Machine and Self Service Coolers Efficiency Program
- LED Traffic Light Conversion Program
- West Nipissing Street Light Conversion Program

These rate-payer funded programs were operated by GSHI in addition to a number of OPA-funded initiatives. All of these initiative and supporting community outreach and communication programs operated under GSHI's "Waste Not - Watt Not" umbrella program.

E.2 Key Impact Findings

A number of GSHI's programs were aimed at loads which operate in the winter months. Given the timing of the evaluation this meant that some of these measures could not be verified through actual measurements. In addition, limitations on available data and time limited the ability to obtain the targeted level of participant feedback for some of the programs. Despite these issues, Navigant is confident that the net energy and demand savings estimates developed for these programs are reasonable.

The estimated net energy and demand savings developed for each of the initiatives is shown in Table E1. Note that the table shows the demand impacts for both the summer and winter peak period as a number of GSHI's programs resulted in significant winter peak reductions but no summer peak demand reduction.

The estimated net energy and demand savings are shown in table E1 below. The energy savings shown are those which occurred in the program year; not cumulative savings over the program.

Table E1: Net Incremental Energy and Demand Savings

Program	Metric	Program Year				
		2009	2010	2011	2012	2013
Electric Thermal Storage	Demand savings - Winter Peak only (kW)	133	116	210	493	1,405
	Est. kWh Savings	n/a	n/a	n/a	n/a	n/a
Parking Lot Conversion (diesel)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	21,046	110,970	3,455	89,475	12,306
Parking Lot Conversion (gas)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	74,323	314,035	133,162	270,296	3,900
Street Lighting	Demand savings - Winter Peak only (kW)	n/a	n/a	1	101	25
	Est. kWh Savings	n/a	n/a	29,407	459,404	108,226
Traffic Light Conversion	Demand savings - Summer & Winter Peak (kW)	43	40	10	22	n/a
	Est. kWh Savings	274,448	168,389	45,404	144,557	n/a
CoolerMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	2,211	3,980	14,595	28,305	15,037
VendorMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	13,814	13,123	93,934	63,543	5,526
Demand Savings - Summer (kW)		**43**	**40**	**10**	**22**	**0**
Demand Savings -Winter Peak (kW)		**176**	**156**	**222**	**616**	**1,431**
Total Est. kWh Savings		**385,842**	**610,497**	**319,957**	**1,055,580**	**144,995**

The savings for 2013 shown in the table above are for installations to September 25th. GSHI expects additional savings for the 2013 program year as it still has a remaining inventory of controllers for the "Parking Lot Plug Controller" and "Vending Machine and Self Service Coolers" programs. GSHI will continue to install these devices in 2013 until the remaining inventory has been used.

E.3 Key Process Findings

Based on surveys completed with participants, the customer-facing side of the programs appears to be performing well. The participants surveyed were very pleased with the programs

offered by GSHI. Over 80 percent of the participants surveyed across the programs reported an overall satisfaction rating of over 8 on a 0 to 10 scale (10 being very satisfied) when asked about their overall program satisfaction and over 70 percent reported a satisfaction rating of over 8 on a 0 to 10 scale (10 being very satisfied) when asked about their satisfaction with GSHI as a company. Participants were happy with the administrative processes and the incentive amounts provided and were particularly happy with the one-on-one support from GSHI staff. Many participants reported participating in both GSHI and OPA programs and responded favourably about their experiences with GSHI programs. Any negative feedback was focused on enhancing communication about the programs and ensuring consistent follow-up.

Consistency and clarity in the format and information collected for all programs would improve the ability to track savings and participants across programs. There were some inconsistencies in the tracking databases and missing information.

1. Introduction and Purpose of Study

1.1 Program Overview

Greater Sudbury Hydro Incorporated (GSHI) obtained approval from the Ontario Energy Board to operate the six conservation and demand management (CDM) programs described below[1]. These rate-payer funded programs were operated by GSHI in addition to a number of OPA-funded initiatives. All of these initiative and supporting community outreach and communication programs operated under GSHI's "Waste Not - Watt Not" umbrella program.

Table 1: Overview of Programs

Program	Brief Description
Community Awareness Program	The Community Awareness Program included working with local schools to develop action plans for promoting energy conservation, providing energy information and "Kill-A-Watt" monitors to consumers, attending public events and a pilot Smart Meter education program.
Electric Thermal Storage Program	Customers were provided with an incentive to offset part of the cost of installing an Electric Thermal Storage system; which stores heat during periods when electricity costs are low and use it to heat the home during periods when electricity costs are higher.
Commercial Parking Lot Plug Controller Program	This program promoted and provided incentives to fully offset the cost of intelligent devices to control the amount of electricity used by electrical outlets servicing block heaters. The program provides an incentive of up to $175 per device. Participants may purchase the controllers directly from Greater Sudbury Hydro.
Vending Machine and Self Service Coolers Efficiency Program	Under this program incentives were provided to offset the costs of devices to automatically power off vending machines when not in use while maintaining product temperature. Participants are provided a $175 financial incentive per device and may purchase the devices directly from Greater Sudbury Hydro.
LED Traffic Light Conversion Program	Incentives were provided to Municipalities within GSHI's service territory to offset the cost of installing LED traffic signals to replace less efficiency incandescent systems.
West Nipissing Street Light Conversion Program	Originally designed to provide assistance to the Municipality of West Nipissing, the focus of this program was shifted to the Municipality of Greater Sudbury. Under the program the Municipality was provided with incentives to help offset the cost of installing LED streetlighting to replace less efficient existing systems.

[1] See OEB Decision EB-2008-0147

1.2 Evaluation Objectives

The objectives of the evaluation were two-fold:

1) To review the processes used in the programs in order to assess their effectiveness and identify areas for further improvement, and,
2) To provide an independent evaluation of energy and demand savings achieved as a result of the programs, taking into account the effects of free-ridership and any spill-over or rebound effects.

1.3 Evaluation Methods

A variety of methods were used to collect information regarding the programs, including interviews with program staff, collection and review of program tracking and participant consumption data, surveys of program participants, research on equipment used in the programs and experience with such measures in other jurisdictions, engineering review of savings estimates and metering of a sample of measures installed under the programs. A full description of the methods used is presented in section 2 (Methodology).

1.4 Organization of Report

This report is organized into four main sections. The Executive Summary, which precedes this section, is followed by an Introduction to the report which also outlines the purpose of the study. The second section of the report describes the methodology used to complete the evaluation, while the third section presents the findings of the evaluation. The final section summarizes the conclusions and recommendations arising from the evaluation. Appendices to the report are included to provide a copy of the survey instrument used and some illustrative marketing materials used in the programs.

2. Methodology

2.1 Overview of Approach

The following sub-tasks were carried out as part of the process evaluation:

- Review of program materials, including marketing materials, applications, guidelines, and other support materials.
- Discussions with GSHI staff to review program design and program logic. Specific program logic models (PLMs) had not been developed as part of the initial program design but many of the elements that would be represented in a PLD were considered as part of the designs.
- Conducting an assessment of marketing strategies and activities for each program relative to the program logic and their impact on program participation and effectiveness.
- Review incentive levels relative to overall program costs and any incremental costs of improvements implemented under the program.
- Review the effectiveness of incentive levels in motivating participation and driving incremental improvements.

2.2 Interviews with Program Staff

Navigant staff met with all of the staff involved in implementing the program following the project "kick off" meeting. Following the interviews, Navigant also obtained program documentation, application forms, tracking data, and information on marketing and outreach activities. As part of these discussions GSHI staff outlined the considerations and experience that had informed the program designs and how the programs had been adjusted based on actual program experience.

2.3 Tracking Data Review

Tracking databases for each program were provided by GSHI. Navigant reviewed the databases for consistency and completeness. Information from the databases was used to estimate initial estimates of program saving and to develop samples for both the process and impact reviews and data collected as part of that process was used to verify tracking data.

2.4 Review of Marketing and Communications Activities

GSHI provided samples of communication materials associated with each initiative for Navigant's review.

2.5 *Review of Participation*

As Table 2 illustrates the number of program participants for each initiative is relatively small and under some programs GSHI was successful in achieving a significant number of installations through individual participants. As a result, some individual participants were responsible for a significant share of total measure installations. GSHI also utilized some trade allies in promoting the programs to their customers.

Table 2: Summary of Program Participation

Program Name	No. of Devices			No. of Participants	
	Original Estimate[6]		Actual Installed	Total	Unique
1) Community Awareness Program	n.a.		n.a.	n.a.	n.a.
2) Electric Thermal Storage Program[1]	300		617	108	65
3) Commercial Parking Lot Plug Controller Program[2]	2,750	*G*	1,404	47	33
		D	383	13	10
		T	1,787	60	43
4) Vending Machine and Self Service Coolers Efficiency Program[3,4]	1,050	*C*	145	70	58
		V	275	40	24
		T	420	110	82
5) LED Traffic Light Conversion Program	832		1,458	1	1
6) West Nipissing Street Light Conversion Program[5]	250		1,454	1	1

Notes:

1. *30% of ETS systems installed in buildings of two organizations (all at one location for one organization and at different locations for other).*
2. *Different types of controllers were installed for gasoline (G) and diesel (D) vehicles. Row T shows total numbers for program. 68% of diesel controllers to two organizations. One organization purchased 24% of diesel units and a second purchased 13%.*
3. *Different devices are used for self-service coolers (C) and vending machines (V). Row T shows program totals.*
4. *90% of "Vending Misers" were installed through 4 organizations; at a variety of locations. Fewer "CoolerMisers" participants installed a large number of units.*
5. *Program design changed to include City of Greater Sudbury.*
6. *Expected number of devices taken from "Custom Programs – Conservation and Demand Management Plan for the Period 2008 to 2010", filed with the OEB in June 2008.*

The GSHI CDM plan indicated that GSHI would seek insights on the effectiveness of the incentives offered and on overall program awareness. To obtain this data and develop defensible information on free-ridership rates Navigant surveyed participants. The survey was designed to elicit insights regarding the program and used an established and well tested battery of net-to-gross questions to determine free-ridership and potential spill-over.

The survey process attempted to reach the key participants and weight their responses according to their proportionate impact on the program. Navigant worked with GSHI to identify participants from program tracking and obtain contact information. A survey form was developed with appropriate customization for each program and used to obtain feedback from both participants. These forms were reviewed with GSHI prior to implementation.

2.6 Data Collection

The approach to data collection differed for each of the initiatives:

1) Electric Thermal Storage

GSHI provided files of hourly customer billing data for 39 accounts where ETS units had been installed. The files include data from the point at which TOU metering was installed or activated up to the most recent month.

- 16 files include at least 1 year of data prior to ETS installation and 36 include at least 6 months of data prior to ETS installation.
- 37 files include at least 1 year of post installation data and all 39 include at least 6 months of post installation TOU data.

GSHI was not able to identify comparable electric heat customers in its Customer Information System (CIS) but provided Navigant with a large sample of customers with high energy use. Navigant reviewed 1,000 residential accounts and compared the level of winter month energy use with that for individual program participants. Accounts with comparable energy use were selected for each ETS program participant using a least squared comparison of energy consumption.

Navigant reviewed the hourly consumption data for ETS program participants with up to 20 comparable customers for each program participant with the objective of determining the level of load shifting and any impact on demand and energy.

2) Commercial Parking Lot Plug Controller Program

The "Intelligent Parking Lot Plug Controllers" (IPLC) installed under this program reduce the operating hours for block heaters based on actual temperature conditions. Given that the savings provided by these devices only occur in the winter months, it was not possible for Navigant to monitor or meter their operation during the time available for the evaluation.

GSHI provided metering and consumption data for:

- One account which installed IPLC has a separate service for parking lot plugs and sentinel lights.

- Four accounts which have IPLC installed where the meter serves common services in the building as well as the parking lot.

- Three accounts which do not have IPLC installed (comparable accounts) where the building is roughly the same size as the buildings with IPLC's installed.

In addition, GSHI provided engineering calculations estimating the savings from installing IPLC's based on historic weather data downloaded from Environment Canada for the period 2009 to 2013.

