



Evaluation of 2019 Conservation First Framework Business Programs

An Addendum to the Evaluation of the 2018 CFF Business
Programs Report

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Foreward

This report is an addendum to the Evaluation of 2018 Conservation First Framework (CFF) Business Programs and provides an overall summary of the energy and demand savings achieved and cost effectiveness results by Independent Electricity System Operator (IESO) funded Business energy efficiency programs in 2019. It is intended for all parties interested in Business energy efficiency programs in Ontario. During the next two (2) years, energy and demand savings achieved and cost effectiveness results of business CFF programs will be provided as an addendum to the 2018 report. All pre-approved projects by the Local Distribution Companies (LDCs) before May 1, 2019 are given until June 30, 2021 to be completed.

Acknowledgement

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List of Acronyms

BRI	= Business Refrigeration Incentive Program
CDM	= Conservation Demand Management
CFF	= Conservation First Framework
EBCx	= Existing Building Commissioning Program
FCR	= Full Cost Recovery
FR	= Free ridership
GWh	= Gigawatt-hour
HP	= Horsepower
HPNC	= High Performance New Construction Program
HVAC	= Heating, ventilation, and air conditioning
kW	= Kilowatt
kWh	= Kilowatt-hour
IESO	= Independent Electricity System Operator
LDC	= Local Distribution Company
LUEC	= Levelized Unit Energy Cost
MW	= Megawatt
MWh	= Megawatt-hour
NTG	= Net-to-gross
NTGR	= Net-to-gross ratio
P4P	= Pay for Performance
PAC	= Program administrator cost
SBL	= Small Business Lighting Program
SO	= Spillover
TRC	= Total resource cost
VFD	= Variable frequency drive

1 Executive Summary

The Independent Electricity System Operator (IESO) retained Nexant, Inc., to conduct a simplified evaluation approach of its business energy conservation programs for Program Year 2019 (PY 2019) as part of an orderly and cost effective wind down of the Conservation First Framework¹. The evaluation team also includes NMR Group, Inc. This section provides a high-level summary of results of the impact and process evaluation of IESO's province-wide and local business programs for PY 2019.

1.1 Evaluation Goals and Objectives

The following are goals and objectives of the 2019 evaluation of the Business Programs:

- Determine net adjusted results based on a simplified evaluation approach of the following province-wide Save on Energy Programs: Retrofit Full Cost Recovery, Retrofit Pay for Performance, Small Business Lighting, Business Refrigeration Initiative, Audit Funding, High Performance New Construction, and Existing Building Commissioning Programs
- Determine net adjusted results based on a simplified evaluation approach of the following local and regional programs: PUMPSaver, RTUsaver, OPSaver, and High Efficiency Agricultural Pumping

The net adjusted results are presented and discussed in Section 2.

1.2 Business Program Results

The total 2019 first-year net adjusted energy and summer peak demand savings across all business programs was 300.2 GWh and 36.6 MW, respectively. The contribution of each program to the net adjusted energy savings is presented in Table 1-1.

¹ The Conservation First Framework (CFF) was discontinued last March 21, 2019 (<http://ieso.ca/Sector-Participants/Conservation-Delivery-and-Tools/Interim-Framework>).

Table 1-1: 2019 Program and Portfolio Savings

Program Availability	Program	Net 2019 Energy Savings (GWh)	Net 2019 Summer Demand Savings (MW)	Net 2020 Energy Savings (GWh)	Net 2020 Summer Demand Savings (MW)
Province Wide	Retrofit FCR	188.80	16.376	188.08	16.413
Province Wide	Retrofit P4P	55.70	7.952	55.70	7.952
Province Wide	Small Business Lighting	19.53	4.007	18.47	3.782
Province Wide	High Performance New Construction	14.53	6.528	14.53	6.528
Province Wide	Audit Funding	7.82	0.437	7.82	0.437
Province Wide	Business Refrigeration	5.82	0.469	5.83	0.470
Province Wide	Existing Building Commissioning	0.04	-	0.04	-
Province Wide	Program Savings	292.24	35.769	290.47	35.581
Regional and Local	Opsaver	4.02	-	4.02	-
Regional and Local	PUMPSaver	2.67	0.314	2.67	0.314
Regional and Local	RTUsaver	1.31	0.547	1.31	0.547
Regional and Local	High Efficiency Agricultural Pumping	0.01	0.003	0.01	0.003
Regional and Local	Program Savings	8.01	0.863	8.01	0.863
All Programs	Total Portfolio Savings	300.24	36.632	298.48	36.444

