Evaluation of 2018 Residential Programs

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Foreword

This report provides an overall summary of the energy and demand savings achieved and cost effectiveness results by Independent Electricity System Operator (IESO) funded residential energy efficiency programs in 2018 within the Conservation First Framework (CFF). It is intended for all parties interested in understanding the achievements of the 2018 residential energy efficiency programs in Ontario. Note, only projects completed by December 31, 2018 have been included in this report. Given that projects pre-approved prior to May 1, 2019 have until December 31, 2020 to complete, the IESO will be providing addendums to this 2018 report over the next two years as 2018 initiated projects which have not been included in this report are completed.

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ACP	Aboriginal Conservation Program
BOMs	Buildings owner and managers
CDM	Conservation and demand management
CFF	Conservation First Framework
COTC	Conversation on the Cost
EUL	Estimated useful life
FNCP	First Nations Conservation Program
GWh	Gigawatt hour
HAP	Home Assistance Program
HVAC	Heating, ventilation and air conditioning
IESO	Independent Electricity System Operator
ISP	Instant Savings Program
LDC	Local distribution company
LED	Light-emitting diode
LUEC	Levelized unit electricity cost
MAL	Measure assumption list
MURB	Multiunit residential building
MW	Megawatt
NTG	Net-to-gross
PAC	Program administrator cost
PY	Program year
RNC	Residential New Construction
TRC	Total resource cost

Executive Summary

As part of the orderly and cost-effective wind down[1] of Independent Electricity System Operators' (IESO) Conservation First Framework (CFF), the Cadmus team (Cadmus, Econoler and Apex Analytics) evaluated program year (PY) 2018 province-wide and local residential programs using a simplified approach.

This report describes the impact and cost-effectiveness results for PY2018 (January 1, 2018, through December 31, 2018) for the following programs:

Province-wide Programs

- Instant Discount Program
- Heating and Cooling (HVAC) Program
- Residential New Construction (RNC) Program
- Home Assistance Program (HAP)

Local Programs

- First Nations Conservation Program (FNCP)
- Conversation on the Coast (COTC) Program
- Social Benchmarking Program
- Clothesline Instant Savings Program (Clothesline ISP)
- Swimming Pool Efficiency Program
- SuiteSaver Program
- Adaptive Thermostat Rebate Program
- Smart Thermostat Rebate Program

Centrally-Delivered Program

- Whole Home Program

For these evaluations, the Cadmus team determined the annual estimated net and gross energy savings and demand reduction and the cost-effectiveness at the program level.

[1] The Conservation First Framework was discontinued on March 21, 2019 (http://www.ieso.ca/en/Sector-Participants/Conservation-Delivery-and-Tools/Interim-Framework).

Impact Results

As shown in Table 1, the PY2018 portfolio achieved a total of 738 GWh in net first-year estimated energy savings and 84.0 MW in first-year summer peak demand savings.

Table 1. PY2018 Portfolio Results

Program	Net Estimated Energy Savings (GWh)	Net Estimated Summer Peak Demand Savings (MW)
Province-Wide Programs	**649.3**	**67.035**
Instant Discount	579.9	44.306
HVAC	59.9	21.237
RNC	2.5	0.506
HAP	7.0	0.986
Local Programs	**77.7**	**15.118**
FNCP	2.2	0.131
COTC	0.1	0.002
Social Benchmarking	61.0	12.459
Clothesline ISP	1.5	0.083
Swimming Pool Efficiency	6.1	1.367
SuiteSaver	1.4	1.076
Adaptive Thermostat Rebate	1.0	0
Smart Thermostat Rebate	4.4	0
Centrally-Delivered Program	**11.0**	**1.562**
Whole Home	11.0	1.562
Total	**738.0**	**83.715**

Cost-Effectiveness

The Cadmus team used the IESO's Conservation and Demand Management (CDM) energy efficiency cost-effectiveness tool to assess the benefit-to-cost ratio of the residential programs at the program and portfolio levels. The Cadmus team assessed performance from the perspective of the total resource cost (TRC) test, the program administrator cost (PAC) test and levelized unit electricity costs (LUEC).

For a program or portfolio to be considered cost-effective, benefits must exceed costs, with a program benefit-to-cost ratio greater than 1.0. Table 2 shows the benefit/cost ratios of PY2018 province-wide, local and centrally delivered programs.[2]

[2] Note: The Home Assistance Program (HAP) and Indigenous programs (FNCP and COTC) are not required to meet the cost effectiveness threshold.