Navigant reviewed the engineering calculations, billing data provided by GSHI as well as data available from secondary sources in order to develop an estimate of the gross energy and demand impacts from the IPLC installations.

3) Vending Machine and Self Service Coolers Efficiency Program

This program provided two different types of controllers that reduce energy use from vending machines (VendingMiser) and self-service coolers (CoolerMiser). The tracking database listed 420 devices purchased or distributed through 82 unique companies. GSHI provided information on pre and post installation monitoring of four CoolerMiser and two VendingMiser installations.

Navigant arranged to install metering on a sample of devices (as described in Table 3).This sample was designed to provide results with higher confidence than proposed in the original EM&V plan approved by the OEB. The metering results were also compared with publicly available case studies and information from Technical Reference Manuals (TRMs) for comparable controllers.

Meters[2] were installed at participating customer locations to record actual energy use (kWh) with and without the controllers. The devices were first installed for a two week period without the controller, providing data on the base level of consumption for each installation. The equipment was then metered for a further two week period with the controller installed, providing data on the level of energy use with the controller in place.

4) LED Traffic Light Conversion Program

GSHI provided Navigant with tracking information on the number of lighting conversions by type of fixture and lamp. Navigant completed a desktop review of the information provided by GSHI and compared the information to publicly available measure data from other sources in order to develop an estimate of gross energy and demand savings.

[2] Eagle 120 power meters from Power Monitors Incorporated (PMI) wer used to record electricity use for each 2 minute interval during the installation period.

5) West Nipissing Street Light Conversion Program

This program was initially intended to replace metal halide streetlights in West Nipissing with more efficient LED lighting. When West Nipissing was unable to participate, GSHI approached the City of Greater Sudbury, which agreed to replace HPS street lighting within Greater Sudbury with LED lighting instead. The City approved replacement of up to 1,313 HPS lights under the program. As a result of the program, the City also moved from a system of spot replacement to group lamp replacement; providing additional maintenance cost savings.

GSHI provided Navigant with information on the street lighting conversions completed as part of the program. This data provides information on the type and wattage of the removed and replacement lamps. The tracking data provides information on the wattage of the replacement lamps installed. In some instances the same LED lamp wattage was used to replace different existing lamp types and wattages[3]. Navigant reviewed this information to develop an estimate of the gross energy and demand impacts associated with the program.

2.6.1 Sampling Plan

Table 3 shows the original estimate of participation and the actual number of measures installed under each program. Given that the number of unique participants was significantly smaller than the number of devices installed, the sample size for the process and impact review differed. In each case the sample size was selected with the goal of providing an 80% confidence interval (+/- 20%) assuming a coefficient of variation of 0.5.

Table 3: Sample Size

Program Name	No. of Devices			No. of Participants		Sample Size Required *(For 80/20 Confidence Interval)*	
	Original Estimate[1]	Actual Installed		Total	Unique	Impact	Process
1) Community Awareness Program	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.
2) Electric Thermal Storage Program	300	617		108	65	10	11
3) Commercial Parking Lot Plug Controller Program[2]	2,750	*G*	1,404	47	33	6	15
		D	383	13	10	5	
		T	1,787	60	43	11	

[3] For example, 72 watt LED lamps were used to replace both 55 watt LPS and 100 watt HPS. A review of the tracking data provided by the City indicated only two instances in which a 72 watt LED was used to replace a 55 watt HPS.

Program Name	No. of Devices			No. of Participants		Sample Size Required *(For 80/20 Confidence Interval)*	
	Original Estimate[1]	Actual Installed		Total	Unique	Impact	Process
4) Vending Machine and Self Service Coolers Efficiency Program[3,4]	1,050	*C*	145	64	58	6	14
		V	275	37	24	5	
		T	420	102	82	11	
5) LED Traffic Light Conversion Program	832		1,458	1	1	11	1
6) West Nipissing Street Light Conversion Program[5]	250		1,454	1	1	11	1

Notes:

- *Expected number of devices taken from "Custom Programs – Conservation and Demand Management Plan for the Period 2008 to 2010", filed with the OEB in June 2008.*
- *Different controllers installed for gasoline (G) and diesel (D) vehicles. Row T shows total numbers for program. 68% of diesel controllers to two organizations. One organization purchased 24% of diesel units and a second purchased 13%.*
- *Different devices are used for self-service coolers (C) and vending machines (V). Row T shows program totals. Numbers shown for impact provided 80/20 C.I. for program as a whole.*
- *90% of "Vending Misers" were installed through 4 organizations; at a variety of locations. Fewer "CoolerMisers" participants installed a large number of units.*
- *Program design changed to include City of Greater Sudbury.*

2.7 *Methods Used to Analyze Impact Data*

The impact evaluation involved the following steps based on information collected during the tasks discussed above to:

- Estimate gross energy and demand savings and realization rates.
- Estimate free ridership rates and net energy and demand savings (Net-to-Gross Ratio).

An initial estimate of claimed (ex-ante) savings for each program was estimated based on data from program-specific tracking databases provided by GSHI. A variety of methods were used to review these claimed savings and determine the level of gross (ex-post) savings for each initiative.

A net-to-gross (NTG) ratio was determined and applied to gross verified savings for each program. There are three methods to determine NTG (self-report, econometric, and market share). For GSHI's programs Navigant selected the enhanced self-report approach as the most

appropriate. This method is simpler and less expensive than other approaches, can use all data points, can be used in a variety of situations and directly addresses the behaviours the program is seeking to affect. It is flexible enough to take into account the complexities of program-participant interaction.

In estimating the net-to-gross ratio and net savings Navigant attempted to include both the impacts occurring without the assistance of the program (free riders) and impacts occurring as a result of the program but not captured in the program participation databases (spillover). Rebound[4] or "take-back" was also considered as part of the assessment of net savings.

[4] Sometimes when participants in a program install a more efficient measure, such as more efficient lighting, they actually operate the new, more efficient technology for more hours per day, thus "taking back" part of the savings that would have otherwise been realized.

3. Detailed Evaluation Findings

3.1 Program Activity

In some cases an individual participant installed a number of the devices. For example over 30 percent of the devices installed under the IPLC program were installed by just three participants and one participant in the vending/cooling miser program installed over 40 percent of the devices. Sampling of the participants was adjusted accordingly to ensure that both participants and devices were well represented.

Table 4 below presents the participation for each program.

Table 4: Program Participation

Participation Levels	Electric Thermal Storage Program	Vending Machine and Self Service Coolers Efficiency Program	Commercial Parking Lot Plug Controller Program	West Nipissing Street Light Conversion Program	LED Traffic Light Conversion Program
# of Participants	108	102	60	1	1
# of Units	617	420	1,787	1,454	1,458

3.2 Process Review

3.2.1 Program Design

The programs were designed to address energy management opportunities that were felt to be significant to GSHI's system demands and customers. Overall, Navigant's assessment is that the programs were generally well designed based on a good understanding of the potential participants and the measures and decision making processes involved.

3.2.2 Program Tracking Data Review

Tracking databases, maintained by GSHI as Excel spreadsheets were provided to Navigant. Separate tracking spreadsheets were maintained for each program. For the programs which involved the provision of equipment (vending machine and parking lot controllers), the same worksheet was used to track the inventory of equipment.

Overall the tracking databases were well organized and generally consistent between programs. The tracking data effectively tracked the participating customers, number of devices provided to participants and the status of installations. The comments which follow highlight areas where further improvements could be made to improve the effectiveness of the tracking spreadsheets and make support future evaluations.

Several general issues were found in reviewing the tracking spreadsheets. Some of these issues relate to simple input errors while others related to the type and completeness of the data collected.

- Some input errors identified appear to have involved data being incorrectly transcribed from a written source (i.e. such as a 7 in a phone number being entered when the correct number was a 2).
- Navigant also identified some duplicate entries and incorrect contacts when participants were contacted. These errors and/or lack of detail created unnecessary confusion and required confirmation with participants.
- A number of fields were found to be blank. In some instances it appears that if a customer participated at more than one location the information was entered on one line but only partially entered on the second line. As a result it was not immediately clear if the information listed on first line related to the second or if the information was simply missing for the second location.
- In many instances, the information listed only the participant's first or last name, making identification of the individual difficult[5]. Phone numbers were not provided for all participants. Best practice is to obtain and record the participant's full name and where possible the person's position or job title.
- The ranges used in some formulas in the spreadsheets did not cover the entire data range, resulting in some of the calculated values being understated (i.e. in the "ETS Incentives 2011", the "connected load" and "Total ETS Heaters" values shown were understated because they did not include all of the installations for the year).

Some issues were also identified for specific program tracking databases:

a) Electric Thermal Storage Program

- Separate tracking spreadsheets were maintained for each program year. In the 2011 and 2012 worksheets the "Total kW" column is calculated based on a formula referencing ETS size by model number. In some locations where multiple units had been installed the field was entered as a hard coded number, overriding the formula. In other cases the formula returned a "FALSE" result; resulting in the "Total Connected kW" field being understated by the amount of kW installed at the sites with multiple units. To make the spreadsheet more transparent and reduce the risk of errors, it is suggested that a separate column be added and the logic revised to use the hard coded value in specific identifiable instances.

- For most installations the applicant was an individual and the individual participant's name is recorded in the worksheet. Where the applicant was an organization, only the organization's name was recorded. It is recommended

[5] For example, when one participating company was contacted, they indicated that there were several people at the firm with the surname listed in the tracking data.

that fields be added to allow entry of a contact person and position to the spreadsheet.

b) Commercial Parking Lot Plug Controller Program

- Separate spreadsheets were maintained for "Diesel" and "Gas" controllers, but the content of the worksheets was consistent.
- Labour costs were only shown for 3 of 13 applicants. It was not clear if this reflected instances where the participating firm used their own electrician to complete the installation or if the information on labour costs was simply missing. It is recommended that a specific indication be added to the tracking database.
- The fields for "estimated kWh" and kW in the spreadsheet were left blank.

c) Vending Machine and Self Service Coolers Efficiency Program

- Separate spreadsheets were maintained for "Vending" and "Cooler" controllers, but the spreadsheets were not completely consistent. The "Incentives Paid" folder of the Vending Miser spreadsheet includes separate columns to track units "purchased" and "returns". The "Cooler" spreadsheet lacked this explicit tracking of returned devices, which were recorded as comments in the spreadsheet. In both cases the information was complete, but the method used in the Vending Miser spreadsheet is preferable.
- CoolerMiser (Sales Summary)
  - Limited contact information was included in the tracking spreadsheet. For example, no phone numbers were recorded for participants.
  - The spreadsheet was used to track units provided to a trade ally who assisted in promoting the program. It is recommended that any intermediate transfer of this type be tracked explicitly to avoid any confusion as to the status of the units.
  - The spreadsheet shows the number of units purchased and the number installed. The number of units returned is not explicitly tracked as in the VendingMiser spreadsheet but is instead recorded in notes and comments.
  - A circular error was found in the spreadsheet. Though the circular error was not critical in this instance, any such error should be identified and corrected immediately.

- VendingMiser (Sales Summary)
    - No field was included to record participant phone numbers. One participant's phone number was recorded in the same field as the contact name. It is recommended that contact information for each participant be included in the tracking database.
    - A note in the spreadsheet indicates that a special incentive of $15 per unit was paid to one participating vending company.

d) LED Traffic Light Conversion Program

- The incentive tracking data for this program is based on invoices provided by installing contractors and the Municipality. The estimated change in power consumption was provided in a separate tracking spreadsheet used for estimating the billing consumption for flat rate accounts. That summary indicated 885 LED devices had been installed in the period from 2008 to February 2012 with a resulting incentive of $41,535.

e) West Nipissing Street Light Conversion

- The tracking data is based on invoices provided by installing contractors. GSHI provided the installing contractors with mapping of the lighting to be replaced and verified the installations against that data. The tracking database listed the removed lamp and the replacement lamp wattage and type for each location in accordance with the working copy of the map provided.
- Ballast data was only provided on one of the six invoices provided in the tracking data sheet and in one sheet the LED replacement wattage was entered in the column for ballast data.