2 Impact Evaluation Results

2.1 Retrofit Full Cost Recovery

The Retrofit Program provides incentives to businesses in the industrial, commercial, institutional and multi-family residential sectors for the purchase and operation of energy efficient equipment. Incentives are based on a per unit basis for the prescriptive track and on a per-kWh or per-kW basis for custom track measures. LDCs are provided the option of two payment methods to re-coup costs associated with the program; Full Cost Recovery (FCR) or Pay for Performance (P4P). Nearly all LDCs choose the Retrofit FCR Program and receive set incentive levels based on the type of equipment installed (prescriptive track) during a project or the reported energy savings (custom track) estimated on the project application.

2.1.1 Retrofit Impact Results

Table 2-1 shows the province-wide results of the 2019 Retrofit Full Cost Recovery (FCR) Program impact evaluation.

Table 2-1: 2019 Retrofit Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	235.1	98.4%	231.4	81.6%	188.8	2,278.9	188.1
Summer Peak Demand (MW)	20.9	93.4%	19.5	84.0%	16.4	-	16.4

Table 2-2: Retrofit FCR Net Results Comparison

Measurement	2018	2019
Projects	8,102	3,173
1st Year Savings		
Net Energy (GWh)	405.6	188.8
Net Summer Peak Demand (MW)	54.8	16.4
2020 Savings		
Net Energy (GWh)	404.1	188.1
Net Summer Peak Demand (MW)	55.0	16.4

2.2 Retrofit Pay for Performance

The Retrofit P4P Program, offered by Alectra Utilities, provided incentives for equipment installed at industrial, commercial, institutional, and residential multi-family sectors. Under the P4P payment mechanism the utility is reimbursed based on the net-verified energy savings evaluated quarterly instead of a set payment dependent on equipment installed or savings reported.

2.2.1 Retrofit Pay for Performance Impact Results

Table 2-3 shows the results of the 2019 Retrofit P4P Program impact evaluation. Interactive effects were added to the program realization rates to account for the influence of lighting savings on heating and cooling loads at the project site.

Table 2-3: 2019 Retrofit P4P Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	66.5	110.6%	73.5	75.8%	55.7	717.5	55.7
Summer Peak Demand (MW)	9.1	114.6%	10.5	76.0%	8.0	-	8.0

Table 2-4: Retrofit P4P Net Results Comparison

Measurement	2018	2019
Projects	749	887
1st Year Savings		
Net Energy (GWh)	43.6	55.7
Net Summer Peak Demand (MW)	7.0	8.0
2020 Savings		
Net Energy (GWh)	43.6	55.7
Net Summer Peak Demand (MW)	7.0	8.0

2.3 Small Business Lighting

The Small Business Lighting (SBL) Program provides small business owners and tenants of commercial, institutional, agricultural facilities, and multifamily buildings who are not residential distribution customers the opportunity to receive up to \$2,000 in free lighting upgrades.

2.3.1 Small Business Lighting Impact Results

Table 2-5 shows the province-wide results of the 2019 SBL Program impact evaluation.

Table 2-5: 2019 SBL Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	26.9	79.2%	21.3	91.6%	19.5	147.4	18.5
Summer Peak Demand (MW)	7.1	62.4%	4.4	90.2%	4.0	-	3.8

Table 2-6: SBL Net Results Comparison

Measurement	2018	2019
Projects	7,233	4,676
1st Year Savings		
Net Energy (GWh)	40.4	19.5
Net Summer Peak Demand (MW)	7.8	4.0
2020 Savings		
Net Energy (GWh)	32.9	18.5
Net Summer Peak Demand (MW)	6.3	3.8

2.4 High Performance New Construction

The High Performance New Construction (HPNC) Program provides design assistance and incentives for building owners and planners who design and implement energy efficient equipment within commercial, institutional, industrial, or multi-residential occupancy new construction or major renovation projects. Incentives are offered for measures or designs that exceed the current Ontario Building Code requirements.

2.4.1 HPNC Impact Results

Table 2-7 shows the province-wide results of the 2019 HPNC Program impact evaluation.