Table 2. Benefit/Cost Ratios for PY2018 Residential Programs

Program	TRC	PAC	LUEC ($/kWh)
Province-Wide Programs			
Instant Discount	9.02	8.88	0.007
HVAC	3.03	4.23	0.029
RNC	0.30	0.82	0.110
HAP	1.02	0.89	0.085
Local Programs			
FNCP	0.65	0.57	0.107
COTC	0.15	0.13	0.420
Social Benchmarking	0.71	0.62	0.111
Clothesline ISP	1.95	1.98	0.030
Swimming Pool Efficiency	2.37	2.98	0.030
SuiteSaver	6.25	5.44	0.038
Adaptive Thermostat Rebate	0.64	1.08	0.043
Smart Thermostat Rebate	1.58	2.40	0.025
Centrally Delivered Program			
Whole Home	0.31	0.53	0.144

Impact Evaluation Approach

This section describes the overall approach used to calculate program-level energy savings, demand savings, incremental costs and estimated useful life (EUL).

Following receipt of a directive from the Ministry of Energy, Northern Development and Mines on March 21, 2019, the IESO took necessary steps to immediately discontinue the Conservation First Framework (CFF) and used all reasonable efforts to minimize costs associated with the CFF. As part of this orderly wind-down the IESO applied a simplified PY 2018 evaluation and reporting approach.

The IESO provided the Cadmus team with raw participation data for each program for PY2018. The Cadmus team reviewed these data for erroneous or missing values and removed duplicate data. Projects across all programs were reviewed for energy and summer peak demand savings using the historical samples of verified projects from previous evaluation years. To estimate program-level gross savings, the Cadmus team multiplied aggregated measure-level reported savings by program-level historical realization rates using up to three years of historical results (See Assumptions in Table 3).

One exception was the Social Benchmarking program that did not claim reported savings in 2016, 2017, or 2018. Instead, for this program the Cadmus team calculated a single average per-home annual kWh and kW savings across all treated homes in 2017 and applied this average to all treated homes in 2018.

Next, the Cadmus team multiplied the program-level gross savings by historical net-to-gross (NTG) ratios, averaging up to three years of historical results (See Assumptions in Table 3), consistent with 2018 program design and measures. Table 3 describes the assumptions applied and the basis for the realization rates and NTG ratios applied by program.

Table 3. Assumptions for Program Realization Rates

Program	Realization Rate		Net-to-Gross		Assumptions
	Energy	Demand	Energy	Demand	
Province-Wide Programs					
Instant Discount	88.1%	88.1%	133.3%	135.0%	Applied PY2017 adjustment factors given that Instant Discount started in Fall 2017.
HVAC	107.3%	71.9%	78.1%	81.1%	Applied PY2017 adjustment factors given that PY2017 was the first year with a new mix of measures.
RNC	21.0%	114.0%	80.8%	78.7%	Applied weighted average of PY2016 and PY2017 results due to updated baseline between 2015 and 2016.
HAP	65.2%	N/A[a]	100.0%	100.0%	Applied PY2015-PY2017 weighted average for realization rates to energy savings as no major program design have occurred since PY2015. Demand savings were calculated by multiplying the PY2015-PY2017 average ratio of demand-to-energy savings by the 2018 realized energy savings. NTG assumed to be 100% for low-income programs.
Local Programs					
FNCP	47.6%	8.6%	100.0%	100.0%	Applied PY2016-PY2017 weighted average.

Program	Realization Rate		Net-to-Gross		Assumptions
	Energy	Demand	Energy	Demand	
COTC	87.5%	19.1%	100.0%	100.0%	NTG assumed to be 100% for indigenous programs.
Social Benchmarking	N/A	N/A	85.4%	93.2%	Applied PY2016-PY2017 weighted average of NTG (program uplift).
Clothesline ISP	35.4%	5.8%	170.8%	170.8%	Applied PY2017 adjustment factors as program was initiated in PY2017.
Swimming Pool Efficiency	99.7%	83.4%	100.2%	100.2%	
SuiteSaver	100.0%	100.0%	100.0%	100.0%	Applied 100% adjustment factors as these are new programs with no historical data.
Adaptive Thermostat Rebate	100.0%	100.0%	100.0%	100.0%	
Smart Thermostat Rebate	100.0%	100.0%	100.0%	100.0%	
Centrally Delivered Program					
Whole Home	51.0%	N/A	89.0%	90.0%	Applied results from year ending June 2018 as program was initiated in mid-2017.