3.2.3 Communications and Outreach

GSHI branded its over-arching efficiency program as "Waste Not Watt Not". A variety of communications were used to promote awareness of GSHI's programs, including advertising in local publications and television, creation of content on the GSHI web page, attendance at community events, and sales calls to larger customers. Business customers served by GSHI were sent information through a direct mail campaign in September 2009 promoting the availability of both OEB-funded. As the programs progressed, GSHI staff indicated that more businesses and other customers reported becoming aware of the programs through "word-of-mouth" communication. The overall marketing message in these communications focused on potential monetary savings, the availability of cash incentives and the environmental benefits associated with energy savings available from participation. Some examples of communications materials are provided in Appendix B.

Information regarding GSHI's initiatives and program application forms were made available through its web page. The "Green Room" section of the web page also provides energy savings tips specific to different sectors. For example, tips are provided for residential customers, convenience and grocery stores, Laundromats and Restaurants. Tracking of the number of web hits regarding each program show an increase in interest over time; as shown in Table 5.

Table 5: Web Hits by Program

Program	2010	2011
Electric Thermal Storage Program	2,199	3,418
Commercial Parking Lot Plug Controller Program	1,029	1,325
Vending Machine and Self Service Coolers Efficiency Program	782	1,409

As part of the Community Outreach program, GSHI also made "Kill a Watt" monitors available to its customers on loan. The "Kill a Watt" meters allow customers to meter equipment in order to better understand how their equipment is consuming power and how operational or other changes affect electricity use.

3.2.4 Motivations for Behaviour and Market Feedback

Most participants surveyed indicated that they were motivated to participate in the program in order to reduce their utility bills. Many were small businesses and noted that anything to improve their bottom line was welcome. Almost 20 percent of the businesses surveyed for the IPLC and Miser programs noted that they actively seek incentive or rebate programs for energy efficiency improvements while approximately 10 percent simply upgrade to more energy efficient measures when equipment needs to be replaced.

Over 80 percent of the participants surveyed across all programs reported a satisfaction rating of over 8 on a 0 to 10 scale (10 being very satisfied) and found the program simple and were very satisfied with the rebate provided by GSHI.

Table 6 shows the primary motivation for participation reported by surveyed participants (Question PA2 in the survey) address why participants were initially interested in participating. Later questions explore the key factors in their decisions to actually install the measures offered under the program.

Table 6: Motivations for Participation

Primary Motivation to Participate	Electric Thermal Storage Program	Vending Machine and Self Service Coolers Efficiency Program	Commercial Parking Lot Plug Controller Program
Program Incentive	0%	0%	0%
GSHI Account Representative	0%	0%	0%
Recommended by Contractor	25%	0%	10%
High utility bills/Wanted to save money	50%	63%	80%
Save energy to protect the environment	0%	38%	10%
Other	25%	0%	0%

Feedback from participants was largely positive with a few exceptions. 85 percent of survey respondents commented on the incentive level and approximately 30 percent of the IPLC and Miser participants surveyed indicated that participation in the program was a "no brainer". Three participants with multiple businesses in multiple LDC territories expressed frustration that the program was not available for other locations of their businesses (i.e. in Hydro One territory). Eight participants surveyed also received incentives through OPA programs for lighting projects at their business and found the administrative processes easier with the GSHI program.

The sections below outline program-specific feedback provided by participants sampled and other observations resulting from surveys.

a) Electric Thermal Storage Program

Over half of the participants cited cost savings as their primary motivation for their initial interest in participating in the program. Others were influenced by recommendations made by contractors or friends and family and were already searching for ways to reduce their utility bills. Many had not heard about ETS technology and were leaning towards converting to natural gas prior to hearing about the ETS program. A couple of participants that were social housing administrators had different perspectives on the program, but were still primarily motivated by cost savings.

Almost all participants specifically noted the improvement in the comfort level of their homes; indicating that previous to the installation of the ETS their only option to reduce their electricity

bills during the winter was to turn down the heat. Participants mentioned the demonstration at Greater Sudbury Hydro as a good way for them to understand what they were purchasing.

b) Commercial Parking Lot Plug Controller Program

As the table below shows, the majority of diesel units were installed by business customers, while the majority of gas controllers were installed at multi-residential sites. Participants in this program were generally more sophisticated in their understanding of their energy use and were proactive in pursuing energy efficiency. Some participants indicated that they have requirements and designated budgets to make energy efficiency improvements. Due to this requirement, many of these sampled companies were actively looking for incentive programs to save electricity and had participated in other rebate programs in Ontario, specifically lighting programs. Many of the sampled participants noted that it was difficult to have non-rebated projects approved by their head office and noted specific payback requirements. 40 percent of survey respondents indicated that their head office paid the electricity bills, limiting the feedback that participants could provide.

Table 7: Participation in IPLC Program

	% of Participants	% of Units
Diesel		
Construction/Transportation	85%	98.4%
Multi-Residential	8%	0.3%
Other or Unknown	7%	1.3%
Gas		
Construction/Transportation	16%	7.2%
Multi-Residential	68%	88.8%
Other or Unknown	16%	4.0%

Half of the participants surveyed indicated that electricity makes up such a small percentage of their total expenses and that they have not been able to discern savings associated with the IPLC's. Participants stated that their primary motivation for participating was cost savings and noted that anything to improve their bottom line was welcome.

One participant commented that the enclosure for the controller provided by the utility didn't comply with size requirements in the Ontario Electrical Code and that another enclosure had to be purchased and installed. These comments were more focused on reducing waste and inefficiency than dissatisfaction and the respondent noted that it is difficult to find products that comply with some Ontario only electrical code.

c) Vending Machine and Self Service Coolers Efficiency Program

Participants were very happy with this program, but found it difficult to assess whether it had resulted in an actual reduction on their utility bills. Participants in this program were generally

less sophisticated about how they could reduce electricity use and appreciated the ease of participation in this program. The types of businesses in this program are typically smaller with few employees and awareness of energy efficiency was generally quite low. However, almost 40 percent of participants claimed that the environmental benefits of saving energy motivated their participation.

During the initial implementation of the program GSHI attempted to work with firms involved in the provision of vending equipment. In most instances these firms retain ownership of the vending machines located in businesses and institutions served by GSHI. GSHI reports that this approach identified some conflicts between the interests of the firms which owned the machines and the business owners who paid for electricity in the businesses where the machines were located. In some instances the controllers identified problems with equipment operation which resulted in higher operating costs for the building owner/utility customer. From the machine owners perspective this resulted in some additional service calls and requests to change equipment. While one vending machine operator became very actively involved in the program and was responsible for over 40 percent of total installations, GSHI broadened their marketing approach to also approach customers with appropriate equipment directly.

d) & e) LED Traffic and Street Light Conversion Program

Both of these initiatives were undertaken by the City of Greater Sudbury. The City of Greater Sudbury staff member involved in the initial decision making for this project had a very good understanding of energy efficient technologies and potential applications in the city. Initial motivations for participating were based on the LED technology itself (i.e. much better technology in terms of maintenance and durability, good payback, etc.). However, the staff person indicated that it is difficult for a municipality to undertake these types of high capital cost projects and that upgrades are often not done unless there is a significant financial motivation. The respondent also indicated that the lead time for such projects is fairly long given the need for consideration and approval by City Council; which often has many competing budget priorities.

3.2.5 Customer Enrollment Process

Most participants reported hearing about the programs on television, or from a contractor (i.e. electrician) or from a GSHI representative.

Participants were asked what their primary source of information regarding the program was. Table 8 summarizes the results for each program. Information was not obtained for the two projects in which the local municipality participated.

Table 8: Participant Information Source

Primary Source of Program Information	Electric Thermal Storage Program	Vending Machine and Self Service Coolers Efficiency Program	Commercial Parking Lot Plug Controller Program
GSHI mailing/flyer	0%	0%	0%
Newsletter	0%	0%	0%
GSHI bill insert	0%	0%	0%
GSHI website	0%	0%	15%
GSHI Account Representative	25%	27%	38%
Newspaper/magazine/print media	0%	0%	0%
Family/friend/word of mouth	25%	9%	8%
Contractor	25%	0%	23%
Vendor/Installer	0%	0%	0%
Retailer advertising	0%	0%	0%
In-store advertising	0%	0%	0%
Television	0%	64%	15%
Other	25%	0%	0%

a) Electric Thermal Storage Program

Roughly equal numbers of participants included in the survey indicated that they heard of the program from contractors, by word-of-mouth, from the GSHI Account Representative and from "other" sources.

b) Commercial Parking Lot Plug Controller Program

Almost 40 percent of sampled participants indicated that they became aware of the program when they were approached by a GSHI representative and the overwhelming majority of participants surveyed specifically noted how happy they were with the GSHI representative. Due to the GSHI representative's involvement they felt the process was very simple and were very pleased with the program. Many mentioned that the GSHI representative also did a walk through their facility and provided them with recommendations and advice on other potential energy efficiency improvements.

Three participants surveyed indicated concerns about the requirement to have three quotes from contractors to install the parking lot controllers. These participants generally had onsite electricians or an electrical company under a longer term contract and felt that this requirement was burdensome. In addition, some smaller participants found it difficult to find electricians that were available to install the devices and as such experienced some delays.

c) Vending Machine and Self Service Coolers Efficiency Program

Over 60 percent of the participants initially heard about the program on television. These participants were typically small businesses with half of the sampled participants having less than 20 employees.

d) & e) LED Traffic and Street Light Conversion Program

Both of these initiatives were undertaken by the City of Greater Sudbury. GSHI approached the City with the project and incentives. GSHI representatives worked with the City throughout the application process and also provided support to the City in pursuing OPA programs. The City of Greater Sudbury representative commented on how proactive and helpful the Conservation Department of GSHI was throughout the entire process from initial contact to the incentive payment.

3.2.6 Incentive Payment Process

Process review indicated that the processing of incentive payments was generally timely. This was confirmed by a review of approval dates and incentive payment dates in the tracking databases. Participants surveyed did not report any challenges in receiving payment.

3.2.7 Customer Experience/Barriers

Overall comments regarding the programs were overwhelmingly favourable. A number of participants made unsolicited comments praising the efforts of GSHI field staff and commented favourably on the processes in the GSHI programs compared to their experience with other similar programs.

Most customers found the application processes simple and straight forward and there were few process-related complaints. One participant reported that the representative from Sudbury Hydro used the inspection visit to help identify other opportunities to save electricity in their business which led them to implement more actions to reduce their energy costs.

3.2.8 Verification and Due Diligence

Navigant reviewed the quality control and verification processes incorporated in the programs and found them to be generally reasonable. The programs included a very strong verification process, with 100% post-installation on-site verification for most of the programs to ensure that participants were eligible and that devices were properly installed. The only program which did not use 100% verification was the LED Traffic Signals program, where a random sample of sites was verified.

3.2.9 Eligibility Review

One potential issue was identified with respect to the ETS program. The program criteria indicated that electricity must be the "primary" source of heating in order for the home to be eligible. While this is easily identified in most homes it may not always be clear-cut in homes with multiple systems. The program design included a pre-installation audit and post-installation verification visit, allowing some judgment to be exercised in determining the "primary" heating system. Navigant is satisfied that this arrangement was sufficient to ensure that participants met the eligibility criteria.

Eligibility rules for the other programs were generally quite clear and relatively simple. No issues were identified with regards to eligibility.

3.3 Impact Findings

3.3.1 Review of Gross Savings

The claimed savings estimated from the tracking databases for each program are shown in Table 9 below. The demand savings shown in the table represent the estimated demand reduction at the point of metering, not demand coincident with the GSHI or Ontario system peak; as shown in the tracking databases.

