

Existing Building Commissioning

A scan of programs and policies implemented
by Canadian provinces, territories and utilities

Tom-Pierre Frappé-Sénéclauze, Madi Kennedy and Bradley Elliott

December 2019



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Introduction

Energy efficiency initiatives provide a way to reduce greenhouse gas (GHG) emissions, lower costs for Canadians and businesses, create jobs, promote energy conservation, and provide stimulus to the economy. Natural Resources Canada's Office of Energy Efficiency delivers energy efficiency programs and tools to the housing, building, equipment, communities, industry, and transportation sectors.

The Pan-Canadian Framework on Clean Growth and Climate Change, which was developed with the provinces and territories and in consultation with Indigenous peoples, is Canada's plan for meeting its emissions targets, building resilience for a changing climate, and growing the economy. The Pan-Canadian Framework consists of four pillars: carbon pricing, mitigation, adaptation, and innovative technology.

The mitigation pillar of the Pan-Canadian Framework includes Build Smart – Canada's Building Strategy, which focuses on actions to reduce greenhouse gas emissions from new and existing buildings and houses. Among other commitments, the Build Smart strategy contains a commitment to launch the development of a "recommissioning framework" to optimize existing buildings starting in 2018.

This report provides an environmental scan of provincial, territorial and utility initiatives and requirements in the area of **existing building commissioning**. This research is provided to inform policy development and stakeholder engagement in the context of this recommissioning framework.

Definitions

Commissioning is an intensive quality assurance process that ensures that a building "operates as the owner initially intended and that building staff are prepared to operate and maintain its systems and equipment."¹ Beyond being a final systems check, commissioning has evolved into a progressive process that includes systematic verification and testing, staff training, and thorough documentation of all systems.

¹ Natural Resources Canada, *Building Operation Optimization: Recommissioning Guide for Building Owners and Managers* (2008).
https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/canmetenergy/pdf/fichier.php/codectec/En/2008-167/NRCan_RCx_Guide.pdf

Existing building commissioning is a broad term that encompasses commissioning options applied to existing buildings, including recommissioning, retrocommissioning and ongoing commissioning, as defined below:

- **Recommissioning** is a re-optimization process for existing buildings. It seeks to improve how building equipment and systems are operating to meet current occupant needs. This is done by investigating to identify problems and integration issues and identifying low-cost or no-cost operational improvements to obtain comfort and energy savings. This process can be undertaken alone or along with a retrofit project.
- **Retrocommissioning** is a related term for the same process, but it applies to an existing building that was not originally commissioned. However, further investigation is usually needed due to lack of previous recommissioning data.
- **Ongoing commissioning** is the continuous process that helps to monitor and ensure effective and efficient building performance over its lifecycle. Energy use, benchmarking, conformance to and continuous revision of the current facility requirements, automated fault detection and diagnostics, and training are all key parts of the ongoing commissioning process.²

Scope

We provide an overview of existing building commissioning initiatives offered (or retired) by each province, territory, or utility. This includes mostly incentive programs along with a few capacity building programs. In the absence of existing building commissioning programs we have noted that custom programs could be used for existing building commissioning; however, for the purpose of this analysis they are not considered an existing building commissioning initiative if this is not explicitly mentioned in the program description.

For utilities, the research focused on the major electric and natural gas/fuel utility in each province and territory (full list in Appendix A.) We also kept an eye out for programs managed by the smaller utilities, but have not reviewed all of these, assuming the major utilities were most likely to have programs of any significant size.

² Building Commissioning Association, *Existing Building Commissioning* (2019) 3. <https://www.bcx.org/wp-content/uploads/2019/09/EBCx-BEST-PRACTICES-Final.pdf>

We classify identified programs based on:

- **Type:** mandated/requirement³, incentive (cash or in-kind), training and capacity building, or pilot program.
- **Scope:** recommissioning, retrocommissioning, ongoing commissioning
- **Program host:** utility, province, or territory.
- **Status:** ongoing or ended.

This report was compiled based on information published on utility and government websites as well as information provided by program managers from across Canada. Based on the authors' review, and the opinion of interviewees,⁴ it includes a comprehensive list of commissioning programs for existing buildings at the provincial, territorial or utility level as of October 2019.

³ For example, regulations, requirements for sale/rental of building, conditions to access subsidies, public procurement requirements, etc.

⁴ Interviewees were: Graham Henderson, BC Hydro; Ben Burger, Clear Results; Cory Young, Manitoba Hydro; Scott Hicks, Enbridge; Sura Abdul-Razzak, IESO; Stephan Gagnon, Transition énergétique Québec; Scott Garinther, NB Power; Aaron Caldwell, Efficiency Nova Scotia; Terry White, Government of Saskatchewan; Nick Walker, Efficiency PEI; David Hatto, Government of the Northwest Territories; Andréane Lussier, Government of Nunavut; Kyle Robar, Government of Newfoundland; Matthew Ooms, Yukon Government.

British Columbia

BC Hydro & FortisBC: Continuous Optimization

Basic details

- Joint utility cash incentive for retrocommissioning, recommissioning, and ongoing commissioning, 2008 to present.⁵
- Provides a cash incentive for a building consultation to improve the building automation system of buildings over 50,000 ft². Energy savings focus on controls of HVAC, lighting, refrigeration and other energy-intensive systems.⁶

Source and magnitude of funding

Ratepayer based.⁷

BC Hydro: From 2009/10 to 2014/15 program funding rose from \$262,580 to \$4,432,827; from 2015/16 to 2018/19 funding fell to \$674,584.⁸

FortisBC: Funding began in 2013/14 at \$990,354 and decreased to \$199,349 in 2017/18 with a small increase to \$253,544 in 2018/19.⁹

Timeframe

Round 1: 2008 to 2016. Round 2: 2017 to present

Key activities

Round 1:

1. *Recommissioning the building*: Provided a consultant to recommend low / no-cost energy efficiency improvements (100% funding).

⁵ Program was initiated as a pilot in 2008, and was officially launched in its current form in 2009.

⁶ BC Hydro, “Continuous optimization.”

<https://www.bchydro.com/powersmart/business/programs/continuous-optimization.html>

⁷ Fiscal year ends March 31.

⁸ Graham Henderson, BC Hydro, personal communication, July 23, 2019.

⁹ Graham Henderson, BC Hydro, personal communication, July 23, 2019.

2. *Installing an energy management information system*: Provided web-based visualization of whole building utility meter interval data through an installed energy management tool (100%).

Round 2: Building owners apply to participate. The owner must select a consultant from a pre-approved list.¹⁰ Consultants are pre-approved by sending a resume showing experience with building operations and one example of a past energy study emphasizing recommissioning type activities.¹¹ Real-Time Energy Management (RTEM) software vendors are also pre-approved by a BC Hydro initiated a Technical Advisory Group comprised of consultants and customers. Round 2 has three funding streams outlined in the table below.

	Refreshing the building	Recommission the building	Real-time energy management
Scope	Review of round 1 measures conducted by consultant or Building Automation System Contractor	Building recommissioning by consultant, with comprehensive review of building systems	Exploring the new generation of software tools (e.g. fault detection). Installation of RTEM software and comprehensive recommissioning of building systems.
Funding	100% of recommissioning consultation costs up to 2.5 cents/ft ²	50% of recommissioning consultation costs up to 5 cents/ft ²	50% of RTEM costs up to 10.0 cents/ft ²
Deliverables	<ul style="list-style-type: none"> Current measures report Completion report (only if new measures are found and implemented) 	<ul style="list-style-type: none"> Findings workbook Investigation report Completion report 	<ul style="list-style-type: none"> Findings workbook Investigation report Completion report RTEM software deployment Monitoring based commissioning plan 12-month service report.¹²
Customer Requirement	Customer requirement: implement measures with a 2-year simple payback up to a maximum investment of 25¢/ft ² of building area.		