[a] Cadmus calculated the demand realization rate after comparing the ratio of 2017 demand-to-energy savings to 2018 reported demand savings.

Consistent with the approach used for calculating realization rates and NTG ratios, the Cadmus team estimated the incremental costs and EUL at the program level.

For the Instant Discount program, the Cadmus team disaggregated the measures into two groups—those with positive incremental costs and those with negative incremental costs (lighting)[3]—to ensure accurate treatment using the cost-effectiveness tool.

For new programs,[4] the Cadmus team calculated the incremental costs as the weighted PY2018 measure-level cost and applied the EUL from the measure assumption list (MAL).[5] For the HAP, FNCP and COTC programs, where incentives equal incremental costs, the Cadmus team applied the weighted average incremental costs per project from PY2017 as the PY2018 incremental costs per project.

For all other existing programs, the Cadmus team calculated PY2018 incremental costs by weighting the 2017 incremental costs by measure counts used in the PY2017 cost-effectiveness analysis.

The Cadmus team calculated lifetime savings using program-level EUL and savings persistence factors. The savings persistence factor represents the percentage of first-year savings that continue to accrue for

[3] LEDs have negative incremental costs since the lifetime of an LED is much longer than the baseline bulb. Therefore, the net present value of incremental costs are negative.

[4] SuiteSaver and Adaptative Thermostat Rebate were new programs in 2018. The Smart Thermostat Rebate program was launched in 2017 and discontinued in 2018.

[5] SuiteSaver is the only new program with multiple measures. Most are LED lighting upgrades so the Cadmus team referred to the MAL and used the LED EUL of 15 years.

each year of the program's EUL. To estimate the savings persistence factors, the Cadmus team divided the total annual savings in each year of the program's EUL by the program's first-year savings.

Instant Discount Program

In PY2018, the IESO operated the Instant Discount program through a network of participating retailer locations across Ontario by offering discounts on certain energy-efficient lighting products, power bars, clotheslines kits, programmable thermostats, pipe wrap, equipment timers, and weather stripping. The PY2018 program consisted of two events, one in the spring (April 6–May 6) and one in the fall (October 5–November 4), during which eligible items purchased in the store and online were discounted. The discounts were programmed into participating stores' inventory pricing systems and deducted automatically at the time of sale.

During the event, the IESO, local distribution companies (LDCs) and participating retailers promoted the event through multiple media channels, particularly through in-store signage. Retailers also trained their staff to appropriately process discounts and to present key program benefits to customers. Some LDCs held one-day in-store promotional events to help drive retail traffic.

Impact Results

Table 4 shows the program's incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 4. PY2018 Instant Discount Program Performance

Item	Units	Values
Participation	Products	14,868,179
Gross Estimated Savings	GWh	435.0
	MW	32.8
Gross Realization Rate	% (MWh)	88.1%
	% (MW)	88.1%
Net Estimated Annual Savings (First Year)	GWh	579.9
	MW	44.3
Net Estimated Annual Savings (2020)	GWh	415.0
	MW	31.8
Net-to-Gross Ratio	%	133.3%

Cost-Effectiveness

As shown in Table 5, the PY2018 Instant Discount program was cost-effective, with a TRC test ratio of 9.02 and a PAC test ratio of 8.88.

Table 5. PY2018 Instant Discount Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	9.02	457,119,563	50,696,176	406,423,386
PAC	8.88	313,083,014	35,241,422	277,841,591
LUEC $/kWh	0.007	N/A	N/A	N/A

Heating and Cooling Program

Launched in PY2006, the IESO marketed the Heating and Cooling (HVAC) program as Save on Energy's Heating and Cooling Incentive program to promote electronically commutated motors when purchased with a high-efficiency furnace, high-efficiency central air conditioners and (new to PY2017) high-efficiency air-source heat pumps. Residents (and businesses with residential-sized systems) received an incentive toward the purchase of qualifying new or replacement equipment through a participating contractor. Operated province-wide, program fulfillment was managed by Summerhill, which processed program data, applications and rebates and reported to the IESO. The Heating, Refrigeration and Air Conditioning Institute of Canada managed the program's contractor network.