Table 9: Reported Activity and Savings

Program	Metric	Program Year				
		2009	2010	2011	2012	2013^
Electric Thermal Storage	Number of Units	30	28	40	214	305
	Demand savings at point of metering (kW)	148	129	234	548	1,405
	Est. kWh Savings	n/a	n/a	n/a	n/a	n/a
Parking Lot Conversion (diesel)	Number of Units	87	133	4	117	42
	Demand savings at point of metering (kW)**	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	38,976	59,584	1,792	52,416	18,816
Parking Lot Conversion (gas)	Number of Units	258	479	205	447	15
	Demand savings at point of metering (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings**	57,792	107,296	45,920	100,128	3,360
Street Lighting	Number of Units	n/a	n/a	63	1,188	203
	Demand savings at point of metering (kW)	n/a	n/a	1.4	101	25
	Est. kWh Savings	n/a	n/a	29,407	459,404	108,226

Program	Metric	Program Year				
		2009	2010	2011	2012	2013^
Traffic Light Conversion	Number of Units	556	505	128	269	n/a
	Demand savings at point of metering (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	14,840	9,336	4,212	n/a	n/a
CoolerMiser	Number of Units	5	9	33	64	34
	Demand savings at point of metering (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	2,180	3,924	14,388	27,904	14,824
VendorMiser	Number of Units	20	19	136	92	8
	Demand savings at point of metering (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	39,260	37,297	266,968	180,596	15,704
Total Demand savings at point of metering (kW)		**148**	**129**	**235**	**649**	**1,431**
Total Est. kWh Savings		**153,048**	**217,437**	**362,687**	**820,448**	**160,930**

Notes:

^ 2013 data includes installations up to September 26.
*** Parking Lot Conversion savings are based on monthly estimates for January, February, November and December of each year based on actual temperatures and the number of devices installed in month.*

In developing these estimates from the tracking data:

- Measures have been assigned to each program year based on the inspection or purchase date for the measure.
- Energy savings for the Parking Lot Plug Controllers have been estimated based on assumptions stated in the program document since the tracking database did not show energy savings for all installations. Demand savings have not been shown though they were estimated for gas controllers in the tracking database. It is assumed that the demand for the controlled block heaters would occur at some point in each billing period during the winter months even with the controller in place.
- Estimated per unit savings for CoolerMiser and VendingMiser are based on testing carried out by GSHI (discussed in section c below).
- The traffic light conversion tracking data tracks number of combined units. The values shown in the table above represent the number of actual lamps converted.

a) Electric Thermal Storage Program

The ETS program is designed to shift energy use from peak to off-peak periods, reducing customer billing costs and winter peak demand. As such, the expected incremental savings

from the program did not anticipate any change in energy use. The program operates during the winter months and was therefore not projected to have any impact on summer energy use or summer peak demand.

Navigant has used the number of units and associated connected kW to estimate the demand change resulting from the ETS Program. As noted above, this reduction will only impact winter peak demand.

b) Commercial Parking Lot Plug Controller Program

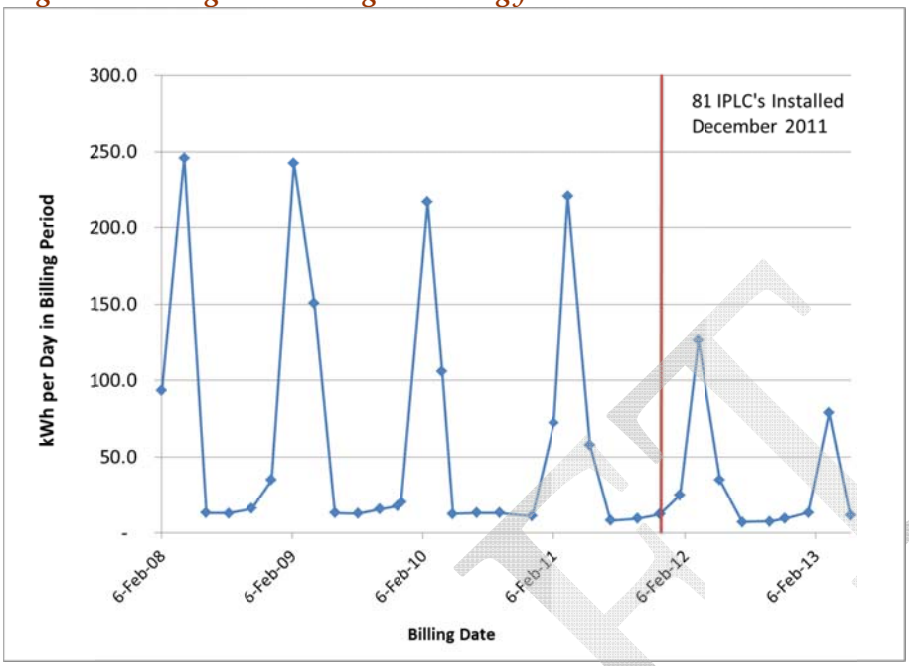
The controllers installed under this program reduce the hours of operation for block heaters plugged into controlled outlets based on ambient temperatures and when the vehicle was plugged in. The device controls energy use at different temperatures for gas and diesel vehicles[6]; resulting in different levels of energy savings. The IPLC also reduces energy use by controlling power off for a 2-hour period when a vehicle is initially plugged in[7] and by eliminating electricity use from the plugs in the non-winter months. This means that the parking lot plugs cannot be used by tenants in the spring, summer and fall months to supply power for other purposes, though it was not possible to assess the impact of this feature.

Given that the controller largely operates during off peak periods and that the block heater would be expected to operate at some time during each month when block heaters are in use, no demand savings were assumed and the program would have no impact on summer energy or demand.

In its CDM Plan, GSHI assumed energy savings of 50 percent relative to an uncontrolled outlet serving a block heater based on a prior study carried out by Manitoba Hydro[8]. GSHI provided Navigant with a small sample of customer accounts where the "common services" meter included parking lot energy use. Billing data was provided for 4 accounts where IPLCs had been installed and three comparable facilities with no IPLCs. A review of these accounts was inconclusive given the difficulty of separating out the impact of parking lot energy use from other changes occurring within the buildings and the small sample size. GSHI provided billing data for one account where IPLCs were installed and the parking lot was metered separately (Figure 1). Winter period energy consumption per day for that account shows a significant decrease in the order of 70 kWh per day.

[6] The Intelligent Parking Lot Controllers turn off energy to the outlet when temperatures rise above -5°C for gas vehicles and above 5°C for diesel vehicles.
[7] Operation of the devices is described in product literature available at: http://www.iplc.com/ .
[8] Manitoba Hydro, Power Smart Profiles: Globe General Agencies Finds Money in Parking Lots, Apartments/ Condominiums, No. 01 March 2005.

Figure 1: Change in Parking Lot Energy Use with IPLC Installation



A review of Technical Reference Manuals did not find any programs which included comparable measures; however a literature review identified two case studies, including the referenced study by Manitoba Hydro[9] in 2005. A 2011 study completed by the Yukon Department of Energy, Mines and Resources which involved metering of 57 IPLC's indicated that a 32.4 percent reduction was achieved[10].

Given the manner in which these controls work, it would be expected that the level of savings will differ depending on local weather conditions; specifically the number of hours above 5°C and -5°C. GSHI carried out an engineering analysis of expected savings based on actual temperatures during the 2009-2010 and 2010-2011 winters, using hourly weather data for the Sudbury Airport obtained from Environment Canada. The analysis assumed that:

- The average gas vehicle block heater was 500 watts while the average block heater in a diesel vehicle was 1,000 watts.
- The controlled block heaters were plugged in from 6 p.m. to 7 a.m. each day from the beginning of November to the end of March,
- The controller turned off power when temperatures rose above the design temperature (-5°C for diesel and +5°C for gas controllers).

[9] As indicated in GSHI's CDM Plan, a case study from Manitoba Hydro indicated annual savings of 50% relative to an uncontrolled block heater.

[10] IPLC Performance Validity Test : Summary of Results, Yukon Department of Energy Mines and Resources, Energy Solutions Center, September 2011 (http://www.energy.gov.yk.ca/pdf/iplc_paper_2011.pdf).

No credit was added for savings due to the IPLC not providing power immediately after a vehicle was plugged in.

The analysis estimated the level of savings shown in Table 10 below.

Table 10: Estimated Savings from Intelligent Parking Lot Plug Controllers

Type of Controller/Vehicle	2009 – 2010	2010 – 2011	2011 - 2012	2012 – 2013
Energy Savings as a % of Baseline Energy Use				
Gas Engine	75%	68%	71%	74%
Diesel Engine	53%	41%	44%	44%
Energy Savings Based on Installations in Each Month				
Gas Engine (kWh)	240,014	491,111	641,886	902,677
Diesel Engine (kWh)	214,438	177,318	191,033	643,829

Navigant reviewed the engineering calculation and assumptions made by GSHI in their engineering estimate. While the assumption that all vehicles are plugged in for all hours between 7 pm and 6 am may overstate the energy savings, we feel that it is reasonable given that savings may be understated given that vehicles may be plugged in during other hours of the day and that no credit is assumed for the 2 hours when the device would control the power off immediately following the vehicle being plugged in. Navigant has therefore used the engineering calculation for the IPLC program developed by GSHI as the basis for estimating savings in each program year.

c) Vending Machine and Self Service Coolers Efficiency Program

In its CDM Plan for 2008 to 2010, GSHI assumed an average savings of 45 percent on a base consumption of 3,500 kWh per year, based on a prior report from London Hydro[11].

The types of controllers used in this program have been applied in a number of programs in other jurisdictions and a number of studies of the savings associated with these devices are available. The estimates of savings for these types of controllers vary both between the type of controller (VendingMiser vs. CoolerMiser) and depending on the type of area where the equipment is used or level of activity in the area. A review of prior studies and Technical Reference Manuals found the following estimates of savings for these types of controllers.

- The equipment vendor who supplied the control devices (Optimum Energy Products) claims a range of savings depending on how frequently the vending or cooler equipment is used.

[11] Greater Sudbury Hydro Inc., Custom Programs: Conservation and Demand Management Plan for the Period 2008 to 2010, Filed June 2008, Appendix A: TRC Technology Input Assumptions, Page 28.

Table 11: Vendor Estimate of Savings for "Miser" Controls

Type of Machine	High Traffic Areas	Average	Low Traffic Areas
Vending Machines	36%	46%	56%
Glass Front Coolers	20%	30%	40%

- A letter from Coca-Cola North America provided on the GSHI website indicates that their data indicates that "*up to 50% energy savings is achieved in locations where there is 12-hours of sales activity per day*" through the installation of a the installation of a VendingMiser. The letter goes on to note that the amount of energy saved depends on the age of the vending machine and the level of activity around the machine.
- The Pennsylvania Technical Reference Manual[12] (TRM) quotes savings of 46% with a reported range of savings from 30 percent to 65 percent. The PA TRM "assumes" no demand savings.
- The Ohio TRM[13] indicates the energy savings factors shown in the table below should be used for controllers installed on non-Energy Star equipment. No summer coincident peak demand savings are indicated. A footnote indicates that it is assumed that the peak period is coincident with periods of high traffic, diminishing the demand reduction potential of occupancy based controls. The default baseline consumption used for vending machines varies from 3,113 to 4,198 kWh per year; depending on machine capacity. The value used by GSHI falls below the middle of that range at 3,500 kWh per year.

Table 12: Ohio TRM Estimate of Savings for "Miser" Controls

Equipment Type	Energy Savings Factor (ESF)
Refrigerated Beverage Vending Machine	46%
Non-Refrigerated Vending Machine	46%
Glass Front Refrigerated Cooler	30%

- A 2002 report on a study by SMUD[14], published by the ACEEE[15] is the only report found to have reported demand reductions. A decrease in demand of 49 to 156 watts per controlled vending machine was reported depending on the type/location of the

[12] Pennsylvania Public Utilities Commission, Technical Reference Manual, June 2012, (State of Pennsylvania, Act 129: Energy Efficiency and Conservation Program & Act 213: Alternative Energy Portfolio Standards), page 216.
[13] 2010 Ohio Technical Reference Manual, August 2010, Vermont Energy Investment Corporation, page 275.
[14] Sacramento Municipal Utility District
[15] Chappell, C., Hanzawi, E., Bos, W., Brost, M., and Peet, R. (2002). "*Does It Keep the Drinks Cold and Reduce Peak Demand? An Evaluation of a Vending Machine Control Program*," 2002 ACEEE Summer Study on Energy Efficiency in Buildings Proceedings, pp. 10.47-10.56.

installation. The highest level of demand savings were found to occur in schools and hotels.