¹⁰ BC Hydro, *Continuous Optimization Approved Vendors*. (2019)
<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/business/programs/COP-Approved-Service-Providers.pdf>

¹¹ Graham Henderson, BC Hydro, personal communication, August 30, 2019.

¹² BC Hydro, *Continuous Optimization* (2019).
<https://www.bchydro.com/powersmart/business/programs/continuous-optimization.html>

Key results

BC Hydro

- Round 1: 550 buildings were approved for participation. Only a few participants owned or were even aware of the existence of Energy Management Information Systems (EMIS) prior to participation in the Continuous Optimization Program. The three EMIS vendors participating in the program reported that the market grew significantly in B.C. from the beginning of the program up to 2012 after which it plateaued, and they attributed this growth to the Continuous Optimization Program.
- Qualitative research showed low free ridership and positive attitude towards the program. An estimated 35% of eligible buildings have participated in the program.¹³
- Round 2: Out of the 550 approved for participation, 483 projects have been implemented with each customer benefiting from an annual average saving of 6.58 GWh (includes energy saving measure from both Round 1 and 2).¹⁴ Results up to June 2018 show a 7.4% average annual utility cost reduction (for natural gas and electricity), with a 1.6 year average simple payback.¹⁵

Program insights between 2010/11 and 2012/13:

- Four customer segments accounted for over 80% of participating buildings and 77% of expected savings: universities/colleges, offices, schools, and hospitals.¹⁶
- Reduction in excessive equipment operation accounted for 38% of measures implemented; building systems controls optimization made up 18% and equipment load reduction or efficiency increase 15%. Most energy conservation measures focused on ventilation (67%) and lighting (11%).¹⁷
- The evaluated net electricity savings from the program was 36.5 GWh/year in 2012/13 (counting the cumulative effect of measures taken in previous years); this amounts to an average annual electricity reduction for participants of 5%.¹⁸

¹³ BC Hydro, *Demand Side Management Milestone Evaluation Summary Report F2017* (2017), 9. <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/revenue-requirements/2018-01-15-bch-d66-f2017.pdf>

¹⁴ Graham Henderson, BC Hydro, personal communication, July 23, 2019.

¹⁵ BC Hydro, *Program Results* (2019). <https://www.bchydro.com/powersmart/business/programs/continuous-optimization/program-results.html>

¹⁶ *Demand Side Management Milestone Evaluation Summary Report*, 11.

¹⁷ *Ibid.*, 12.

¹⁸ *Ibid.*, 13

FortisBC

- Average incremental cost measure observed for natural gas projects in 2018 was \$41,738, with average incentives at \$9,208.
- The average implemented natural gas savings in 2018 was 777 GJ.¹⁹

Key partners

The Continuous Optimization Program is implemented through a BC Hydro and FortisBC partnership beginning in 2012. BC Hydro acts as the primary administrator of program activities, while FortisBC provides financial and process support for gas customer participants.

Other Programs

In fall 2019, FortisBC launched an existing building commissioning pilot with 12 participating buildings. The program is like the Continuous Optimization Program; however, they have reduced the administrative requirements for participants. The pilot was initiated because the Continuous Optimization Program is not currently accepting new participants.²⁰

¹⁹ Fortis BC Inc., *Natural Gas Demand-Side Management (DSM) – 2018 Annual Report* (2019), 35.
https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/190329-fei-2018-dsm-annual-report-ff.pdf?sfvrsn=98547415_28

²⁰ James Allen, FortisBC, personal communication, Nov 22, 2019.

Alberta

Energy Efficiency Alberta: Custom Energy Solutions, retro- and recommissioning investigations

Basic details

- Government retrocommissioning and recommissioning cash incentive for industrial, institutional, and commercial customers. The incentive is part of a larger program focused on reducing GHG emissions.
- The program is focused on optimizing operations and maintenance of equipment, building shell and occupant behaviour.²¹
- Implemented in 2018 and set to run for three years but was terminated early (October 2019) due to a change in the provincial government.

Source and magnitude of funding

\$88 million dollars over three years was provided by the Alberta government and the federal Low Carbon Economy Leadership Fund to the whole Custom Energy Solutions program to cover a range of energy upgrades, including existing building commissioning investigations. The funding is not earmarked for specific interventions and is distributed on a first-come, first-served basis.²²

Timeframe

Program launched May 1, 2018. CLEAResult was originally contracted with EEA until March 31, 2021. However, the Custom Energy Solutions program was cancelled in October 2019, by the newly elected United Conservative Party government as they repealed the carbon tax and eliminated the funding source for the incentives. The program will continue allocating funding to pre-approved projects, but will eliminate

²¹ Energy Efficiency Alberta, *Custom Energy Solutions Scoping Audits, Engineering Studies, and Retro and Re-Commissioning (RCx) Investigations* (2019). <https://www.encyalberta.ca/app/uploads/CES-Scoping-Audit-Engineering-Study-And-RCx-Investigation-Guidelines-FINAL.pdf>

²² Government of Alberta, “Custom program boosts energy efficiency.” <https://www.alberta.ca/release.cfm?xID=55921EE6FEAFA-E86E-59F5-3E83A19BF848A445>

the requirement for monitoring and evaluation, with the intention of having all projects complete by Spring 2020.²³

Key activities

The recommissioning incentive was added to the Climate Leadership Plan portfolio in 2018, to enable commercial customers to cover 100% of the non-measure-related recommissioning cost up to \$60,000 for facilities emitting over 10,000 tCO₂e/year and up to \$30,000 for lesser emitters.^{24,25} Funding is paid upon a completed investigation (25%); pre-approval for custom greenhouse gas reduction project that meets minimum standard (50%) and verification of installing approved measures (25%). Capital incentives are also available towards equipment or control upgrades as identified and quantified during the investigation (recommission study report) phase.

The program is marketed through the website, which provided information about building recommissioning, and account managers who work directly with customers to promote the program to eligible building owners.²⁶

Key results

There are no participants who have received funding for recommissioning through the program. The lack of uptake is attributed to the wide scope and complexity of the program, low demand for existing building commissioning services, and the relatively few commissioning service providers.²⁷

Key partners

CLEAResult was contracted by EEA to develop the program structure and assist in administration.

²³ Ben Burger, Clear Results, personal communication, November 4, 2019.

²⁴ *Custom Energy Solutions*, 15.

²⁵ Energy Efficiency Alberta, *2017-2018 Annual Report* (2018), 22.

https://efficiencyalberta.ca/itsbeenabigyear/pdf/EEA_2017_Annual_Report.pdf

²⁶ Ben Burger, Clear Results, personal communication, September 9, 2019.

²⁷ Ibid.

Saskatchewan

SaskPower does not have any programs explicitly for existing building commissioning, but provides programs that support components of commissioning; for example, the Energy Performance Contracting Program (2000–2015), the Industrial Energy Optimization Program (for large industrial customers), and the Walk-through Assessment Program (for medium-sized commercial customers).²⁸

No other current or past commissioning programs for existing buildings were identified by the provincial government or utilities.²⁹

²⁸ Curtis Dorosh, Ministry of Central Services, Government of Saskatchewan, personal communication, August 21, 2019.

²⁹ Terry White, Government of Saskatchewan, personal communication, August 27, 2019.

Manitoba

Manitoba Hydro: Enhanced Building Operations program

Basic details

- Utility cash incentive for retrocommissioning / recommissioning and ongoing commissioning, 2006 to present
- Formerly called Commercial Building Optimization Program, the current program is implemented by Manitoba Hydro and soon to be transitioned to Efficiency Manitoba.³⁰
- The program is focused on optimizing large (> 50,000 sqft) commercial and institutional (including municipal, university, schools, and hospitals) buildings operations by providing incentives to cover 50% of professional building consultant fee and implementations of energy conservation measures (ECMs) identified in the process.^{31,32}

Source and magnitude of funding

Ratepayer based. The total program investment (utility and customer) between 2006/07 and 2019/20 is \$3.5 million, for an annual average of approximately \$0.3 million per year. 97% of these costs were born by the utility.³³

Timeframe

Started in 2006 and ongoing.