Impact Results

Table 6 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 6. PY2018 HVAC Program Performance

Item	Units	Values
Participation	Projects	47,261
Gross Estimated Savings	GWh	76.7
	MW	26.2
Gross Realization Rate	% (MWh)	107.3%
	% (MW)	71.9%
Net Estimated Annual Savings (First Year)	GWh	59.9
	MW	21.2
Net Estimated Annual Savings (2020)	GWh	59.9
	MW	21.2
Net-to-Gross Ratio	%	78.1%

Cost-Effectiveness

As shown in Table 7, the PY2018 HVAC program was cost-effective, with a TRC test ratio of 3.03 and a PAC test ratio of 4.23.

Table 7. PY2018 HVAC Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	3.03	100,193,342	33,069,127	67,124,215
PAC	4.23	87,124,645	20,577,745	66,546,900
LUEC $/kWh	0.029	N/A	N/A	N/A

Residential New Construction Program

Launched in PY2011, the RNC program encouraged homebuilders to include energy-efficient design and technologies in new and substantially renovated homes. Residential homebuilders received incentives to participate in three program tracks—prescriptive, performance and custom:

- Through the prescriptive track, the IESO offered incentives for installations of individual measures including dimmer switches, ENERGY STAR lighting, motion sensors and central air conditioners.
- Through the performance track, the IESO provided incentives for homes receiving an ENERGY STAR® certification, an EnerGuide rating of 83 or 84 or an EnerGuide rating of 85 or more from a Natural Resources Canada auditor.
- Through the custom track, the IESO provided incentives based on savings from improvements exceeding the Ontario Building Code.

Impact Results

Table 8 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 8. PY2018 Residential New Construction Program Performance

Item	Units	Values
Participation	Projects	344
Gross Estimated Savings	MWh	3,046.1
	MW	0.6
Gross Realization Rate	% (MWh)	21.0%
	% (MW)	114.0%
Net Estimated Annual Savings (First Year)	MWh	2,461.2
	MW	0.5
Net Estimated Annual Savings (2020)	MWh	2,461.2
	MW	0.5
Net-to-Gross Ratio	%	80.8%

Cost-Effectiveness

As shown in Table 9, the PY2018 RNC program was not cost-effective, with a TRC test ratio of 0.30 and a PAC test ratio of 0.82.

Table 9. PY2018 Residential New Construction Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.30	2,948,131	9,892,251	-6,944,120
PAC	0.82	2,563,592	3,107,462	-543,870
LUEC $/kWh	0.110	N/A	N/A	N/A

Home Assistance Program

Launched in 2011 and managed by the IESO and LDCs,[6] HAP helps income-qualified homeowners and tenants in nonprofit housing and private rentals improve the energy efficiency of their homes and manage their energy use more effectively at no cost to the resident or owner. Program representative (delivery agent or LDC staff) first conduct an energy audit to identify appropriate program measures. With the participant's and/or property owner's consent, the representative installs these measures, either through the initial audit visit or during a follow-up visit. Measures include showerheads, aerators, LEDs, power bars, window air conditioners, dehumidifiers, clothes drying racks, draft proofing and attic insulation.

During the audit, participants also receive education about electricity conservation, time-of-use rates and the new energy efficiency equipment they receive. With the consent of the participant and/or property owner, the delivery agent installs the eligible measures, either at the initial audit visit or during a follow-up visit.

Participants in single-family homes that are heated by electricity may receive a more extensive weatherization audit to determine eligibility for additional air sealing and insulation upgrades. To receive weatherization or domestic hot water measures (or both), residences must be heated by or produce hot water using electricity.

Impact Results

Table 10 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

[6] In PY2018, the program shifted to, primarily, a centrally delivered program with some LDCs opting to continue to deliver the program themselves.

Table 10. PY2018 Home Assistance Program Performance

Item	Units	Values
Participation	Homes	4,609
Gross Estimated Savings	MWh	7,047.3
	MW	0.986
Gross Realization Rate	% (MWh)	65.2%
	% (MW)	0.6%
Net Estimated Annual Savings (First Year)	MWh	7,047.3
	MW	0.986
Net Estimated Annual Savings (2020)	MWh	7,047.3
	MW	0.986
Net-to-Gross Ratio	%	100.0%

[a] Cadmus applied historical demand/energy ratios to estimate demand savings for this program.

Cost-Effectiveness

As shown in Table 11, HAP was cost-effective according to the TRC test (1.02) and was not cost-effective according to the PAC test (0.89). However, as indicated, low-income programs are not required to meet the cost-effectiveness test thresholds.