Table 2-7: 2019 HPNC Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	23.2	108.0%	25.0	58.0%	14.5	305.1	14.5
Summer Peak Demand (MW)	5.8	104.0%	6.0	108.0%	6.5	-	6.5

Table 2-8: HPNC Net Results Comparison

Measurement	2018	2019
Projects	124	93
1st Year Savings		
Net Energy (GWh)	20.9	14.5
Net Summer Peak Demand (MW)	8.1	6.5
2020 Savings		
Net Energy (GWh)	20.9	14.5
Net Summer Peak Demand (MW)	8.1	6.5

2.5 Business Refrigeration Incentive

The Business Refrigeration Incentive (BRI) Program provides small business owners and tenants of commercial, institutional, agricultural facilities, and multifamily buildings who are not residential distribution customers the opportunity to receive up to \$2,500 in free refrigeration equipment upgrades.

2.5.1 BRI Impact Results

Table 2-9 shows the province-wide results of the 2019 BRI impact evaluation.

Table 2-9: 2019 BRI Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	8.9	67.0%	5.9	98.0%	5.8	71.5	5.8
Summer Peak Demand (MW)	1.1	63.0%	0.7	67.0%	0.5	-	0.5

Table 2-10: BRI Net Results Comparison

Measurement	2018	2019
Projects	2,980	1,576
1st Year Savings		
Net Energy (GWh)	12.0	5.8
Net Summer Peak Demand (MW)	0.9	0.5
2020 Savings		
Net Energy (GWh)	12.0	5.8
Net Summer Peak Demand (MW)	0.9	0.5

2.6 Audit Funding

The Audit Funding Program provides funding of up to half of the cost of certain energy audits that are undertaken to identify opportunities to reduce electricity consumption at industrial, commercial, institutional, and multi-family residential buildings; this program also acts as a feeder for the Retrofit Program.

2.6.1 Audit Funding Impact Results

Table 2-11 shows the province-wide results of the 2019 Audit Funding Program impact evaluation.

Table 2-11: 2019 Audit Funding Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	8.7	100.0%	8.7	90.0%	7.8	77.3	7.8
Summer Peak Demand (MW)	0.5	100.0%	0.5	87.0%	0.4	-	0.4

Table 2-12: Audit Funding Net Results Comparison

Measurement	2018	2019
Projects	374	172
1st Year Savings		
Net Energy (GWh)	17.0	7.8
Net Summer Peak Demand (MW)	0.9	0.4
2020 Savings		
Net Energy (GWh)	17.0	7.8
Net Summer Peak Demand (MW)	0.9	0.4

2.7 Existing Building Commissioning

The Existing Building Commissioning (EBCx) Program provides funding for projects comprised of commissioning phases and the installation of measures to reduce electricity consumption associated with chilled water systems in existing industrial, commercial, institutional, and multifamily residential buildings.

2.7.1 Existing Building Commissioning Impact Results

Table 2-13 shows the province-wide results of the 2019 EBCx impact evaluation.

Table 2-13: 2019 EBCx Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	49.5	100.0%	49.5	78.0%	38.6	192.9	38.6
Summer Peak Demand (MW)	-	117.0%	-	100.0%	-	-	-

Table 2-14: EBCx Net Results Comparison

Measurement	2018	2019
Projects	1	2
1st Year Savings		
Net Energy (GWh)	75.9	38.6
Net Summer Peak Demand (MW)	41.3	-
2020 Savings		
Net Energy (GWh)	75.9	38.6
Net Summer Peak Demand (MW)	41.3	-

2.8 PUMPSaver

The PUMPSaver local program was created to save electricity consumption through improving the efficiency of cooling and heating distribution systems. Specifically, the program's objective is to re-engineer and re-balance inefficient closed loop heating and cooling distribution systems, typically found in mid to high-rise buildings, with the application of variable frequency drives (VFDs). Typically, valves are used to restrict the flow of liquid which creates back-pressure on the motor and increases energy consumption. With a variable frequency drive valves can be opened and systems can be configured to move liquid at the desired rate of flow, reducing work required of the motor.

2.8.1 PUMPSaver Impact Results

Table 2-15 shows the results of the 2019 PUMPSaver Program impact evaluation.