- A subsequent NREL study showed average savings from installing a controller on beverage vending machines as averaging 33% with a range of savings from 22 – 50%[16].
- Table 13 summarizes the different levels of energy and demand reductions reported for controllers installed on vending machines and glass front coolers.

Table 13: Summary of Vending/Cooler Savings Estimates

Type of Equipment Controlled	GSHI Plan	Vendor Estimate (Average)	Coca-Cola	Ohio and PA TRMs	MI Case Study^	NREL Study
Vending Machines						
Energy	45%	46%	Up to 50%	46%	59%	33%
Demand	0%	*n.a.*	*n.a.*	0	*n.a.*	49-156 watts/device
Glass Front Coolers						
Energy			30%	30%		
Demand			*n.a.*	*n.a.*		

^ - *3 machines metered - savings from 39% to 80%.*

GSHI conducted its own monitoring on two vending machines located in the cafeteria in their office and four coolers with different door configurations in a convenience store.

- Metering on the vending machines was installed for 168 hours without the controller and 185 hours with the controller. Operating with the controller in place, the vending machine used 47.7 percent less energy over an equivalent period.
- For the coolers, metering indicated a 20 percent reduction in energy use. One of the four coolers was eliminated from the test as the CoolerMiser identified a defective door seal.

As part of the impact evaluation, metering was installed to record energy use with and without the controller for seven glass-fronted coolers and six vending machines.

- For the cooler installations, the results indicate that energy use for one of the seven coolers actually increased by 7.6 percent. The remaining coolers showed savings ranging from 7.5 percent to 29.6 percent. Average savings for all of the coolers averaged 16 percent. The average savings for the coolers which showed energy savings was 22 percent.

[16] Results quoted are for the use of a controller only, without any de-lamping of the display lights.

- For the vending machine installations, none of the device showed an increase in consumption. The vending machines showed energy savings ranging from 15.3 percent to 39.0 percent. The average reduction in energy use for all of the vending machines was 25 percent.
- A review of peak demand during the mid-week workday between 2 and 4 pm found no significant change in demand for either type of installation.

Prior experience with this type of control systems has indicated that the controller can increase energy use if there are other problems with the controlled equipment (i.e. a faulty compressor, leaking door seals, etc.). Given that the devices provide an error indication when these conditions exist, they can actually create further energy savings by flagging where such problems exist if the problem is then addressed. The test results indicate the importance of periodically checking the controllers for indications of improper operation[17]. Comments from GSHI staff indicate that participating customers have, in fact, called for assistance when they noticed error indications on the controllers.

Navigant has used the metering results, including the devices which indicated higher energy use, as the basis for estimating energy savings from this program.

d) LED Traffic Light Conversion Program

Traffic lights typically operate continuously during the year (8760 hours per year). However, not all lights in traffic signals operate at all times. The estimated energy and demand reductions indicated in the program tracking data are shown in the table below.

Table 14: LED Traffic Signals Savings

Signal Type	No. of Devices	Incentive per Device	Total Incentives	Demand Reduction per Device (kW)	Total kW
Red	7	$20	$140	0.125	***0.9***
Green	5	$30	$150	0.083	***0.4***
Advanced Green	6	$30	$180	0.083	***0.5***
Red & Green	323	$55	$17,765	0.208	***67.2***
Red , Green & Advanced Green	110	$88	$9,680	0.291	***32.0***
Red and Advanced Green	30				-
Pedestrian Signals	404	$30	$12,120	0.080	***32.3***
Totals -			***$40,035***		***133.3***

[17] LED lights on the controllers will flash if the controlled unit is not operating correctly.

These savings calculations assume continuous operation of the lights but do not take into account any changes in ancillary loads for controllers, fans or heaters.

A search of deemed savings data from other jurisdictions found that Ohio, Pennsylvania and the Regional Technical Forum[18] of the Northwest Power and Conservation Council have all established savings for LED Traffic Signals. The table below shows the energy and demand values used in the Ohio and Pennsylvania Technical Reference Manuals[19] and RTF database for the types of conversions implemented under the GSHI program.

Table 15: Deemed Savings for LED Traffic Signals

	Ohio/Pennsylvania TRM				Regional Technical Forum	
	% Burn	Annual Hours of Use	Savings from LED Conversion		Savings from LED Conversion	
			kW	kWh	kW	kWh
Red 8 inch	55%	4818	0.062	299	*Not provided*	367
Green 8 inch	43%	3,767	0.060	226		283
Turn Signal (8" Green)	8%	701	0.109	76		111
Pedestrian	100%	8,760	0.108	946		1,210

Per section 4.3.1 of the CDM plan (page 12), yellow yield and yellow arrows were not to be covered by the program.

The higher figures used in the RTF database are based on program evaluations carried out in Northern California in 2005[20] that evaluated a sample of 165 units.

Navigant has used the demand change and kWh reduction per devices from the Ohio and Pennsylvania TRMs as the basis for estimating savings from the LED Traffic Light Program. These values represent a consistent set of savings data taking into account burn time and hours of use.

e) West Nipissing Street Light Conversion Program

The initial intent of this program was to replace 250 mercury vapour streetlights located in West Nipissing with LED fixtures. GSHI approached West Nipissing on several occasions but it appeared that West Nipissing was unable to finance the project. GSHI therefore re-targeted the program to replace high pressure sodium lamps in the municipality of Greater Sudbury.

[18] The Northwest Regional Technical Forum database, for commercial lights/LED Traffic Signals. http://rtf.nwcouncil.org/

[19] Both the Ohio and Pennsylvania Technical Reference Manuals (previously cited) were prepared by the Vermont Energy Investment Corporation. The TRM references PECO as the source of the savings data.

[20] Mowris, R., & Carlson, K. (2005). Measurement & Verification Load Impact Study for Northern California Power Agency Senate Bill 5X Programs, Study ID: NCP0001.01 . Roseville, CA: Northern California Power Agency. Retrieved from http://www.calmac.org/publications/M&V_Load_Impact_Study_for_NCPA_SB5X_Programs.pdf .

Navigant has estimated the energy and demand reductions for the LED streetlighting program based on information provided in the tracking data. The estimate presented below makes two assumptions:

1) That the average ballast size for the HPS lamps replaced under the program was 38 watts. Information provided for one invoice indicated this ballast wattage for all 150w HPS lamps listed. Navigant believes this is a conservative assumption given that roughly 50 percent of the lamps replaced under the program were 150w HPS and about 40 percent were above that wattage.
2) That the lamps operate for 4,306 hours per year on average; the value used by GSHI in billing street lighting energy use.

Table 16: LED Streetlighting Savings

Program Year	Energy Savings (kWh/year)	Change in Connected Load (KW)
2011	29,407	1.4
2012	459,404	101.0
2013	108,226	25.0
	597,037	***127.4***

The estimated gross savings for each program are summarized in Table 17. Note that demand savings are shown for both the summer and winter peak as a number of the programs targeted winter peak demand reductions.

Table 17: Estimated Gross Savings by Program

Program	Metric	Program Year				
		2009	2010	2011	2012	2013
Electric Thermal Storage	Number of Units	30	28	40	214	305
	Demand savings - Winter Peak only (kW)	148	129	234	548	1,405
	Est. kWh Savings	n/a	n/a	n/a	n/a	n/a
Parking Lot Conversion (diesel)	Number of Units	87	133	4	117	42
	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	24,760	130,553	4,065	105,265	14,477
Parking Lot Conversion (gas)	Number of Units	258	479	205	447	15
	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	87,439	369,453	156,661	317,996	4,589
Street Lighting	Number of Units	n/a	n/a	63	1,188	203

Program	Metric	Program Year				
		2009	2010	2011	2012	2013
	Demand savings - Winter Peak only (kW)	n/a	n/a	1.4	101	25
	Est. kWh Savings	n/a	n/a	29,407	459,404	108,226
Traffic Light Conversion	Number of Units	556	505	128	269	n/a
	Demand savings - Summer & Winter Peak (kW)	43	40	10	22	n/a
	Est. kWh Savings	274,448	168,389	45,404	144,557	n/a
CoolerMiser	Number of Units	5	9	33	64	34
	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	2,835	5,103	18,711	36,288	19,278
VendorMiser	Number of Units	20	19	136	92	8
	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	17,710	16,825	120,428	81,466	7,084
Demand Savings - Summer (kW)		**43**	**40**	**10**	**22**	**0**
Demand Savings -Winter Peak (kW)		**191**	**169**	**245**	**671**	**1,431**
Total Est. kWh Savings		**407,192**	**690,322**	**374,676**	**1,144,975**	**153,654**

The savings for 2013 shown in the table above are for installations to September 25th. GSHI expects additional savings for the 2013 program year as it still has a remaining inventory of controllers for the "Parking Lot Plug Controller" and "Vending Machine and Self Service Coolers" programs. GSHI will continue to install these devices in 2013 until the remaining inventory has been used.

3.3.2 Estimation of Net Savings

The net-to-gross ratio for the GSHI's programs was estimated in a manner consistent with that prescribed in the OPA's EM&V Protocols and Requirements – STG-12 Net-to-Gross Adjustment.

Navigant used the self-reporting survey method to estimate the net-to-gross adjustment required. Data from the participant telephone survey was used quantitatively, with free-ridership values assigned to different respondents based on respondents' answers to a number of direct program participation and program influence questions. This quantitative assessment of free-ridership was also compared with comments offered by the respondents themselves (in

open-ended survey questions) to qualitatively assess the reasonableness of both the individual and overall average level of free ridership. The overall free-ridership rate applied to gross savings is the weighted average of the surveyed individual's free-ridership scores.

Net energy savings incorporate not only free-ridership, but spill-over[21] and rebound. Questions regarding the impact of participation in the GSHI programs on other energy efficiency improvements were included in the survey. Analysis of the survey results did not provide any indication of significant spillover from the GSHI initiatives and comments offered by participants indicated that decisions to participate in other initiatives were largely made independently, though based on the same underlying motivations.

The table below shows the number of responses obtained for each program and the proportion of installed units represented by those responses. As the table indicates, the responses received for the Commercial Parking Lot Plug Controller and Vending Machine and Self Service Coolers Efficiency programs represented over half of the units installed under those programs. However, the respondents reached for the ETS program represent a very small proportion of the units installed.

Table 18: Survey Response Rates by Program

	Electric Thermal Storage Program	Commercial Parking Lot Plug Controller Program	Vending Machine and Self Service Coolers Efficiency Program
No. of Respondents	3	13	10
No. of Units Installed by Respondents	11	1033	210
Total Units Installed in Program	1034	1787	415
% of Units Represented in Survey	1%	58%	51%

Navigant asked participants a number of direct questions regarding their intentions prior to participating in the programs and the likelihood that they would have installed the measures absent the program. In addition, participants were asked about the level of influence that the program had on their decision and whether participation in the program influenced other energy management actions. Table 19 below summarizes the responses by program.

[21] In accordance with the OPA's EM&V Protocols, and due to the nature and quantity of data available, Navigant elected not to estimate the possible "rebound" or "snap-back" effects of the program.