Table 11. PY2018 Home Assistance Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	1.02	6,997,150	6,860,595	136,556
PAC	0.89	6,084,479	6,860,595	-776,116
LUEC $/kWh	0.085	N/A	N/A	N/A

First Nations Conservation Program

From PY2011 to PY2014, the IESO offered the Aboriginal Conservation Program (ACP) to help on-reserve First Nation customers improve the energy efficiency of their homes. Starting in PY2015, the IESO transferred delivery of the ACP to the LDCs.

Consequently, Hydro One created the FNCP to directly serve its First Nation communities. The program, managed by Hydro One, helps homeowners and tenants in band-owned and private housing improve the energy efficiency of their homes and manage their energy use more effectively at no cost to the resident or owner. A program representative directly installs eligible efficiency measures, as determined through an in-home energy audit. Measures include LEDs, power bars, blocker heater timers, aerators, dehumidifiers, refrigerator or freezer replacement, programmable thermostat, as well as attic, basement and hot water tank insulation. In addition, the LDC could make repairs to the residence, installing eligible measures and making health and safety upgrades when necessary. During the in-home audit, participants also receive conservation education.

Impact Results

Table 12 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 12. PY2018 First Nations Conservation Program Performance

Item	Units	Values
Participation	Homes	1,742
Gross Estimated Savings	MWh	2,245.0
	MW	0.131
Gross Realization Rate	% (MWh)	47.6%
	% (MW)	8.6%
Net Estimated Annual Savings (First Year)	MWh	2,245.0
	MW	0.131
Net Estimated Annual Savings (2020)	MWh	2,245.0
	MW	0.131
Net-to-Gross Ratio	%	100.0%

Cost-Effectiveness

As shown in Table 13, the PY2018 FNCP was not cost-effective, with a TRC test ratio of 0.65 and a PAC test ratio of 0.57. However, as indicated, programs serving First Nations are not required to meet the cost effectiveness test thresholds.

Table 13. PY2018 First Nations Conservation Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.65	1,990,389	3,060,062	-1,069,673
PAC	0.57	1,730,773	3,060,062	-1,329,289
LUEC $/kWh	0.107	N/A	N/A	N/A

Conservation on the Coast Program

The COTC program, launched in 2016 and managed by Five Nations Energy Inc., helps customers improve the energy efficiency of their homes and manage their energy use more effectively at no cost to the resident or owner. A program representative directly installs eligible efficiency measures, as determined through an in-home energy audit, and provides participants with education on electricity conservation, time-of-use rates and their new energy efficiency equipment. Measures include LEDs, power bars, aerators, as well as insulation and draft proofing. In addition, the representative may repair the residence to install eligible measures and may make health and safety upgrades, when necessary

Impact Results

Table 14 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 14. PY2018 Conservation on the Coast Program Performance

Item	Units	Values
Participation	Homes	23
Gross Estimated Savings	MWh	125.0
	MW	0.002
Gross Realization Rate	% (MWh)	87.5%
	% (MW)	19.1%
Net Estimated Annual Savings (First Year)	MWh	125.0
	MW	0.002
Net Estimated Annual Savings (2020)	MWh	125.0
	MW	0.002
Net-to-Gross Ratio	%	100.0%

Cost-Effectiveness

As shown in Table 15, the COTC program was not cost-effective, with a TRC test ratio of 0.15 and a PAC test ratio of 0.13 in PY2018.

Table 15. Conservation on the Coast Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.15	104,738	709,776	-605,038
PAC	0.13	91,076	709,776	-618,700
LUEC $/kWh	0.420	N/A	N/A	N/A

Social Benchmarking Program

In PY2018, the Social Benchmarking local program was offered by four LDCs.[7] All of the programs shared a common tool—home energy reports—which were mailed or emailed to a large proportion of customers who were randomly selected to receive behavioural "treatment". The reports stimulated customer interest in energy efficiency and attempted to change their behaviours by putting the customer's energy use in context and benchmarking against similar homes and by providing personalized actionable recommendations to reduce energy use.

Each LDC implemented a uniquely designed program including features such as web portals, email reports, or opt-in opportunities, all having components based in behavioural science, which sought to reduce residential electrical demand and consumption, enhance customer experience and encourage participation in other energy efficiency programs.