³⁰ Manitoba Hydro, *Demand Side Management Plan 2019/20* (2019), 28.

³¹ Manitoba Hydro, *Enhanced Building Operations Program*. <https://www.hydro.mb.ca/contractors/pdfs/ebop-program-summary.pdf>

³² Cory Young, Manitoba Hydro, personal communication, September 4, 2019.

³³ *Demand Side Management Plan 2019/20*, 28. The authors note that the very small contribution from customer is surprising given that the program notionally should cover 50% of existing building commissioning professional fees, and possibly some non-capital intensive ECMs. We were not able to reconcile these two facts.

Key activities

- *Preliminary planning*: Owner selects a project team, hires a participating professional building consultant and allocates program budget. Incentives cover up to 50% of the fees. Incentives for each phase are withheld until all deliverables are completed.
- *Opportunities investigation*: Consultant revises facility requirements and generates an opportunity report.
- *Measures investigation*: Consultant collects data for measures report, which is reviewed by Manitoba Hydro to finalize energy conservation efforts.
- *Implementation and validation*: Building owner implements energy conservation measures and the consultant reports the efficiency to Manitoba Hydro.
- *Ongoing efficiency*: Consultant resolves any remaining issues and the building owner provides efficiency reports on agreed-upon intervals for 36 months. The building owner and operators receive training from the building consultant and continue to implement measures to improve building performance and energy efficiency.³⁴

Key results

- 21 buildings have participated in recommissioning since the start of the program; projected annual savings by the end of 2019/20 for all participants are expected to be 4.2 GWh and 0.6 MW of electricity and 0.9 million cubic metres of natural gas.³⁵
- Participating buildings have seen an average annual utility cost reduction of \$11,739 for electricity and \$7,590 in natural gas. Implementation costs are usually covered within two years.³⁶
- The potential market is estimated at 500 buildings; the program to date has achieved a 4% penetration rate. Lack of awareness of recommissioning cost-effectiveness and lack of trained professionals are noted in the DSM report as key market barriers, although there have been prior initiatives led by Manitoba Hydro to support training of professionals in commissioning and recommissioning (see details below).³⁷

³⁴ *Enhanced Building Operations Program.*

³⁵ *Demand Side Management Plan 2019/20*, 28.

³⁶ *Enhanced Building Operations Program.*

³⁷ *Demand Side Management Plan 2019/20*, 28.

Other relevant information

The program is currently marketed through traditional channels (ads, online and newsletters), industry marketing efforts (conferences, trade-shows, meetings, and trade associations), account reps (for owners of large buildings), and one-on-one engagement with commissioning providers. Efficiency Manitoba will be rebranding and relaunching the program and are also expected to have more capacity for marketing and outreach.³⁸

Other Programs

Training for the Enhanced Building Operation Program

Manitoba Hydro provides training for building consultants to deliver the Enhanced Building Operation Program that includes some technical content for existing building commissioning. The training is provided when significant changes have been made to the program or when there is sufficient demand.³⁹

Building Commissioning Accreditation

In June 2009, Manitoba Hydro, in partnership with NRCan, provided the first part of the Qualified Commissioning Process Provider Certificate, a two-part accreditation program for building commissioning from the University of Wisconsin,⁴⁰ to approximately 30 participants. The second part of the accreditation was an examination at the University of Wisconsin and was not subsidized by Manitoba Hydro or NRCan.⁴¹

³⁸ Cory Young, Manitoba Hydro, personal communication, June 24, 2019.

³⁹ Cory Young, Manitoba Hydro, personal communication, September 4, 2019.

⁴⁰ University of Wisconsin-Madison, *Qualified Commissioning Process Provider Certificate* (2019) <https://epd.wisc.edu/certificate/commissioning-certificate-2/>

⁴¹ Cory Young, Manitoba Hydro, personal communication, September 4, 2019.

Ontario

Enbridge Gas Inc.: Run it Right and RunSmart programs

Basic details

- Utility cash and in-kind incentive for operational improvements, 2012 to present.⁴²
- As of January 1, 2019, Union Gas and Enbridge Gas merged into Enbridge Gas Inc. The merger is ongoing and efficiency programs are provided to customers based on the utilities' pre-merger service areas.⁴³
- Enbridge's existing building commissioning program (Run it Right) is primarily targeted at smaller industry and commercial customers, whereas Union's (RunSmart) focuses solely on commercial projects. Both programs are run jointly through Enbridge Gas Inc. and optimize buildings to operate efficiently by identifying low-cost or no cost measures. The programs have identical eligibility criteria but serve different geographic areas: Enbridge serves Thunder Bay, Toronto, Ottawa and Sarnia area; Union serves all other Ontario areas. Their offers vary slightly.

Source and magnitude of funding

Both programs are ratepayer funded. Enbridge's program spend in 2016 was \$526,781 (out of a budget of \$1.7 million). Union's spend for its two 'performance-based' programs (Strategic Energy management and RunSmart) was \$532,776 in 2017; 22% of these costs were for incentives, the rest for promotion and administration.⁴⁴ We estimate program spend for RunSmart at \$250,000.⁴⁵

⁴² The incentive is in-kind because Enbridge provides a building investigation by an Enbridge expert free of charge.

⁴³ Union Gas, "Enbridge Gas Inc." <https://www.uniongas.com/about-us/company-overview/we-are-enbridge-gas-inc>

⁴⁴ Union Gas, *2017 Demand Side Management Draft Annual Report* (2018), 101.

⁴⁵ \$162,052 reported as program costs plus approximately half of the \$176,837 administration costs for both performance-based program. Union Gas, *2017 Demand Side Management Draft Annual Report* (2018), 2.

Timeframe

Enbridge Run it Right: 2012 to present. Union RunSmart: 2016 to present.⁴⁶

Key activities

Enbridge Run it Right ⁴⁷	Union RunSmart ⁴⁸
<ul style="list-style-type: none"> • In-kind building investigations by an Enbridge building expert or accredited third party, which includes an investigation report outlining energy consumption activities and operational improvements (maximum incentive of \$1000). • Implementation incentive up to \$10,000 towards upgrades identified by Enbridge expert. • Free access to energy management software through Enbridge for a 12-month monitoring term. This includes training and support (maximum incentive of \$1000). 	<ul style="list-style-type: none"> • A no-cost site walkthrough by a third-party expert to identify heating equipment and systems energy improvements. • Customers complete recommended RunSmart actions and monitor and maintain these actions over a 12-month time period. • Incentives are available after a 12-month period based on the savings realization level. 5-10% = \$0.20 per annual m³ saved; 10-15% = \$0.25 per annual m³ saved, or greater than 15% = \$0.30 per annual m³ saved.

Key results

Enbridge

84 projects (meeting participation targets) were completed in 2016. In 2016, annual net gas savings of 387,468 m³ and a cumulative net savings of 1,937,342 m³ were achieved by 39 participants (the others being deemed ineligible for savings verification because they undertook capital projects or were statistically insignificant). Average utility cost reductions in 2016 were 6.1%.⁴⁹

Enbridge attributes the relatively high participation in the Run it Right program to its simplicity. The program is fairly high-level and in comparison to other existing building commissioning programs, it does not require building owners to implement low/no cost options (like B.C.'s program), and the incentive is not tied to realized energy savings as

⁴⁶ Ontario Energy Board, *2016-2018 Natural Gas Demand Side Management Evaluation, Measurement, and Verification (EM&V) Plan* (2016), 24. https://www.oeb.ca/oeb/_Documents/EB-2014-0134/2016-18_DSM_EMV_Plan.pdf

⁴⁷ Enbridge, *2016 Demand Side Management Annual Report*, 116. <https://www.enbridgegas.com/-/media/Extranet-Pages/Regulatory-Filings/RateCases/Other-Regulatory-Proceedings/EB-2018-0301---2016-DSM-Clearance-of-Accounts-Application/Application-and-evidence/B-2-1.ashx>

⁴⁸ Union Gas, *2017 Demand Side Management Draft Annual Report*, 102.