Table 2-15: 2019 PUMPSaver Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	2.3	114.0%	2.6	101.0%	2.7	40.1	2.7
Summer Peak Demand (MW)	0.3	102.0%	0.3	114.0%	0.3	-	0.3

Table 2-16: PUMPSaver Net Results Comparison

Measurement	2018	2019
Projects	12	38
1st Year Savings		
Net Energy (GWh)	7.3	2.7
Net Summer Peak Demand (MW)	0.9	0.3
2020 Savings		
Net Energy (GWh)	7.3	2.7
Net Summer Peak Demand (MW)	0.9	0.3

2.9 RTUsaver

The RTUsaver program helps non-residential customers to reduce the use of their packaged HVAC units through providing or incentivizing smart thermostats, occupancy sensor controls, and demand controlled ventilation (CO2 sensors and fan controller).

The program includes an initial assessment of the HVAC equipment and provides the customer with a choice of controls. This initial assessment is also used to identify any repairs needed, which must be completed by the customer prior to receiving the offered measures.

2.9.1 RTUsaver Impact Results

Table 2-17 shows the results of the 2019 RTUsaver Program impact evaluation.

Table 2-17: 2019 RTUsaver Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	1.8	103.0%	1.8	71.0%	1.3	13.1	1.3
Summer Peak Demand (MW)	0.4	148.0%	0.5	103.0%	0.5	-	0.5

Table 2-18: RTUsaver Net Results Comparison

Measurement	2018	2019
Projects	432	217
1st Year Savings		
Net Energy (GWh)	2.7	1.3
Net Summer Peak Demand (MW)	1.2	0.5
2020 Savings		
Net Energy (GWh)	2.7	1.3
Net Summer Peak Demand (MW)	1.2	0.5

2.10 OPsaver

OPsaver is a 'Continuous Energy Improvement' (CEI) program that provided Toronto Hydro's medium to large sized commercial, institutional, and industrial customers with the opportunity to work with energy experts who guide them towards continuous building operations improvements. OPsaver motivates organizations to achieve and maintain operational maintenance and behaviour energy savings.

Through year-over-year engagement, the program provides 'coaching' for building operators and employees to encourage energy conservation activities with the intention that these practices persist over time. Participants work with the OPsaver Consultants to identify, implement and evaluate operational and behavioural energy efficiency measures and establish continuous energy improvement processes to ensure the energy savings are realized over the long-term.

2.10.1 OPsaver Impact Results

Table 2-19 shows the results of the 2019 OPsaver Program impact evaluation.

Table 2-19: 2019 OPsaver Program Impact

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	3.9	104.0%	4.0	1.0	4.0	43.9	4.0
Summer Peak Demand (MW)	-	-	-	-	-	-	-

Table 2-20: OPsaver Net Results Comparison

Measurement	2018	2019
Projects	1	10
1st Year Savings		
Net Energy (GWh)	0.2	4.0
Net Summer Peak Demand (MW)	-	-
2020 Savings		
Net Energy (GWh)	0.2	4.0
Net Summer Peak Demand (MW)	-	-

2.11 High Efficiency Agricultural Pumping Program

The High Efficiency Agricultural Pumping (HEAP) program is a regional program covering the service territories of Hydro One and NPEI. The program involves the delivery of incentives for high efficiency pump measures sold by pump distributors or wholesalers; and education targeting contractors and end users through the same pump system distributors. HEAP included only Integrated High Performance Pumping Systems (IHPPS or "smart pumps") between 0.5 horsepower (hp) and 10 hp.

2.11.1 High Efficiency Agricultural Pumping Impact Results

Table 2-21 shows the results of the 2019 HEAP Program impact evaluation.