The Social Benchmarking programs were designed to enable measurement of resulting effects through two primary experimental research designs. These experimental designs allowed for measurement control and rely on statistical power to determine if a treatment was effective:

- Randomized control trial (RCT) design for opt-out programs
- Randomized encouragement design (RED) for programs that encourage customers to opt-in

All of the programs shared a common tool—home energy reports (HERs)—which were mailed or emailed to a large proportion of customers who were randomly selected to receive behavioural "treatment". The reports stimulate customer interest in energy efficiency and attempted to change their behaviours by putting the customer's energy use into context and benchmarking against similar homes and by providing personalized actionable recommendations to reduce energy use.

Table 16 summarizes the program designs for each LDC and details the treatment customer counts provided to the Cadmus team for evaluation.

[7] These LDCs were Alectra Utilities Corporation, Hydro Ottawa, Collus PowerStream and Toronto Hydro.

Table 16. LDC Behavior Program Design

LDC	Design	Measure	Treatment size
HONI	RCT	• Direct Mail • Web Portal	544,004*
Alectra Utilities (PowerStream, Horizon)	RCT	• Customer Engagement Platform • Electronic Reports • Direct mail	244,027
Hydro Ottawa	RCT and RED	• Email HER • Mobile app	65,592*[8] (RCT) 65,595 (RED)
Collus PowerStream	RCT	• Direct Mail • Web Portal	8,037
Toronto Hydro	RCT	• Direct Mail • Email HER • Web Portal	68,266 (paper) 104,886 (email)

Impact Results

Table 17 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 17. PY2018 Social Benchmarking Program Performance

Item	Units	Values
Participation	Participants	544,769
Gross Estimated Savings	MWh	71,414.5
	MW	13.368
Gross Realization Rate	% (MWh)	N/A
	% (MW)	N/A
Net Estimated Annual Savings (First Year)	MWh	60,988.0
	MW	12.459
Net Estimated Annual Savings (2020)	MWh	0
	MW	0
Net-to-Gross Ratio	%	85.4%

Cost-Effectiveness

As shown in Table 18, the Social Benchmarking program was not cost-effective, with a TRC test ratio of 0.71 and a PAC test ratio of 0.62 in PY2018.

Table 18. PY2018 Social Benchmarking Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.71	4,690,595	6,580,085	-1,889,490
PAC	0.62	4,078,778	6,580,085	-2,501,307
LUEC $/kWh	0.111	N/A	N/A	N/A

Clothesline Instant Savings Program

Through the Clothesline ISP, launched in PY2017, fourteen (14) LDCs[8] provided free retractable clotheslines directly to customers during events that the LDCs sponsored in the community and at their offices. In PY2018, to receive a clothesline, customers had to have a residential account with the LDC and not have previously participated in the program. Along with the clothesline, the LDC provides additional information on energy-savings opportunities, such as about other efficiency programs and energy-savings tips.

Impact Results

Table 19 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 19. PY2018 Clothesline Instant Savings Program Performance

Item	Units	Values
Participation	Homes	10,768
Gross Estimated Savings	MWh	865.9
	MW	0.049
Gross Realization Rate	% (MWh)	35.4%
	% (MW)	5.8%
Net Estimated Annual Savings (First Year)	MWh	1,479.0
	MW	0.083
Net Estimated Annual Savings (2020)	MWh	1,479.0
	MW	0.083
Net-to-Gross Ratio	%	170.8%

Cost-Effectiveness

As shown in Table 20, the PY2018 Clotheslines ISP was cost-effective, with a TRC test ratio of 1.95 and a PAC test ratio of 1.98 in PY2018.

[8] Algoma Power Inc., Bluewater Power Distribution Corporation, Canadian Niagara Power Inc., Entegrus Powerlines Inc., Espanola Regional Hydro Distribution Corporation, Essex Powerlines Corporation, Festival Hydro Inc., Greater Sudbury Hydro Inc., Hearst Power Distribution Company Limited, Newmarket-Tay Power Distribution Ltd., North Bay Hydro Distribution Limited, Northern Ontario Wires Inc., PUC Distribution Inc., Westario Power Inc.

Table 20. PY2018 Clothesline Instant Savings Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	1.95	752,025	385,037	366,988
PAC	1.98	653,935	329,922	324,013
LUEC $/kWh	0.030	N/A	N/A	N/A

Swimming Pool Efficiency Program

Launched in PY2017, the Swimming Pool Efficiency program was offered by 11 LDCs[9]. The program was designed to replace constant-speed swimming pool pumps with variable speed pumps for existing in-ground pools. Constant-speed pumps are sized to provide a continuous flow rate regardless of usage, whereas variable-speed pumps adjust flow rates by use (filtering and sanitation, heating, and cleaning), resulting in energy savings.