⁴⁹ Enbridge, *2016 Demand Side Management Annual Report*, 118.

it is for RunSmart. The trade-off of this approach is that buildings tend to have lower rates of energy savings compared to other programs.^{50,51} Key barriers identified in the DSM report were: time intensity of the process (for program administrators and participants), lack of follow-through on recommendations by building operators, and the fact that many potential participants were ineligible because they had plans to undertake capital projects during the program.⁵²

Union

35 projects (below participation targets) were completed in 2017, with an annual net gas savings of 72,252 m³ and a cumulative net savings of 376,261 m³. In 2017, average utility cost reductions were estimated at 1.61%.⁵³

To promote the program, Enbridge uses traditional marketing (e.g. advertisements, online and newsletters) and one-on-one sales engagement, and leverages contractor networks.⁵⁴

Key partners

None

Other information

Delivery of the Run it Right offer was modified in 2017 to provide customers with the flexibility to work with third-party contractors (efficiency partners) for all steps of the offer. There does not seem to be any qualification requirements to be an 'efficiency

⁵⁰ Synapse, *Ontario Gas Demand Side Management 2016-2020 Plan Review* (2015) 86. https://www.synapse-energy.com/sites/default/files/Ontario_Gas_DSM_Plan_Review_15-065.pdf

⁵¹ Scott Hicks, Enbridge Gas Distribution Inc, personal communication, September 10, 2019.

⁵² Enbridge, *2016 Demand Side Management Annual Report*, 118: "Enbridge identified that despite many customers who showed initial interest and had an investigation completed, some of these customers were unable or unwilling to follow through and complete implementation. As an example, in 2015, there were 49 customers who agreed to participate in investigations, but did not proceed with the implementation of measures. In 2016, Enbridge continued to work to mitigate this challenge by increasing participant engagement through training for building owners/operators, follow up visits from investigation agents, and increased support from Enbridge Energy Solutions Consultants (ESCs). Improved outreach has had a positive impact on ensuring customers follow through with implementation of measures. (...) Participation in the program requires customers do not undertake capital projects. This expectation remains a large barrier to offer participation and calculating savings. Enbridge continues to explore how to appropriately apply a methodology to capture concurrent operational and capital savings."

⁵³ Union Gas, *2017 Demand Side Management Draft Annual Report*, 2, 20.

⁵⁴ Scott Hicks, Enbridge Gas Distribution Inc, personal communication, September 10, 2019.

partner’; only the willingness to refer clients to the program (and thus access a \$250 Sales Program Incentive Fund (SPIFF)).⁵⁵ Previously, participation was limited to requiring use of an Enbridge-contracted investigation agent to complete the investigation.⁵⁶

IESO: The Existing Building Commissioning Program

Basic Details

- Utility cash incentive funded by the IESO from 2015 to 2019.
- The Existing Building Commissioning Program provided funding for retrocommissioning and recommissioning activities to reduce electricity consumption associated with chilled water systems in existing industrial, commercial, institutional and multifamily residential buildings.

Source and Magnitude of Funding

- Between 2015/16 and 2017/18 the program delivery costs were \$2 million and the incentive costs were \$0.7 million, with total program costs of \$2.7 million. Data for 2018/19 is not currently available.⁵⁷

Timeframe

The Existing Building Commissioning Program ran from 2015/16 to 2018/19. The program was one of 13 energy conservation programs terminated by the newly elected provincial government through a ministerial directive issued in March 2019.⁵⁸

⁵⁵ Enbridge, Runit Right Program for Business Partners (2019). <https://enbridgesmartsavings.com/business-energy-management/programs-and-campaigns/runitright-program-business-partners>

⁵⁶ Enbridge, *2016 Demand Side Management Annual Report*, 121.

⁵⁷ IESO, *Energy Efficiency Programs Progress Report* (2019), 4. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation-reports/Quarterly/Q1-2019-Conservation-Progress-Report.pdf>

⁵⁸ IESO, *Conservation First Framework Program Wind Down Guideline* (2019) 3. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/LDC-toolkit/CFF-Program-Wind-Down-Guideline-vf-20190321.pdf?la=en>

Key Activities

Four phases of work were required for participation in the program:

1. *Scoping Study Phase*: A qualified commissioning agent – or industry expert – is hired to create a Scoping Study Commissioning Report. This report provides a snapshot of the chilled water system and its performance (maximum contribution of \$2,500).⁵⁹
2. *Investigation Phase*: A data acquisition system is installed enhanced with metering points to log data from the chilled water system. The commissioning agent analyzes the results and produces an Investigation Phase Commissioning Report, including recommended energy efficiency measures, peak demand of the chilled water system, and project measurement and verification plan (maximum contribution of \$30,000).⁶⁰
3. *Implementation Phase*: The participant commits to implement all measures with a payback period of less than two years. Measures with a payback period of greater than two years may be eligible for further incentives on implementation. The commissioning agent uses the results for Implementation Phase Commissioning Report (maximum contribution of \$5,000).
4. *Hand-Off/Completion Phase*: A Hand-Off/Completion Phase Commissioning Report is produced by the commissioning agent. It describes the training and documentation provided to the chilled water system operators as well as an analysis of the yearly energy consumption and savings (maximum contribution of \$2,500).⁶¹

Key Results

- 93 buildings participated in this program from 2015 to 2019 with a total of 2 GWH of lifetime energy savings. In 2017, there were 15 projects in various stages of completion.⁶²

⁵⁹ Ontario Power Authority, *SaveONenergy Existing Building Commissioning* (2014) 1. <https://saveonenergy.ca/-/media/Files/IESO/Document-Library/conservation/program-rules/Rules-SOE-Existing-Building-Commissioning-10312014.pdf?la=en>

⁶⁰ Ibid., 2.

⁶¹ *SaveONenergy Existing Building Commissioning*, 8.

⁶² IESO, *Energy Efficiency Programs Progress Report* (2019) 3, 4, 248. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation-reports/Quarterly/Q1-2019-Conservation-Progress-Report.pdf>

- A qualitative survey found some free-ridership. In 2015 there was 6% free ridership with 9 participants, in 2016 there was 0% free ridership with 2 participants, and in 2017 free ridership increased to 45.1% with 3 participants.^{63,64,65}
- Barriers to greater customer participation were identified by a survey as lack of customer understanding (17% of respondents), complexity of the program (13%), and inadequately trained contractors (9%). The percentage of respondents that mentioned cost of upgrades as a barrier decreased between 2016 and 2017 (from 9% to 0%).⁶⁶
- The existing building commissioning program did not pass total resource cost (TRC) and program administrator test (PAC) tests in 2015 and 2017 (TRC of 0.23 and 0.63 and PAC of 0.2 and 0.46 respectively), although the program did pass these tests in 2016 (TRC 1.6 and PAC 1.4; both > 1).⁶⁷

Key Partners

Local distribution companies were responsible for administering the program.

Other Programs

Energy Performance Program and Retrofit Program Custom Track

The IESO's Energy Performance Program and Retrofit Program Custom Track provides flexible funding that could be used to support existing building commissioning if

⁶³ NMR Group Inc. and Nexant, *Evaluation of 2017 Business Programs* (2018), 252. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/EMV/2017/2017-Business-Programs-Evaluation-Report.pdf?la=en>

⁶⁴ NMR Group Inc. and Nexant, *Evaluation of 2016 Business Programs* (2017), 63. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/EMV/2016/2016-Business-Programs-Evaluation-Report.pdf?la=en>

⁶⁵ NMR Group Inc. and Nexant, *Evaluation of 2015 Business Programs* (2016), 112. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/EMV/2015/2015-Business-Program-Evaluation-Report.pdf?la=en>

⁶⁶ *Ibid.*, 256.