Table 19: Free Ridership Questions

Question No.	Short description	Potential Responses	Electric Thermal Storage Program	Commercial Parking Lot Plug Controller Program	Vending Machine and Self Service Coolers Efficiency Program
FR1	Had you already been thinking of installing the measure prior to involvement in the program.	Yes/No	27%	35%	2%
FR1a	Had planned to install similar equipment before participating in the program.	Yes/No	27%	0%	2%
FR1b	How far had planning advanced?	1 to 10	0.0	1.5	0.0
FR1c	Had funds been budgeted?	1 to 10	0.0	1.5	0.0
FR2	Learned of incentive after measure installed.	Yes/No	0.0%	0%	0%
FR3	Incentive influenced earlier installation	Yes/No	91%	92%	12%
FR3a	Without incentive would have installed measure within 1 year.	Yes/No	0%	19%	0%
FR4	Likelihood that measure would have been installed without the program	1 to 10	0.0	2.0	0.1
FR6	Importance of Rebate to decision.	1 to 10	0.0	9.0	9.8

The responses to the survey questions were reviewed for consistency and weighted based on the number of units installed by each participant as a proportion of total responses for the program. Questions FR1c, FR3, FR3a and FR4 were used to derive an estimate of free-ridership for each program as indicated below.

Table 20: Estimated Free Ridership Rates

	Electric Thermal Storage Program	Commercial Parking Lot Plug Controller Program	Vending Machine and Self Service Coolers Efficiency Program	LED Traffic Light Conversion Program	LED Street Light Conversion Program
Free Ridership Rates	2%	15%	22%	0%	0%

Navigant notes that the number of responses for the ETS program was very small and that some of the responses were internally inconsistent. For example, one of the three respondents indicated that they had considered and planned to install an ETS system before learning of the program but later indicated that they would never have installed the equipment without the incentive. As a result, we have used the assumed 10 percent free ridership rate used in the initial program proposal for that program.

The responses for the LED Traffic Lights and LED Streetlighting program were based on an interview with the key decision maker at the municipality who was responsible for the City's participation in both programs. As mentioned previously, the challenges of implementing this

type of project in a municipality include high capital costs and navigating decision making processes. The participant surveyed stated that the LED street lighting and traffic lighting project would likely not have taken place until the cost of LED lighting reduced significantly.

Table 21: Free Ridership Rates Used for NTG Calculation

	Electric Thermal Storage Program	Commercial Parking Lot Plug Controller Program	Vending Machine and Self Service Coolers Efficiency Program	LED Traffic Light Conversion Program	LED Street Light Conversion Program
Free Ridership Rates	10%	15%	22%	0%	0%

3.3.3 Summary of Impact Findings

The estimated net energy and demand savings are shown in Table 22 below.

Table 22: Net Energy and Demand Savings

Program	Metric	Program Year 2009	2010	2011	2012	2013
Electric Thermal Storage	Demand savings - Winter Peak only (kW)	133	116	210	493	1,405
	Est. kWh Savings	n/a	n/a	n/a	n/a	n/a
Parking Lot Conversion (diesel)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	21,046	110,970	3,455	89,475	12,306
Parking Lot Conversion (gas)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	74,323	314,035	133,162	270,296	3,900
Street Lighting	Demand savings - Winter Peak only (kW)	n/a	n/a	1	101	25
	Est. kWh Savings	n/a	n/a	29,407	459,404	108,226
Traffic Light Conversion	Demand savings - Summer & Winter Peak (kW)	43	40	10	22	n/a
	Est. kWh Savings	274,448	168,389	45,404	144,557	n/a
CoolerMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	2,211	3,980	14,595	28,305	15,037
VendorMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	13,814	13,123	93,934	63,543	5,526
Demand Savings - Summer (kW)		**43**	**40**	**10**	**22**	**0**

Program	Metric	Program Year 2009	2010	2011	2012	2013
Demand Savings -Winter Peak (kW)		176	156	222	616	1,431
Total Est. kWh Savings		385,842	610,497	319,957	1,055,580	144,995

3.3.4 Incentive Levels

Incentive levels for some of the programs were adjusted during the operation of the programs based on actual program experience.

a) Electric Thermal Storage Program

- Initially the incentive for this program was set at $2,500 per installation. Based on early experience, GSHI changed the incentive to provide up to $2,500 for materials. This change required the program participant to pay for labour costs associated with the installation.
- Participants commented that the cost of the ETS system was high. When asked about their satisfaction of the incentive amount, participants felt it was reasonable and likely the most that GSHI could provide. All participants surveyed reported that they would not have purchased the ETS units without the incentive provided by GSHI.

b) Commercial Parking Lot Plug Controller Program

- The original incentive of $200 was found to be excessive based on initial program experience. As a result, the incentive was reduced to $175 almost immediately after the program was started. In addition a requirement was added to the program requiring that the participants using a contractor obtain at least three quotes for the installation. Participants with their own in-house electrician were also required to obtain competitive quotes to install the devices to establish the allowable level of labour costs.
- Participants were very satisfied with the level of incentive provided by GSHI. Over 20 percent of the participants surveyed reported that their business made capital decisions based on a specific payback period. Therefore, reassessing the incentive amount with this perspective may allow GSHI to lower the incentive amount while maintaining an attractive offer for businesses should the program be considered for extension or reoffered.

c) Vending Machine and Self Service Coolers Efficiency Program

- The initial incentive of $150 per installation was increased to $175 based on the actual costs of the devices; reported as $200 for VendingMiser and $180 for CoolerMiser.

- Participants were very satisfied with the incentive level and 90 percent of participants reported that the importance of the rebate in their decision to participate was at least an 8 out of 10 (10 being extremely important).

d) & e) LED Traffic Light Conversion Program & West Nipissing Street Light Conversion Program

- The City of Greater Sudbury representative was very satisfied with the incentive level of the program and specifically commented that the project would not have received approval without the incentive.

4. Conclusions and Recommendations

4.1 Conclusions

4.1.1 Process Issues

Based on surveys completed with participants, the customer-facing side of the programs appears to be performing well. The participants surveyed were very pleased with the programs offered by GSHI. Over 80 percent of the participants surveyed across the programs reported an overall satisfaction rating of over 8 on a 0 to 10 scale (10 being very satisfied) when asked about their overall program satisfaction and over 70 percent reported a satisfaction rating of over 8 on a 0 to 10 scale (10 being very satisfied) when asked about their satisfaction with GSHI as a company. Participants were happy with the administrative processes and the incentive amounts provided and were particularly happy with the one-on-one support from GSHI staff. Many participants reported participating in both GSHI and OPA programs and responded favourably about their experiences with GSHI programs. The only significant concerns expressed by participants related to ensuring consistent follow-up and suggestions relating to enhancing communication about the programs to improve awareness.

Overall comments regarding the programs were overwhelmingly favourable. A number of participants made unsolicited comments praising the efforts of GSHI field staff and commented favourably on the processes in the GSHI programs compared to their experience with other similar programs

Consistency and clarity in the format and information collected for all programs would improve the ability to track savings and participants across programs. As noted, there were some inconsistencies and missing information in the tracking databases.

4.1.2 Program Impacts

A number of GSHI's programs were aimed at loads which operate in the winter months. Given the timing of the evaluation this meant that some of these measures could not be verified through actual measurements. In addition, limitations on available data and time limited the ability to obtain the targeted level of participant feedback for some of the programs. Despite these issues, Navigant is confident that the net energy and demand savings estimates developed for these programs are reasonable.

The estimated net energy and demand savings developed for each of the initiatives is shown in Table 21. Note that the table shows the demand impacts for both the summer and winter peak period as a number of GSHI's programs resulted in significant winter peak reductions but no summer peak demand reduction.

The estimated net energy and demand savings are shown in the table below.

Table 23: Net Energy and Demand Savings

Program	Metric	Program Year				
		2009	2010	2011	2012	2013
Electric Thermal Storage	Demand savings - Winter Peak only (kW)	133	116	210	493	1,405
	Est. kWh Savings	n/a	n/a	n/a	n/a	n/a
Parking Lot Conversion (diesel)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	21,046	110,970	3,455	89,475	12,306
Parking Lot Conversion (gas)	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	74,323	314,035	133,162	270,296	3,900
Street Lighting	Demand savings - Winter Peak only (kW)	n/a	n/a	1	101	25
	Est. kWh Savings	n/a	n/a	29,407	459,404	108,226
Traffic Light Conversion	Demand savings - Summer & Winter Peak (kW)	43	40	10	22	n/a
	Est. kWh Savings	274,448	168,389	45,404	144,557	n/a
CoolerMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	2,211	3,980	14,595	28,305	15,037
VendorMiser	Demand savings (kW)	n/a	n/a	n/a	n/a	n/a
	Est. kWh Savings	13,814	13,123	93,934	63,543	5,526
Demand Savings - Summer (kW)		**43**	**40**	**10**	**22**	**0**
Demand Savings -Winter Peak (kW)		**176**	**156**	**222**	**616**	**1,431**
Total Est. kWh Savings		**385,842**	**610,497**	**319,957**	**1,055,580**	**144,995**

The savings for 2013 shown in the table above are for installations to September 25th. GSHI expects additional savings for the 2013 program year as it still has a remaining inventory of controllers for the "Parking Lot Plug Controller" and "Vending Machine and Self Service Coolers" programs. GSHI will continue to install these devices in 2013 until the remaining inventory has been distributed.

4.2 Recommendations for Program Improvements

4.2.1 Process Recommendations

Based on a review of tracking databases, Navigant recommends three potential improvements.

- With respect to customer information collected, the level of contact information obtained from customers and entered into the database could be improved. Specifically, tracking databases should include the full names of participants or contacts within an organization and, where possible, obtain a description of the contact's position within the organization.
- When performing estimates of energy savings (kWh) and demand savings (kW) for each program, tracking databases should contain clear estimates that are consistently applied to all customers.
- Finally, when tracking multiple programs, consistency in the setup of each database should be ensured for the clear tracking of sales and any returns of the devices promoted under the program.

Navigant recommends that continuing attention be paid to ensuring that commitments to program participants are met, for example with regards to follow-up visits to verify measure installation. While the majority of participants were very satisfied in this regard, it was the most common concern regarding the program by participants. As noted above, GSHI does verify 100% of measure installations, but notes that the staff involved with the installation may not always be present at the time of the visit.

Based on responses from participant surveys, Navigant recommends that GSHI continue one-on-one outreach to business customers to provide information about programs. Participants surveyed felt this form of outreach was effective and were very happy with the support provided by GSHI staff throughout the application and installation process.

In terms of program design, Navigant recommends that GSHI maintain the practice of structuring the incentive process such that the participant does not receive the full value of the incentive until the process, including field verification, is completed.

4.2.2 Impact Recommendations

Based on a review of the energy savings (kWh) and demand savings (kW) for each program, Navigant recommends the incorporation of a process to educate business owners that have participated in the Vending and Reach-In Cooler program on the importance of monitoring the devices for warning codes. Correcting issues identified by the warning codes can avoid increased energy use from issues such as leaking door seals or a faulty compressor.

For the LED Traffic Light program it is recommended that the program tracking data be consistent in the treatment of fixtures or devices (i.e. red/green/yellow) device and the number of lamps used in these fixtures.

Appendix A: Participant Survey Instrument

Survey Form for

on following pages for

Vending Machine and Self Service Coolers Efficiency Program.

(Note: The same survey format was used for each program but customized to refer to the applicable program name).

GSHI Participant Survey Modules: Smart Vending/VendingMiser/CoolerMiser

Module	Questions	Notes
Screening	A1 – A2.	
Program Awareness	PA1-PA2	
Free Ridership and Consistency Checks	FR0-FR7, CC1-CC2	Appears lengthy but very few respondents will need to answer all questions.
Spillover	SO1-SO2	
Program Satisfaction	PS1-PS6	
GSHI Satisfaction	GS1	
Program-Specific Process Questions	Not included in this document.	
Demographics (residential) / Firmographics (commercial)	D1-D5 or F1-F5	
Module	**Questions**	
Screening	A1 – A2.	

Sample Variables/Customization Needed:

<PROGRAM>: Program name

<MEASURE >: Program-qualifying high efficiency product or service implemented by respondent; select measure with greatest savings for respondents with multiple measures.

<MEASURE 2> is measure with second highest savings;

<MEASURE 3> is measure with third highest savings.

Phrasing Notes:
-If the measure is a service (e.g., AC tune-up, duct sealing) replace verbs such as "purchase" and "install" with "implement" or another appropriate verb.
-For residential programs, change "this site" or "this property" to "your home".