Table 2-21: 2019 HEAP Program Impact Results

Measurement	Reported Savings	Realization Rate	Gross Adjusted Savings	Net-to-Gross Ratio	Net Savings	Lifetime Net Savings	Net Savings at 2020
Energy (GWh)	6.2	100.0%	6.2	100.0%	6.2	93.6	6.2
Summer Peak Demand (MW)	2.5	100.0%	2.5	100.0%	2.5	-	2.5

Table 2-22: HEAP Net Results Comparison

Measurement	2018	2019
Projects	12	8
1st Year Savings		
Net Energy (GWh)	27.2	6.2
Net Summer Peak Demand (MW)	9.1	2.5
2020 Savings		
Net Energy (GWh)	27.2	6.2
Net Summer Peak Demand (MW)	9.1	2.5

3 Appendix A: Business Program Impact Results

Table 3-1: Business Program Energy Savings

Program Type	Program	Project Count	Reported Energy Savings (GWh)	Realization Rate	Gross Adjusted Energy Savings (GWh)	Net-to-Gross Ratio	Net Energy Savings (GWh)	Lifetime Net Energy Savings (GWh)	Net Energy Savings at 2020 (GWh)
Province Wide	Retrofit FCR	3,173	235.13	98.4%	231.37	81.6%	188.80	2,278.93	188.08
	Retrofit P4P	887	66.46	110.6%	73.47	75.8%	55.70	717.53	55.70
	Small Business Lighting	4,676	26.92	79.2%	21.32	91.6%	19.53	147.40	18.47
	High Performance New Construction	93	23.19	108.0%	25.05	58.0%	14.53	305.14	14.53
	Audit Funding	172	8.69	100.0%	8.69	90.0%	7.82	77.27	7.82
	Business Refrigeration	1,576	8.87	67.0%	5.94	98.0%	5.82	71.52	5.83
	Existing Building Commissioning	2	0.05	100.0%	0.05	78.0%	0.04	0.19	0.04
	Province Wide Sub-total¹	10,579	369.31	99.1%	365.89	79.9%	292.24	3,597.99	290.47
Regional and Local	Opsaver	10	3.87	104.0%	4.02	100.0%	4.02	43.89	4.02
	PUMPSaver	38	2.32	114.0%	2.65	101.0%	2.67	40.08	2.67
	RTUsaver	217	1.79	103.0%	1.84	71.0%	1.31	13.10	1.31
	High Efficiency Agricultural Pumping	8	0.01	100.0%	0.01	100.0%	0.01	0.09	0.01
	Regional and Local Sub-total¹	273	7.98	106.7%	8.52	94.0%	8.01	97.16	8.01
All Programs	Full Portfolio¹	10,852	377.29	99.2%	374.40	80.2%	300.24	3,695.15	298.48

¹Table values may not sum to Full Portfolio values due to rounding errors

Table 3-2: Business Program Summer Peak Demand Savings

Program Type	Program	Reported Demand Savings (MW)	Realization Rate	Gross Adjusted Demand Savings (MW)	Net-to-Gross Ratio	Net Demand Savings (MW)	Net Demand Savings at 2020 (MW)
Province Wide	Retrofit FCR	20.873	93.4%	19.495	84.0%	16.376	16.413
	Retrofit P4P	9.127	114.6%	10.458	76.0%	7.952	7.952
	Small Business Lighting	7.119	62.4%	4.442	90.2%	4.007	3.782
	High Performance New Construction	5.812	104.0%	6.044	108.0%	6.528	6.528
	Audit Funding	0.502	100.0%	0.502	87.0%	0.437	0.437
	Business Refrigeration	1.112	63.0%	0.700	67.0%	0.470	0.470
	Existing Building Commissioning	-	100.0%	-	100.0%	-	-
	Province Wide Sub-total¹	44.544	93.5%	41.642	85.9%	35.769	35.581
Regional and Local	Opsaver	-	100.0%	-	100.0%	-	-
	PUMPSaver	0.270	102.0%	0.275	114.0%	0.314	0.314
	RTUsaver	0.359	148.0%	0.531	103.0%	0.547	0.547
	High Efficiency Agricultural Pumping	0.003	100.0%	0.003	100.0%	0.003	0.003
	Regional and Local Sub-total¹	0.631	128.1%	0.809	106.7%	0.863	0.863
All Programs	Full Portfolio¹	45.175	94.0%	42.451	86.3%	36.632	36.444

¹Table values may not sum to Full Portfolio values due to rounding errors

4 Appendix B: Business Program Cost Effectiveness Results

No cost effectiveness evaluation was performed for PY2019. As CFF is winding down and fewer projects are expected to be completed, the cost effectiveness results of PY2019 CFF programs may not accurately be representative of the program's performance. Instead, the overall cost effectiveness of each of the commercial province wide and local programs covering all program years in CFF will be presented in the final evaluation report.



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