⁶⁷ *Ibid.*, 251: "There are several reasons the cost effectiveness declined in 2017. These include 1) an increase in the amount of incentives paid out relative to the amount of savings, 2) and decrease in the average energy savings per project, 3) an increase in the average incremental costs per project and 4) a backlog of projects that received incentives but have not yet been completed. The average per-project incentive increased 350% between 2016 and 2017. This increase is primarily due to one very large 2017 project with higher than usual incentives. The average energy savings per project decreased from 672,517 kWh in 2016 to 267,847 kWh in 2017. The average incremental cost of project increased from \$6,071 in 2016 to \$7,398 in 2017."

participants chose to apply for this particular energy efficiency solution and met eligibility requirements.^{68,69}

⁶⁸ Save on Energy, “Energy Performance Program” (2019). <https://saveonenergy.ca/For-Business-and-Industry/Programs-and-incentives/Energy-Performance-Program>

⁶⁹ Save on Energy, “Retrofit Program” (2019). <https://saveonenergy.ca/For-Business-and-Industry/Programs-and-incentives/Retrofit-Program>

Québec

Transition Énergétique Québec: Écoperformance – volet ‘Remise au point des systèmes mécaniques des bâtiments’

Basic details

- Government cash incentive for existing building commissioning, including retrocommissioning, recommissioning and ongoing commissioning, 2016 to present
- The incentive program covers up to 75% of the cost of commissioning for existing buildings (up to \$100,000). This includes internal cost (staff time), external consultants, and ongoing commissioning for a period of at least 2 and up to 10 years.^{70,71}

Source and magnitude of funding

Provincial funding, budget estimated each year based on last year’s performance. 2018 budget was approximately \$500,000. The budget in 2019 is expected to increase to up to \$1 million, given expanded program offering.

Timeframe

The program began in 2016, then was expanded and simplified in 2019. The incentive was increased from 50% to 75% of cost, and proponents can no longer apply to both Énergir (see below) and TEQ programs but must choose between them.⁷²

⁷⁰ Transition Énergétique Québec, “Financial assistance EcoPerformance Crux.”

<https://transitionenergetique.gouv.qc.ca/en/affaires/programmes/remise-au-point-des-systemes-mecaniques-des-batiments/aide-financiere-ecoperformance-rcx>

⁷¹ Transition Énergétique Québec, *Programme ÉcoPerformance Cadre normative* (2019).

<https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/ecoperformance/Cadre-normatif-EcoPerformance-2019-06-05.pdf>

⁷² Transition Énergétique Québec, “Programme ÉcoPerformance – Une offre de service améliorée pour les projets de remise au point des systèmes mécaniques de bâtiment,” June 7, 2019.

<https://transitionenergetique.gouv.qc.ca/en/nouvelles/actualites/detail/programme-ecoperformance-une-offre-de-service-amelioree-pour-les-projets-de-rcx>

Key activities

- Consultant-driven investigation and report followed by an implementation phase and 2 to 10 years of ongoing monitoring of measures implemented. The program does not include the cost of implementing suggested conservation measures, though this is eligible under other ecoperformance funding streams.

Key results

- To date no analysis has been done to measure the GHG and energy impacts of the program.⁷³

Key Partners

None

Other relevant information

- Commissioning agent must be from a TEQ accredited pre-qualified list.⁷⁴ Accreditation requirements include being a registered engineer with five years' experience or registered technologist with seven years' experience and having successfully completed the Canadian Institute for Energy Training's (CIET) four-day Advanced Course on Building Recommissioning or the Certified Building Commissioning Professional.^{75,76}
- Program covers all fuels (electric-heated buildings are eligible, unlike other greenhouse gas-focused conservation programs by TEQ).

⁷³ Guy Desbians, Transition Énergétique Québec, personal communication, August 12, 2019.

⁷⁴ Transition Énergétique Québec, "Remise au point des systèmes mécaniques des bâtiments : Agents accrédités." <https://transitionenergetique.gouv.qc.ca/en/affaires/programmes/remise-au-point-des-systemes-mecaniques-des-batiments/agents-accredites>

⁷⁵ CIET, *Advanced Course on Building Recommissioning* (2019). <https://cietcanada.com/training-calendar/?program=24>

⁷⁶ CIET, *Certified Building Commissioning Professional* (2019). <https://cietcanada.com/training-calendar/?program=13>

Énergir: Diagnostics et mise en œuvre efficaces, volet remise au point des systèmes mécaniques des bâtiments

Basic details

- Utility cash incentive for recommissioning, 2010 to present
- Grant covering approximately 10% of cost of retrocommissioning and recommissioning existing mechanical systems in commercial and institutional buildings that consume at least 75,000 m³ of natural gas a year.⁷⁷
- Program originally designed in collaboration with Hydro-Québec and the former Quebec government's Bureau de l'efficacité et de l'innovation énergétiques.⁷⁸

Source and magnitude of funding

Rate-payer based. Actual program costs were \$437,938 in 2016/17, 65% of which was for incentives. Program costs were projected to be \$915,700 for 2017/18, though only one-tenth of the budget was spent after the first quarter (comparable to 2016/17 actuals). Projected program costs are projected to stay above \$900,000 per year through to 2022/23.⁷⁹

Timeframe

2010 to present.

Key activities

- *Investigation*: accredited professional investigates and provides a report outlining recommended recommissioning measures. Grant provides a fixed amount to cover investigation, up to a maximum of 50% of total cost (\$10,000 to \$25,000 depending on the volume of gas purchased annually).⁸⁰

⁷⁷ Énergir, *Energy Efficiency Program – Energy Analysis and Implementation* (2014), 7. https://www.energir.com/~media/Files/Affaires/EE_Programmes/Remise_au_point/GuideParticipant_remiseaupoint_EN.pdf?la=en

⁷⁸ Philippe Rivard, Énergir, personal communication, July 16, 2019.

⁷⁹ Énergir, *Plan Global en Efficacité Énergétique Horizon 2019-2023* (2018), 27. http://publicsde.regie-energie.qc.ca/projets/424/DocPrj/R-4018-2017-B-0153-DemAmend-Piece-2018_05_25.pdf

⁸⁰ *Energy Efficiency Program –Energy Analysis and Implementation*, 8.

- *Implementation and hand-off*: from the date Énergir provides financial assistance, the applicant has two years to complete recommended measures and produce a report outlining changes in energy demand. Grant covers \$0.25/m³ of gas saved in the first year, up to \$25,000 or 50% of total cost.
- *Project completion*: the accredited professional must submit follow-up reports for the next two years monitoring the persistence of such recommissioning measures. Grant covers 100% of monitoring costs, up to \$4,000.

Key results

In the four years of the evaluation study (2013/14-2016/17), 20 projects were completed and 162 measures taken. This was only 17% of expected participation rate; shortfall is loosely attributed to administrative complications, such as the withdrawal of Hydro-Québec in 2013 and a temporary suspension of the program in 2014/15.⁸¹

Average cost of intervention was \$117,696 (\$2.7 per GJ, considering the total consumption before audit). Grants cover on average 11% of investigation costs, 10% of implementation costs, and 3% of monitoring costs.⁸² Free-ridership is estimated at 16%.⁸³

Based on monitoring of the sites, the effective savings resulting from the program were 96,098 m³ of gas per year per site (22.5% of total), and 535,262 kWh of electricity per year per site (7.1% of total), for an overall annual average energy savings of 12.8%. This was within 10% of the savings estimates forecasted by the recommissioning agents.⁸⁴ 48% of gas savings came from ventilation controls, and 21% from heat recovery.⁸⁵

Total resource cost (TRC) for these four years was evaluated at approximately \$5 million, with a TRC ratio of 2.53.⁸⁶

Key partners

The initial version was designed in collaboration with Hydro-Québec and the former Quebec government's Bureau de l'efficacité et de l'innovation énergétiques (BEIE), as

⁸¹ *Évaluation du Volet PE226*, i.