All single-family residential customers of participating LDCs who owned an in-ground pool with a constant-speed pump with or without existing controls were eligible for the program. The LDCs provided an instant $400 discount at the point of sale toward an ENERGY STAR variable-speed pool pump. The pool pump had to be installed by a participating pool pump vendor or a participating vendor's contracted installer. The program design used a midstream approach in which vendors were responsible for recruiting participants, providing the discounted equipment to customers and claiming incentives from the LDCs.

Impact Results

Table 21 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 21. PY2018 Swimming Pool Efficiency Program Performance

Item	Units	Values
Participation	Homes	1,969
Gross Estimated Savings	MWh	6,123.9
	MW	1.365
Gross Realization Rate	% (MWh)	99.7%
	% (MW)	83.4%
Net Estimated Annual Savings (First Year)	MWh	6,136.1
	MW	1.367
Net Estimated Annual Savings (2020)	MWh	6,136.1
	MW	1.367
Net-to-Gross Ratio	%	100.2%

[9] Burlington Hydro Inc., Energy+ Inc., Halton Hills Hydro Inc., Hydro One Networks Inc., Hydro Ottawa Limited, Kitchener-Wilmot Hydro Inc., Milton Hydro Distribution Inc., Oakville Hydro Electricity Distribution Inc., Toronto Hydro-Electric System Limited, Veridian Connections Inc., Waterloo North Hydro Inc.

Cost-Effectiveness

As shown in Table 22, the PY2018 Swimming Pool Efficiency program was cost-effective, with a TRC test ratio of 2.37 and a PAC test ratio of 2.98.

Table 22. PY2018 Swimming Pool Efficiency Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	2.37	4,817,243	2,033,473	2,783,770
PAC	2.98	4,188,907	1,404,652	2,784,255
LUEC $/kWh	0.030	N/A	N/A	N/A

Whole Home Program

The IESO partnered with Enbridge Gas and Union Gas Limited to offer customers an audit-based Whole Home retrofit program, which was launched in 2017. Through the program, customers received up to $5,000 in incentives for a range of energy-saving measures including insulation, air-sealing, windows, water heaters and drain water heat recovery. Through a partnership with the IESO, the program was expanded to include residents who had all-electric homes and who added electricity-saving measures such as central air conditioners, heat pumps and consumer appliances.

To qualify, a program-affiliated energy advisor visited a customer's home, assessed the home's energy-saving opportunities and made recommendations for efficiency improvements. After participants completed the efficiency improvements, they could apply to receive incentives for their upgrades and for the pre- and post-audit costs for the energy advisor.

Impact Results

Table 23 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 23. PY2018 Whole Home Program Performance

Item	Units	Values
Participation	Homes	34,604
Gross Estimated Savings	GWh	12.4
	MW	1.736
Gross Realization Rate	% (MWh)	51.0%
	% (MW)	N/A[a]
Net Estimated Annual Savings (First Year)	MWh	11.0
	MW	1.562
Net Estimated Annual Savings (2020)	MWh	11.0
	MW	1.562
Net-to-Gross Ratio	%	89.0%

[a] As demand savings were not reported, the Cadmus team estimated demand savings using an energy to demand ratio calculated from PY2017 results.

Cost-Effectiveness

As shown in Table 24, the PY2018 Whole Home program was not cost-effective, with a TRC test ratio of 0.31 and a PAC test ratio of 0.53.

Table 24. PY2018 Whole Home Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.31	12,745,165	40,946,924	-28,201,758
PAC	0.53	11,082,753	20,859,656	-9,776,904
LUEC $/kWh	0.144	N/A	N/A	N/A

SuiteSaver Program

Through the SuiteSaver program, Toronto Hydro offers building owners and managers of high-rise multiunit residential buildings (MURB) free smart power bars and in-suite lighting retrofits for installation in residential units. The program began implementation in September 2018.

Toronto Hydro designed the SuiteSaver program with the goal of overcoming barriers to improving energy efficiency in the multifamily sector, especially in MURBs with all-inclusive rents or administration fees. In this segment, residents (tenants or unit owners) often pay a fixed cost for electricity as part of their rent or maintenance fees, and building operators are responsible for maintenance. Through the SuiteSaver program, building owners and managers may receive a direct reduction in electricity costs from efficiency upgrades and may be able to install in-suite upgrades throughout the entire building.