Intro/Screener

Hello, this is _____ from Navigant calling on behalf of Greater Sudbury Hydro Inc. (Sudbury Hydro). This is not a sales call. May I please speak with <**ContactName**>?

Our records show that <**BusinessName** > purchased VendingMiser/CoolerMiser and received an incentive from Sudbury Hydro. We are calling to do a follow-up study about <**BusinessName** >'s participation in this program.

I was told you're the person most knowledgeable about this project. Is this correct?
[IF NOT, ASK TO BE TRANSFERRED TO MOST KNOWLEDGABLE PERSON OR RECORD NAME & NUMBER.]

This survey will take about 20 minutes. Is now a good time? [If no, schedule a call-back time.]

SCREENING QUESTIONS

A1. Just to confirm, did <**BusinessName**> participate in Sudbury Hydro's **Smart Vending/VendingMiser/CoolerMiser** program?

(**IF NEEDED**: This is a program where you/your business would have received an incentive for installing one or more VendingMiser/CoolerMiser. You may have participated in the program with projects at more than one site. We are discussing only the facility at <**SiteAddress**>)

READ CODES 1-3

1 Yes, participated as described
2 Yes, participated but at another location.
3 No, did not participate in program.
97 OTHER, SPECIFY.
98 DON'T KNOW.
99 REFUSED.

[SKIP A2 IF A1=1, 2]

A2. Is it possible that someone else dealt with the VendingMiser/CoolerMiser installation?

DO NOT READ LIST

1 YES, SOMEONE ELSE DEALT WITH IT
2 NO
97 OTHER, SPECIFY
98 DON'T KNOW
99 REFUSED

[IF A2=1, ASK TO BE TRANSFERRED TO THAT PERSON. IF AVAILABLE, GO BACK TO A1] IF NOT AVAILABLE, THANK, OBTAIN NAME & APPROPRIATE TIME TO CALL - THENTERMINATE.

[IF A1=2, 3, 97, 98, 99: THANK AND TERMINATE. RECORD AS "COULD NOT CONFIRM PARTICIPATION".]

If they express hesitation, use an appropriate combination of the following.

Overcoming objections:

- Confidentiality. We are an independent consulting firm and your response only will be presented in aggregate along with responses from other survey participants.

- Not the right person – that's fine, do you know who would be more appropriate to talk to? Do you have their contact details? RECORD NEW CONTACT

- Security. Your responses will not affect any financial incentives or rebates you have received, nor will it affect your ability to participate in the program in the future.

- Sales concern. I am not selling anything. On behalf of GSHI I simply want to understand what factors were important to your company's decision to apply to this program and subsequent decision to proceed.

- Contact. If you would like to talk with someone about this survey from our client or the Program Managers, the contacts are:

    - **GSHI** – the contact person is **Paula Tarini** or **Ron Lefebvre** – available by phone at 705-675-7536 x 2266or by e-mail at: ronl@shec.com

Program-Specific Verification Questions

Program Awareness

PA1. How did you hear about the Smart Vending/VendingMiser/CoolerMiser?

[DO NOT READ LIST, RECORD ALL MENTIONED]

1. (GSHI mailing/flyer)
2. (Newsletter)
3. (GSHI bill insert)
4. (GSHI website)
5. (GSHI account representative)
6. (Newspaper/magazine/print media)
7. (Family/friend/word of mouth)
8. (Contractor)
9. (Vendor/Installer)
10. (Retailer advertising)
11. (In-store advertising)
77. (Other: SPECIFY)
88. (Don't know)
1. (Refused)

[IF MULTIPLE RESPONSES GIVEN TO PA1, ASK PA1a, ELSE SKIP TO PA2]

PA1a. Which of these sources of information was most influential in your decision to participate in the program?

1. (GSHI mailing)
2. (Newsletter)
3. (GSHI bill insert)
4. (GSHI website)
5. GSHI account representative)
6. (Newspaper/magazine/print media)
7. (Family/friend/word of mouth)
8. (Contractor)
9. (Retailer advertising)
10. (In-store advertising)
11. (Salesperson)
12. ((Other: SPECIFY)
88. (Don't know)
99. (Refused)

PA2. What was the main reason you started thinking about installing VendingMiser/CoolerMiser at this site?

[DO NOT READ LIST, SELECT ONE]

1. (GSHI /Smart Vending/VendingMiser/CoolerMiser incentive)
2. GSHI Account Representative
3. (Recommended by contractor)
4. (High utility bills/wanted to save money)

5. (Save energy to protect the environment)
77. (Other: SPECIFY)
88. (Don't know)
99. (Refused)

Free Ridership

Prior Planning

FR1. Prior to your involvement in the Smart Vending/VendingMiser/CoolerMiser, had you already been thinking about installing VendingMiser/CoolerMiserfor this property?

1. (Yes) [CONTINUE TO FR1a]
2. (No) [SKIP TO FR3]
88. (Don't know) [SKIP TO FR2]
99. (Refused) [SKIP TO FR2]

FR1a. Had you planned to install similar equipment that would have reduced electricity use before you participated in the program?

1. (Yes) [CONTINUE TO FR1a(i)]
2. (No) [SKIP TO FR3]
88. (Don't know) [SKIP TO FR2]
99. (Refused) [SKIP TO FR2]

i) Please describe the type of equipment you had considered.
[OPEN ENDED]

ii) On a scale of 1 to 10 where "0" means highly unlikely and "10" means highly likely – how likely do you think it is that you would have installed this similar equipment?
1. [RECORD 0-10]

FR1b. Now, I would like you to think about prior to participating in the program again. On a scale of 0 to 10, where 0 means you "Had not yet planned for equipment and installation" and 10 means you "Had identified and selected specific equipment and the contractor to install it", please tell me how far along your plans were.

2. [RECORD 0-10]
88. (Don't know)
99. (Refused)

FR1c. On a scale of 0 to 10, where 0 means "Had not yet budgeted or considered payment" and 10 means "Already had sufficient funds budgeted", please tell me how far along your planning and budgeting/approval was?

3. [RECORD 0-10]
88. (Don't know)
99. (Refused)

Timing

FR2. When did you learn about the financial incentive or rebate? Was it before you installed the VendingMiser/CoolerMiser or after you installed it/them?

1. Before installed equipment
2. After installed equipment [SKIP TO CC1]
88. (Don't know)
99. (Refused)

FR3. Did the program influence you to purchase and install the VendingMiser/CoolerMiser earlier than you otherwise would have?

1. (Yes) [CONTINUE TO FR3a]
2. (No) [SKIP TO FR4]
3. (No, the program actually delayed installation) [SKIP TO FR4]
88. (Don't know) [SKIP TO FR4]
99. (Refused) [SKIP TO FR4]

FR3a. How much later would you have installed the VendingMiser/CoolerMiser, if you hadn't participated in the program?

1. Within 1 year
2. Between 1 and 2 years
3. Sometime after 2 years
4. Would never have installed without the program [SKIP TO FR6]
88. (Don't know)
99. (Refused)

Likelihood

FR4. On a 0 to 10 scale, with 0 being not at all likely and 10 being very likely, how likely is it that you would have purchased and installed the VendingMiser/CoolerMiser on your property if you had not participated in the program?

4. [RECORD 0-10]
88. (Don't know)
99. (Refused)

[ASK IF <QUANTITY> >1]

FR5. Without the program, would you have installed fewer VendingMiser/CoolerMiser, the same number, or more?

1. Fewer VendingMiser/CoolerMiser [SKIP TO FR5a]
2. Same number of VendingMiser/CoolerMiser [SKIP TO FR6]
3. More VendingMiser/CoolerMiser [SKIP TO FR6]
88. (Don't know) [SKIP TO FR6]
99. (Refused) [SKIP TO FR6]

[IF FR5 = 1]

FR5a. What percent of the VendingMiser/CoolerMiser would you have installed without the program?

5. [RECORD 0-100%]
88. Don't know
99. Refused

Importance

FR6. On a scale of 0 to 10, where 0 means "not at all important" and 10 means "extremely important", please tell me how important the program's rebate was in your decision to install the energy efficient VendingMiser/CoolerMiser.

6. [RECORD 0-10]
88. Don't know
99. Refused

FR7. On a scale of 0 to 10, where 0 means "not at all important" and 10 means "extremely important", please tell me how important the program's advertising and information was in your decision to install the energy efficient VendingMiser/CoolerMiser.

7. [RECORD 0-10]
88. Don't know
99. Refused

Consistency Checks on Free Ridership Responses

[ASK CC1 IF FR4 =<5 AND MAX (FR6, FR7) =<5, ELSE SKIP TO CC2 IF APPLICABLE]

CC1. Let me make sure that I understand you. Earlier, you indicated that it was unlikely that you would have installed VendingMiser/CoolerMiser without the program, but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision to purchase and install VendingMiser/CoolerMiser.

[OPEN ENDED]

[ASK CC2 IF ANY OF THE FOLLOWING SITUATIONS OCCUR:

IF FR4 >6 AND MAX (FR6, FR7) >5

IF FR4 >6 AND FR3 = 1
IF FR4 >6 AND FR5 = 1]

CC2. Let me make sure that I understand you. Earlier, you indicated that you likely would have installed VendingMiser/CoolerMiser even without the program, but that differs from some of your other responses. Please tell me in your own words what influence, if any, the program had on your decision to purchase and install VendingMiser/CoolerMiser.

[OPEN ENDED]

Spillover

We've just discussed the measures that you installed through Smart Vending/VendingMiser/CoolerMiser.

[READ THIS STATEMENT TO ALL]

Now I would like to ask you about any *other* energy efficiency measures that you might have installed after participating in Smart Vending/VendingMiser/CoolerMiser.

SO1. Apart from the equipment for which you received a Smart Vending/VendingMiser/CoolerMiser rebate, did you do any subsequent energy efficiency improvements **which were not rebated**?

1. (Yes)
2. (No) [SKIP TO SO2]
88. (Don't know) [SKIP TO SO2]
99. (Refused) [SKIP TO SO2]

Measures	SO1a. What type of equipment did you install? [SELECT APPLICABLE MEASURE]

SO1b. On a scale of 0 – 10, where 0 means no influence at all and 10 means extremely influential, how influential was the Smart Vending/VendingMiser/CoolerMiser program in your choice to take these additional measures?

[RECORD 0-10]

SO1c. Was the program as influential in your decision to install all the other additional measures as it was in your decision to install VendingMiser/CoolerMiser, or would you say the program influenced some measures more than others?

1. The program influenced some measures more than others [REPEAT SO1b FOR EACH RESPONSE TO SO1a]
2. The program was similarly influential for all additional measures installed [CONTINUE TO SO1d]
88. (Don't know) [CONTINUE TO SO1d]
99. (Refused) [CONTINUE TO SO1d]

SO1d. Please briefly describe in your own words how the program has influenced your decision to incorporate additional energy efficiency measures at this property that did not receive a program rebate.

[OPEN ENDED]

[FOR BUSINESSES ONLY]

SO2. Apart from the equipment for which you received a Smart Vending/VendingMiser/CoolerMiser rebate, did you do any subsequent energy efficiency improvements **which were not rebated** at *other* properties within <**REGION**>?

1. (Yes)
2. (No) [SKIP TO NEXT SECTION]
88. (Don't know) [SKIP TO NEXT SECTION]
99. (Refused) [SKIP TO NEXT SECTION]
8.

Possible Measures	SO2a. Other actions taken or equipment installed? [SELECT APPLICABLE MEASURE]
for CoolerMiser/VendorMiser	
Repairs - Compressor	
Repairs – Door Seals	
Occupancy sensors on lights	
Smart Strip Power Strip	

SO2b. On a scale of 0 – 10, where 0 means no influence at all and 10 means extremely influential, how influential was the Smart Vending/VendingMiser/CoolerMiser program in your choice to install <FIRST RESPONSE FROM SO2a>?

[RECORD 0-10]

SO2c. Was the program as influential in your decision to install all the other additional measures as it was in your decision to install < FIRST RESPONSE FROM SO2a >, or would you say the program influenced some measures more than others?