⁸² *Ibid.*, iii.

⁸³ *Ibid.*, 28.

⁸⁴ *Ibid.*, 26.

⁸⁵ *Ibid.*, 21.

⁸⁶ Énergir, *Évaluation du Volet PE226 — Remise Au Point Des Systèmes Mécaniques des Bâtiments (Projet Pilote)* (2018), prepared by Econoler, v. http://www.regie-energie.qc.ca/audiences/Suivis/Suivi_PGEE_Energir/Energir_EvaluationPE226_14janv2019.pdf

well as with recommissioning professionals. The program has been re-designed twice since.⁸⁷

Other relevant information

Professionals are accredited by Énergir for participation in their overall ‘Diagnostic et mise en oeuvre’ program. Interested companies submit a form outlining their qualification, and the information is reviewed and scored by Énergir.⁸⁸ Note that this accreditation is not specific to the delivery of recommissioning services, but includes energy conservation services more broadly.

⁸⁷ Philippe Rivard, Énergir, personal communication, July 16, 2019.

⁸⁸ Énergir, *Document de mise en candidature : Entreprises spécialisées en gestion de l’énergie*.
https://partenaires.energir.com/fr/SectionTravail/pdf/formulaire_accréditation.pdf

New Brunswick

NB Power: Building optimization pilot

Basic details

- Utility pilot program offering in-kind incentive for retrocommissioning and recommissioning, 2018 to 2019
- This pilot project offered commercial and industrial customers in-kind engineering support, software, and real-time energy monitoring hardware (where required). Pilot participants needed to consume more than 200,000 kWh/year and set an objective to reduce consumption by at least 10%. NB Power experts assessed and interpreted the participants' energy data, then consulted with pilot participants to help identify consumption, demand and peak saving opportunities.⁸⁹

Source and magnitude of funding

Ratepayer based. \$150,000 provided for implementing the pilot.⁹⁰

Timeframe

October 2018 – September 2019

Key activities

Pilot ran in five steps:⁹¹

- *Confirm participants*: Energy smart participants with or without energy management systems who are keen to implement the software and energy improvements suggested by energy managers.
- *Install real-time energy management software*
- *Collect and analyze data*: Identify points of recommissioning and further opportunities for energy savings associated with building operation systems.
- *Implementation*: Follow through with recommended actions.

⁸⁹ NB Power, "NB Power Energy Management and Building Optimization Pilot." 2018.

⁹⁰ Scott Garinther, NB Power, personal communication, June 21, 2019.

⁹¹ Ibid.

- *Measurement:* Verification after a three-month period to ensure optimization stays consistent.

Key results

Pilot was met with varying levels of success. In the coming months, NB Power will be completing a final report with specific details on metrics of success.⁹² NB Power will also be assessing options to develop the pilot into a full program and have noted they are considering expanding the offering to include real time energy monitoring (as BC Hydro has done).

Key partners

SimpTek Technologies Inc. visited participants and gathered site-specific information to design an energy management system suited to participant's building systems. In addition, they supervised and managed the deployment of energy monitoring software and hardware plus the commissioning and calibration of the energy systems.⁹³

Other Programs

Energy Management Information Systems

NB Power's Energy Management Information Systems (EMIS) program is a utility cash incentive for ongoing commissioning (October 2017 to present). The program is offered to industrial customers with demand greater than 2 MW each month. NB Power technical energy advisors provide guidance to optimize energy management information systems and incentives for studies and implementation.⁹⁴ The program covers 50% of the ongoing commissioning costs up to a maximum of \$155,000. Currently the EMIS program is not applicable to commercial building; however, NB Power is planning to pilot EMIS on two commercial buildings beginning in 2019/20.

EMIS Training

NB Power offers training on conducting energy management information systems (EMIS) audits. Specifically, the training covers how to build the business case in line with the EMIS audit manual published by NRCAN. This course is designed for consulting

⁹² Scott Garinther, NB Power, personal communication, June 21, 2019.

⁹³ NB Power, "NB Power Energy Management and Building Optimization Pilot." 2018.

⁹⁴ Énergie NB Power, "New Brunswick Energy Efficiency Programs: Large Industry." <https://www.saveenergy.nb.ca/en/save-energy/industrial/large-industry/>

engineers and energy management service providers in addition to facilities/production managers looking to expand their awareness and services to include audits around EMIS. Course participants will be given consideration to be included in a future directory of NB Power trade allies, which will be published on the NB Power website.⁹⁵

Commercial Buildings Retrofit Program

NB Power also manages a Commercial Buildings Retrofit Program that is designed to help owners and operators of commercial buildings reduce energy consumption. The program provides financial incentives of up to \$3,300 towards an energy audit of a participant's building, and up to \$75,000 towards an efficiency retrofitting project. As part of this program, eligible measures include, but are not limited to, the implementation of energy management controls systems that are leveraged for continuous building commissioning. In the Commercial Buildings Retrofit Program, for the current fiscal year, 29 out of 186 active projects touch on energy management systems in some form as a recommended measure for continuous optimization.⁹⁶

⁹⁵ Énergie NB Power, Energy Management Information Systems / Systèmes d'information de gestion de l'énergie (2019). <https://www.eventbrite.ca/e/energy-management-information-systems-emis-systemes-dinformation-de-gestion-de-lenergie-sige-tickets-57031485709>

⁹⁶ Scott Garinther, NB Power, personal communication, September 11, 2019.

Newfoundland and Labrador

Newfoundland and Labrador have a \$20 million Climate Change Challenge Fund program that provides flexible incentives to projects that result in measurable GHG reductions.⁹⁷ In some cases existing building commissioning may be eligible for incentives through this fund.

No other commissioning programs for existing buildings were identified at the provincial government or utility level.⁹⁸

⁹⁷ Newfoundland and Labrador, Department of Municipal Affair and Environment and Climate Change Branch, *Climate Change Challenge Fund* (2019), 5.

https://www.exec.gov.nl.ca/exec/occ/pdf/CCCF_Program_Guidelines.pdf

⁹⁸ Kyle Robar, Government of Newfoundland, personal communication, September 9, 2019.

Nova Scotia

Efficiency Nova Scotia: Building Optimization

Basic details

- Utility cash incentive for retrocommissioning and recommissioning, 2016 to present
- The program provides a streamlined application process and incentives to support retrocommissioning and recommissioning of HVAC, refrigeration, lighting and air/water system balance through engineering studies. Must be an institutional, charitable, commercial or industrial facility served (directly or indirectly) by Nova Scotia Power to be eligible.⁹⁹

Source and magnitude of funding

Demand side management funding through Nova Scotia Power (approximately \$121 million total from 2016-18). There is no dedicated budget envelope for existing building commissioning; the Building Optimization program is allocated funds based on demand.¹⁰⁰

Timeframe

In 2016 the Existing Building Commissioning Program was changed to Building Optimization, and the program incentive structure changed. The program is ongoing.

Key results

- 21 projects completed since 2016.

⁹⁹ Efficiency Nova Scotia, *Building Optimization Program Guide* (2016), 3-5. <https://www efficiencyns.ca/wp-content/uploads/2016/09/Building-Optimization-Program-Guide.pdf>

¹⁰⁰ Nova Scotia Power, *Nova Scotia Utility and Review Board 2016-2018 DSM Plan* (2016), 48. <https://nspower.ca/docs/default-source/pdf-to-upload/ns-power-2016-2018-dsm-plan-evidence.pdf>

- Lack of customer awareness has been a key barrier to the program's success; however, uptake within the past five years has increased substantially. Efficiency Nova Scotia has been promoting the program through its website and direct discussions between the business development team and real estate owners. Some service providers also market the program directly to their clients.¹⁰¹
- There has not been an evaluation, measurement and verification study of the program given the small sample size. Participant evaluation studies could not be shared because of privacy issues.^{102,103}

Key activities

- *Investigation:* Identifies recommissioning opportunities in a building through a short-term study. The intention is to provide maximum value to customer through short, simple payback periods relative to study costs. Incentive covers 100% of project costs up to \$5,000.
- *Implementation:* Baseline energy use is measured, and customers pick from the recommissioning opportunities identified and submit an application for approval. Incentive covers 75% of project costs, depending on the electrical energy savings associated with the project (measured by the service provider).