Impact Results

Table 25 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 25. PY2018 SuiteSaver Program Performance

Item	Units	Values
Participation	Projects	63
Gross Estimated Savings	MWh	1,428.6
	MW	1.076
Gross Realization Rate	% (MWh)	100.0%
	% (MW)	100.0%
Net Estimated Annual Savings (First Year)	MWh	1,428.6
	MW	1.076
Net Estimated Annual Savings (2020)	MWh	1,428.6
	MW	1.076
Net-to-Gross Ratio	%	100.0%

Cost-Effectiveness

As shown in Table 26, the PY2018 SuiteSaver program was cost-effective, with a TRC test ratio of 6.25 and a PAC test ratio of 5.44.

Table 26. PY2018 SuiteSaver Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	6.25	3,350,034	535,593	2,814,441
PAC	5.44	2,913,073	535,593	2,377,480
LUEC $/kWh	0.038	N/A	N/A	N/A

Adaptive Thermostat Rebate Program

Through the Adaptive Thermostat program, launched in 2018, Toronto Hydro and Enbridge Gas Distribution provided incentives to residential customers who upgraded from standard (non-learning) thermostats to Nest, ecobee, or Honeywell smart thermostats, also known as adaptive thermostats.

Customer could purchase qualifying thermostats from participating Home Depot and Best Buy retailers. To be eligible, participants had to register their thermostats online after installation, be served by Toronto Hydro and Enbridge Gas and own a single-family home with central air conditioning and natural gas heating. All participants received a $100 rebate in the form of bill credits from Enbridge Gas.

Each month, Enbridge Gas invoiced Toronto Hydro for half ($50) of the total incentives disbursed per customer.

Impact Results

Table 27 shows the incentive spending, participation, gross and net program savings, realization rates and NTG ratio for PY2018.

Table 27. PY2018 Adaptive Thermostat Rebate Program Performance

Item	Units	Values
Participation	Measures	4,326
Gross Estimated Savings	MWh	1,008.3
	MW	0.000
Gross Realization Rate	% (MWh)	100.0%
	% (MW)	N/A[a]
Net Estimated Annual Savings (First Year)	MWh	1,008.3
	MW	0.000
Net Estimated Annual Savings (2020)	MWh	1,008.3
	MW	0.000
Net-to-Gross Ratio	%	100.0%

[a] There were no reported demand savings and therefore demand realization rate is not applicable.

Cost-Effectiveness

As shown in Table 28, the PY2018 Adaptive Thermostat Rebate program was not cost-effective according to the TRC test (0.64) but was cost-effective according to the PAC test (1.08).

Table 28. PY2018 Adaptive Thermostat Rebate Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	0.64	404,363	630,086	-225,724
PAC	1.08	351,620	325,622	25,998
LUEC $/kWh	0.043	N/A	N/A	N/A

Smart Thermostat Program

Through the Smart Thermostat program, the CFF and GreenON each provided $50 to qualifying Ontario residential customers for a total rebate of $100 for each thermostat, which controls the participant's HVAC equipment. Participants received the rebate by enrolling on a rebate application portal maintained by eligible smart thermostat manufacturers. The program launched in PY2017 and was discontinued July 31, 2018.

Impact Results

Table 29 shows gross and net program savings, realization rates, and NTGs for PY2018.

Table 29. PY2018 Smart Thermostat Program Performance

Item	Units	Values
Participation	Measures	13,431
Gross Estimated Savings	MWh	4,430.9
	MW	0.321
Gross Realization Rate	% (MWh)	100.0%
	% (MW)	N/A
Net Estimated Annual Savings (First Year)	MWh	4,430.9
	MW	0.321
Net Estimated Annual Savings (2020)	MWh	4,430.9
	MW	0.321
Net-to-Gross Ratio	%	100.0%

Cost-Effectiveness

As shown in Table 30, the PY2018 Smart Thermostat program was cost-effective, with a TRC test ratio of 1.58 and a PAC test ratio of 2.40.

Table 30. PY2018 Smart Thermostat Program TRC and PAC Ratios and Net Benefits

Metric	Result	Benefits ($)	Costs ($)	Net Benefits ($)
TRC Ratio	1.58	2,336,335	1,479,468	856,867
PAC	2.40	2,031,595	846,651	1,184,944
LUEC $/kWh	0.025	N/A	N/A	N/A