1. The program influenced some measures more than others [REPEAT SO2b FOR EACH RESPONSE TO SO2a]
2. The program was similarly influential for all additional measures installed [CONTINUE TO SO2d]

88. (Don't know) [CONTINUE TO SO2d]
99. (Refused) [CONTINUE TO SO2d]

SO2d. Please briefly describe in your own words how the program has influenced your decision to incorporate additional energy efficiency measures at these other properties that did not receive a program rebate.

[OPEN ENDED]

Program Satisfaction

I am now going to ask a few questions about your experience with the program.

PS1a. Using a scale of 0-10 where 0 represents very easy and 10 represents very difficult – how would you rate the ease of finding information about the program?

9. [RECORD 0-10]

PS1b. Using that same scale, how easy or difficult did you find it was to apply to the program?

[RECORD 0-10]

PS2. On a scale of 0 to 10 where 0 means extremely dissatisfied and 10 means extremely satisfied, please rate your overall satisfaction with the Smart Vending/VendingMiser/CoolerMiser?

10. [RECORD 0-10]
88. (Don't know)
99. (Refused)

PS2a. Why did you give it that rating?

[OPEN-ENDED]

PS3. Would you recommend Smart Vending/VendingMiser/CoolerMiser to a friend?

1. (Yes)
2. (No)
88. (Don't know)
99. (Refused)

PS4. On a scale of 0 to 10 where 0 is extremely dissatisfied and 10 is extremely satisfied, how would you rate your satisfaction with the following aspects of your experience with the Smart Vending/VendingMiser/CoolerMiser: [ROTATE LIST]

PS4a. The overall cost of the VendingMiser/CoolerMiser. [0-10, DK, REF]

PS4b. The incentive amount provided by GSHI . [0-10, DK, REF]

PS4c. The energy savings resulting from the VendingMiser/CoolerMiser installed. [0-10, DK, REF]

PS4d. The program application process. [0-10, DK, REF]

[REPEAT PS5 FOR ANY RESPONSES TO PS4a-d <6, IF ALL RESPONSES ARE >=6, SKIP TO PS6]

PS5. Why did you give [PS4a/PS4b/PS4c/PS4d] that rating?

[OPEN-ENDED]

PS6. From your perspective, what if anything could be done to improve the GSHI Smart Vending/VendingMiser/CoolerMiser?

[OPEN-ENDED]

GSHI Satisfaction

GS1. Based on your overall experience as a customer of Sudbury Hydro, how would you rate the company on a 0 to 10 scale, where 0 is extremely dissatisfied and 10 is extremely satisfied?

11. [RECORD 0-10]
88. (Don't know)
99. (Refused)

Firmographics (for Commercial Programs)

We're almost finished. I have a few final questions about your business and then we are done.

F1. What sector is this business in? [READ LIST IF NECESSARY, SELECT ONE.]

1. K-12 School
2. College
3. Grocery
4. Medical
5. Hotel/Motel
6. Light Industry
7. Heavy Industry
8. Office
9. Restaurant
10. Retail/Service
11. Warehouse
12. Other, specify
88. Don't know
99. Refused

F2. How many people does this business employ?

[RECORD #, DK, REF]

F4.Which of the following best describes the ownership of the facility where the tune-up was completed? [READ LIST, SELECT ONE]

1. Our company owns and occupies this facility [SKIP TO CLOSING COMMENT]
2. Our company owns this facility but it is rented to someone else [CONTINUE TO F5]
3. Our company rents this facility [CONTINUE TO F5]
88. Don't know [SKIP TO CLOSING COMMENT]

99. Refused [SKIP TO CLOSING COMMENT]

[ASK IF F4=2 OR 3]

F5. Does your company pay the electric bill?

1. (Yes)
2. (No)
88. (Don't know)

99. (Refused)

F6. How much (approximate %) of your total business expenses are electricity?

12. [RECORD 0-100%], DK

CLOSING

CL1: Is there anything we haven't discussed that you would like to mention with regards to the program?

CLOSING COMMENT: Those are all the questions I have for you today.

Thank you very much for your time. Sudbury Hydro appreciates your taking the time to help improve this program.

Appendix B: Illustrative Advertising

Buy it cheap – and use it all day long.

Reduce heating costs with
Electric Thermal Storage

With the introduction of Smart Meters, electricity will be sold at different rates during the day depending on load. But if you use electric heat, now you can purchase electricity when it's at its lowest rate (during off-peak hours) and store it to heat your home all day long. It's called Electric Thermal Storage (ETS) and this technology can now be installed in your home or business, saving energy… and money. To make it even easier, Greater Sudbury Hydro will provide an incentive equal to 75% of the purchase price of the Electric Thermal Storage system up to a maximum of $2500.00. For details on our ETS incentive, call today.

675-0517

Greater Sudbury Utilities
Services Publics du Grand Sudbury

It's like storing nuts for the winter.

Reduce heating costs with
Electric Thermal Storage

With the introduction of Smart Meters, electricity will be sold at different rates during the day depending on load. But if you use electric heat, now you can purchase electricity when it's at its lowest rate (during off-peak hours) and store it to heat your home all day long. It's called Electric Thermal Storage (ETS) and this technology can now be installed in your home or business, saving energy… and money. To make it even easier, Greater Sudbury Hydro will provide an incentive equal to 75% of the purchase price of the Electric Thermal Storage system up to a maximum of $2500.00. For details on our ETS incentive, call today.

675-0517

Greater Sudbury Utilities
Services Publics du Grand Sudbury

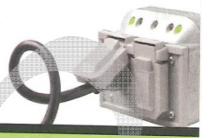
GET PLUGGED INTO...

The Ultimate Energy and Cost Saving Solution for Parking Lot Operators

As an operator of a commercial establishment, you know how taxing winter energy costs can be. By installing Intelligent Parking Lot Controllers you can save up to 65% in energy costs associated with vehicle plug-ins.

Call Greater Sudbury Hydro today for details on how to reserve parking lot controllers.

We will even pay you up to $175 per unit installed!



Greater Sudbury Hydro Inc/
Hydro du Grand Sudbury Inc

Visit **sudburyhydro.com**
or call **753-2341** ext **2272** or 2283

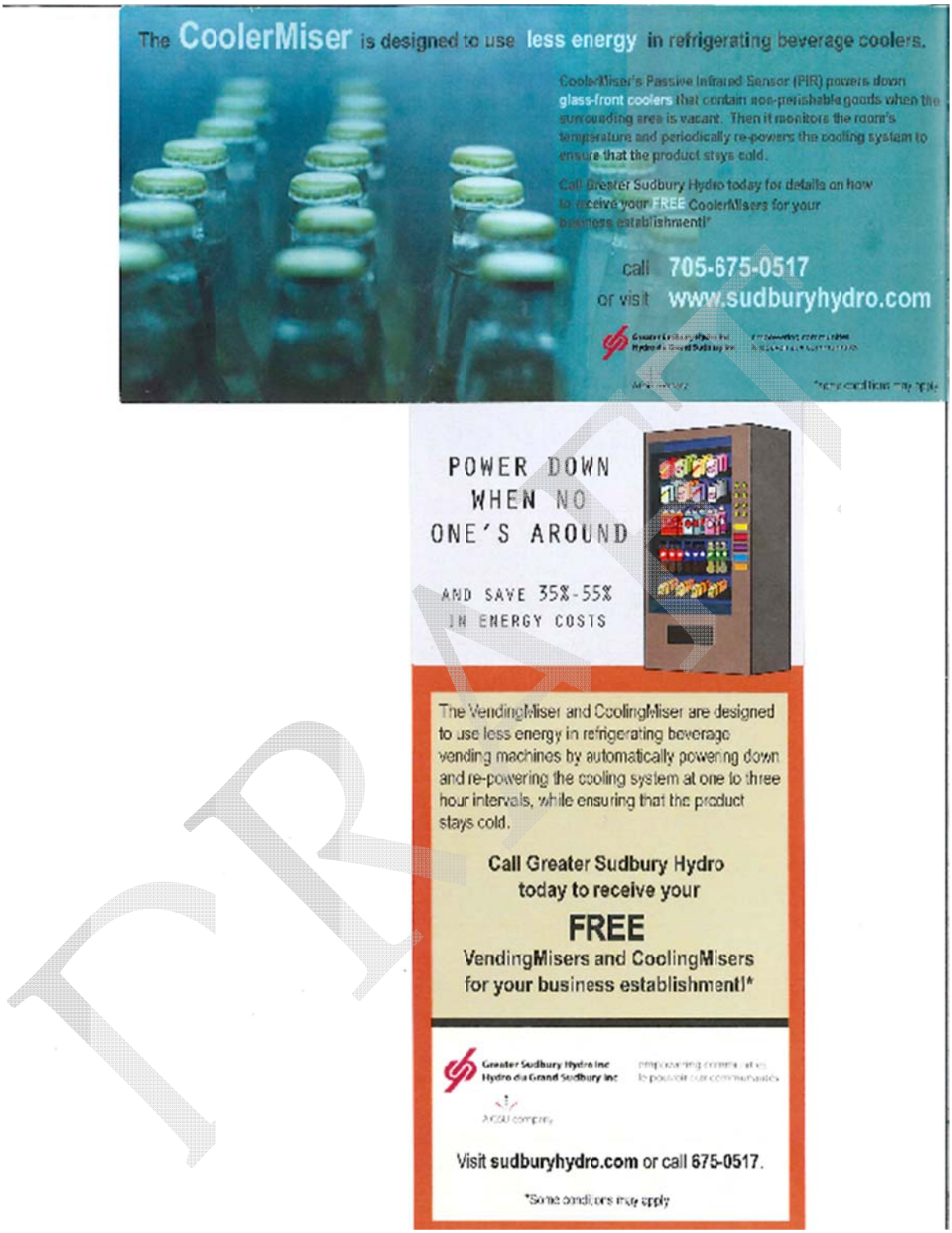
Store your heat when you need it most.

Reduce heating costs with Electric Thermal Storage

With the introduction of Smart Meters, electricity will be sold at different rates during the day depending on load. But if you use electric heat, now you can purchase electricity when it's at its lowest rate (during off-peak hours) and store it to heat your home all day long. It's called Electric Thermal Storage (ETS) and this technology can now be installed in your home or business, saving energy… and money. To make it even easier, Greater Sudbury Hydro will provide an incentive equal to 75% of the purchase price of the Electric Thermal Storage system up to a maximum of $2500.00. For details on our ETS incentive, call today.

675-0517

Greater Sudbury Utilities
Services Publics du Grand Sudbury


The CoolerMiser is designed to use less energy in refrigerating beverage coolers.
CoolerMiser's Passive Infrared Sensor (PIR) powers down glass-front coolers that contain non-perishable goods when the surrounding area is vacant. Then it monitors the room's temperature and periodically re-powers the cooling system to ensure that the product stays cold.
Call Greater Sudbury Hydro today for details on how to receive your FREE CoolerMisers for your business establishment!*
call 705-675-0517
or visit www.sudburyhydro.com
POWER DOWN WHEN NO ONE'S AROUND
AND SAVE 35%-55% IN ENERGY COSTS
The VendingMiser and CoolingMiser are designed to use less energy in refrigerating beverage vending machines by automatically powering down and re-powering the cooling system at one to three hour intervals, while ensuring that the product stays cold.
Call Greater Sudbury Hydro today to receive your
FREE
VendingMisers and CoolingMisers for your business establishment!*
Greater Sudbury Hydro Inc
Hydro du Grand Sudbury Inc
Visit sudburyhydro.com or call 675-0517.
*Some conditions may apply


POWER DOWN WHEN
NO ONE'S AROUND...
And save 35% - 55% in energy costs
The VendingMiser®, is designed to use less energy in refrigerating beverage vending machines by automatically powering down and re-powering the cooling system at one to three hour intervals, while ensuring that the product stays cold.
Call Greater Sudbury Hydro today for details on how to reserve VendingMisers® for your business establishment.
We will even pay you up to $175 per unit installed!
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