Key partners

None

¹⁰¹ Aaron Caldwell, Efficiency Nova Scotia, personal communication, September 10, 2019.

¹⁰² Aaron Caldwell, Efficiency Nova Scotia, personal communication, July 5, 2019.

¹⁰³ Colin MacDonald, Efficiency Nova Scotia, personal communication, July 5, 2019.

Prince Edward Island

Efficiency PEI plans to launch a Custom Energy Solutions program in fall 2019 that will offer incentives for large retrofits in existing facilities. The program will provide funding for capital investments and energy managers; existing building commissioning projects may be eligible for this funding in the future.

No other current or past commissioning programs for existing buildings were identified at the provincial government or utility level.¹⁰⁴

¹⁰⁴ Nick Walker, EfficiencyPEI, personal communication, September 6, 2019.

Yukon

The Yukon Government offers incentives for a custom commercial energy retrofit program called The Good Energy Program.¹⁰⁵ Commercial-grade audit rebates are subject to customers implementing at least one recommendation by a certified professional, which may include some building tune-up components. There is no explicit funding for existing building commissioning. There is interest in creating a retro and recommissioning program for the Yukon, but the shortage of professionals able to conduct the work is a significant barrier.¹⁰⁶

No other current or past commissioning programs for existing buildings were identified at the provincial government or utility level.¹⁰⁷

¹⁰⁵ Yukon Energy, “Energy Upgrade Measures list.” <https://yukon.ca/sites/yukon.ca/files/emr/emr-good-energy-commercial-institutional-upgrades-measures-list.pdf>

¹⁰⁶ Matthew Ooms, Yukon Government, personal communication, July 15, 2019.

¹⁰⁷ Ibid.

Northwest Territories

The Arctic Energy Alliance offers incentives for retrofit upgrades and in-kind energy audits for community governments through their Efficiency Rebates for Community Governments Program.¹⁰⁸ This may include some building tune-up components but there are no explicit offerings for existing building commissioning. The program is funded in part by the Northwest Territories government and the federal Low Carbon Economy Leadership Fund. The combination of small, remote communities and consequent lack of locally-available commissioning practitioners offers a significant barrier to uptake in NWT.

No other current or past commissioning programs for existing buildings were identified at the provincial government or utility level.¹⁰⁹

¹⁰⁸ Arctic Energy Alliance, “Efficiency Rebates for Community Governments.”

<http://aea.nt.ca/programs/community-building-energy-retrofit-program>

¹⁰⁹ David Hatto, Government of the Northwest Territories, personal communication, August 21, 2019.

Nunavut

There is no official commissioning program or regulations for existing buildings within Nunavut. However, the local utility, Qulliq Energy Corporation, and the Government of Nunavut's Community Government Services Department have in-house commissioning plans.¹¹⁰

The Government of Nunavut's Energy Management Program¹¹¹ includes measures such as the implementation of building automation systems, building operator training and building system optimization for public sector buildings. Building commissioning is integrated into this process. This program was piloted in Iqaluit¹¹² and has been expanded to North and South Baffin and Kivalliq regions.¹¹³ This program is considered out of scope because it is only applicable to public buildings. No other current or past existing building commissioning programs were identified at the provincial government or utility level.¹¹⁴

¹¹⁰ Andréane Lussier, Government of Nunavut, personal communication, September 19, 2019.

¹¹¹ Government of Nunavut, "Nunavut Energy Management Program."

<http://www.energy.gov.nu.ca/en/home.aspx>

¹¹² Government of Nunavut, "Iqaluit Pilot Program." <http://www.energy.gov.nu.ca/en/iqpilotproject.aspx>

¹¹³ Government of Nunavut, *Ikummatiit: The Government of Nunavut Energy Strategy* (2007).

https://gov.nu.ca/sites/default/files/ikummatiit_energy_strategy_english.pdf

¹¹⁴ Andréane Lussier, Government of Nunavut, personal communication, September 19, 2019.

Appendix A - LEED existing building commissioning requirements

The Canada Green Building Council's Leadership in Energy and Environmental Design (LEED) certification program is another national driver for the uptake of commissioning for existing buildings. Below we discuss commissioning requirements for LEED's existing buildings and new construction programs, and the potential impact on market demand in each province and territory.

LEED Existing Buildings: Operations and Maintenance

LEED v4 — the most recent version of LEED — offers 7 optional credits (outlined below) for commissioning in LEED Existing Building: Operations & Maintenance (LEED EB: O&M). LEED EB: O&M V4 increased the credits for ongoing commissioning from the previous version LEED 2009.¹¹⁵

In 2018, 200 buildings had LEED EB: O&M certification, of which 98% received credit for existing building commissioning analysis and investigation, 86% received credit for implementation, and 46% received credit for ongoing commissioning.¹¹⁶

Energy and Atmosphere Credits	# of Credits		# of buildings with credit (in 2018)
	v4	v2009	
Existing Building Commissioning— Analysis & Investigation	2	2	196
Existing Building Commissioning—Implementation	2	2	172
Ongoing Commissioning	3	2	92

Buildings with LEED EB: O&M certification are concentrated in Ontario, Alberta, B.C. and Québec, with a few projects in Manitoba and Nova Scotia (see below). The

¹¹⁵ U.S. Green Building Council, *LEED Credit Library* (2019). <https://www.usgbc.org/credits/existing-buildings/v4>

¹¹⁶ Canada Green Building Council, *LEED Canada for EB:O&M Credit Distribution* (2018). https://www.cagbc.org/cagbcdocs/leed/LEED_Canada_EBOM2009_Scorecard_20180215-EN.pdf

remaining provinces and territories did not have buildings with certification as of 2019.¹¹⁷

Province	# of Buildings with LEED EB: O&M Certification 2010-2019*
British Columbia	69
Alberta	82
Manitoba	12
Nova Scotia	5
Ontario	290
Quebec	53

*Note: the table above uses different timeframes than the previous table, therefore the total number of buildings is slightly different.

LEED Building Design and Construction: New Construction

New projects seeking LEED certification must also meet some ongoing commissioning requirements. To meet the Energy and Atmosphere prerequisite ‘Fundamental Commissioning & Verification V4,’ all buildings are required to create a plan that includes “periodic commissioning requirements, ongoing commissioning tasks, and continuous tasks for critical facilities.”¹¹⁸ This addition in V4 could have a significant impact on the demand for recommissioning services given the popularity of the LEED certification process (and its requirement by several local and provincial governments for new public buildings).¹¹⁹ However, the certification does not require the implementation of the plan, nor does it monitor progress after the certification has been received;¹²⁰ for this reason, it is unclear how many LEED building owners will follow through with their ongoing commissioning plans.

¹¹⁷ Canada Green Building Council, “Project Database” (2019).

https://leed.ca/gbc.org/LEED/projectprofile_EN.aspx

¹¹⁸ U.S. Green Building Council, *LEED BD+C: New Construction V4 Fundamental commissioning and verification*. (2019) <https://www.usgbc.org/credits/new-construction-commercial-interiors-core-and-shell-schools-new-construction-retail-new-c-6>

¹¹⁹ Green Business Certification Inc., *LEED in Motion: Canada* (2017).

<https://cloud.kapostcontent.net/pub/817bd9c8-85de-4b8c-8376-53f84e991469/leed-in-motion-canada.pdf>

¹²⁰ U.S. Green Building Council. *LEED BD+C: New Construction v4 Enhanced commissioning* (2019).

<https://www.usgbc.org/credits/new-construction-core-and-shell-schools-new-construction-retail-new-construction-healthca-17>

Appendix B - Utilities surveyed

Electric utilities and Crown corporations		
Province / Territory	Name	Has / had EBCx program
British Columbia	BC Hydro	Yes, ongoing
Alberta	ENMAX	No program found
Saskatchewan	SaskPower	No program found
Manitoba	Manitoba Hydro	Yes, ongoing
Ontario	Hydro One	No program found
	IESO	Program discontinued in 2019
Quebec	Hydro-Québec	No program found
	Transition Énergétique Québec ^a	Yes, ongoing
New Brunswick	NB Power	Pilot program
Newfoundland and Labrador	Fortis Inc.	No program found
Nova Scotia	Efficiency Nova Scotia ^b	Yes, ongoing
Prince Edward Island	Maritime Electric	No program found
Yukon	Yukon Energy	No program found
Northwest Territories	Northwest Territories Power Corporation	No program found
Nunavut	Qulliq Energy Corporation	Ongoing program for public sector buildings only

a. Transition Énergétique Québec is a crown corporation set up by the Government of Quebec to deliver energy efficiency programs.

b. Efficiency Nova Scotia is an energy efficiency utility.

Gas utilities		
Province / Territory	Name	Has / had EBCx program
Ontario	Enbridge/Union Gas Inc.	Yes, ongoing
Quebec	Énergir	Yes, ongoing
British Columbia	Fortis BC Natural Gas	Yes, ongoing
Alberta	ATCO Gas	No program found
Manitoba	Manitoba Hydro	Yes, ongoing
Saskatchewan	SaskEnergy	No program found
Nova Scotia	Heritage Gas	No program found
New Brunswick	Enbridge Gas New Brunswick	No program found
Northwest Territories	Inuvik Gas	No program found

Appendix C – Summary of programs

The table below indicates the key features of each of the provincial and utility existing building commissioning initiative. Only programs that have an explicit commissioning focus are captured. We have not included any ‘custom programs’ which often include some recommissioning activities as part of a broader customized set of energy conservation measures.

P/T	Program	Type					Scope		Program Host		Status	
		Mandated Requirement ^a	Incentive Cash	Incentive In-kind	Training/capacity building	Pilot Program	Ongoing Commissioning	Re/Retrocommissioning	Utility	Province/Territory	Ongoing	Ended
BC	Fortis BC & BC Hydro Continuous Optimization Program		✓				✓	✓	✓		✓	
AB	Energy Efficiency Alberta: Custom Energy Solutions		✓					✓		✓		✓
MB	Manitoba Hydro: Enhanced Building Operations Program		✓		✓ ^b		✓	✓	✓		✓	
	Building Commissioning Accreditation				✓		✓	✓	✓			✓
ON	Enbridge Gas Inc. : Run it Right / Run Smart Program		✓	✓	✓ ^b			✓ ^c	✓		✓	
	IESO: Existing Building Commissioning		✓		✓ ^b			✓	✓			✓
QC	Énergir: Diagnostics et mise en œuvre efficaces, volet remise au point des systèmes mécaniques des bâtiments		✓					✓	✓		✓	

P/T	Program	Type					Scope		Program Host		Status	
		Mandated Requirement ^a	Incentive Cash	Incentive In-kind	Training/capacity building	Pilot Program	Ongoing Commissioning	Re/Retrocommissioning	Utility	Province/ Territory	Ongoing	Ended
	TEQ: Écopformance – volet ‘Remise au point des systèmes mécaniques des bâtiments’		✓				✓	✓		✓ ^d	✓	
NB	NB Power: Building Optimization Pilot			✓		✓		✓	✓			✓
NS	Efficiency Nova Scotia: Building Optimization		✓					✓	✓ ^e		✓	
NVT	Nunavut Energy Management Program					✓ ^f		✓		✓	✓	
SK, PEI, YK, NWT, NL,	No programs explicitly for existing building commissioning. Some of the provinces have flexible incentives (e.g. custom programs) for energy efficiency that may be applied to existing building commissioning. Programs that are not explicitly targeted at existing building commissioning are not included in the scope of this analysis.											

a. Mandated requirements refer to a regulatory or legislated requirement for existing buildings to undergo commissioning, or a programmatic requirement to access incentives or programs. Such mandates exist in the US (e.g. New York City), but to date none of the provinces, territories, or utilities in Canada have implemented this sort of requirement.

b. Training requirements are built into the incentive program.

c. The program provides funding for ‘operational improvements’ which are less in-depth than what is included in standard recommissioning and retrocommissioning programs.

d. Crown corporation

e. Energy efficiency utility

f. Applicable to public sector buildings only.

Appendix D - Summary of program results

The table below provides a summary of program results, for programs which have undergone some evaluation process. There is significant variation in program evaluation methodologies, which causes discrepancies in units and availability of data. We provided comparable information wherever possible.

P/T	Program	Key Results						
		Duration	Implemented projects	Penetration rate	Average annual program costs	Average annual energy reduction	Average payback	Total Resource Cost
BC	FortisBC & BC Hydro Continuous Optimization Program	2008-present (10+ years)	483 ⁱ	35% (based on review of program 2011-2013) ⁱⁱ	\$2,500,000 ⁱⁱⁱ	7.4% ^{iv} utility cost savings (2009-2019)	1.6 year ^v (2009-2019)	0.5 in 2018 ^{vi}
MB	Manitoba Hydro: Enhanced Building Operations Program	2006- present (12+ years)	21 ^{vii}	4% ^{viii}	\$292,000 ^{ix}	\$11,739 (electric) \$7,590 (natural gas) ^x	2 years (estimated) ^{xi}	1.9 (2016) ^{xii}
ON	Enbridge Gas: Run it Right Program	2012-present (6+ years)	84 (2016) ^{xiii}	Not available	\$431,273 (2012-2016)	6.1% (2016) ^{xiv}	Not available	0.7 TRC-plus, includes 15% social benefit adder
	Union/Enbridge Gas: Run Smart Program	2016-present (3+ years)	35 (2017) ^{xv}	Not available	\$162,052 (in 2017)	1.61% (2017) ^{xvi}	Not available	Not available

P/T	Program	Key Results						
		Duration	Implemented projects	Penetration rate	Average annual program costs	Average annual energy reduction	Average payback	Total Resource Cost
	IESO: Existing Building Commissioning	2015-2019 (4 years)	93 ^{xvii}	Not available	~\$900,00 (average 2015/16 – 2017/18) ^{xviii}	Not available (average savings 267,847 kWh per project in 2017) ^{xix}	Not available (Levelized Unit Energy Cost in 2017: \$125/MWh; \$1.4M/MW) ^{xx}	0.23 (2015) 1.6 (2016) 0.63 (2017) ^{xxi}
QC	Énergir: Diagnostics et mise en œuvre efficaces, volet remise au point des systèmes mécaniques des bâtiments	2010-present (8+ years)	20 (between 2013/14 and 2016/17) ^{xxii}	Not available	\$437,938 (2016/17) ^{xxiii}	12.8% ^{xxiv}	Not available	2.53 ^{xxv}
	TEQ: Écopformance – volet 'Remise au point des systèmes mécaniques des bâtiments'	2016-present	Not available	Not available	\$500,000 (in 2018)	Not available	Not available	Not available
NB	NB Power: Building Optimization Pilot	2018-2019 (1-year pilot)	Not available	Not available	\$150,000 (2018/2019)	Not available	Not available	Not available
NS	Efficiency Nova Scotia: Building Optimization	2016 – present (3+ years)	21	Not available	Not available	Not available	Not available	Not available

ⁱ Graham Henderson, BC Hydro, personal communication, July 23, 2019.

ⁱⁱ BC Hydro, *Demand Side Management Milestone Evaluation Summary Report F2017* (2017), 9. <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/revenue-requirements/2018-01-15-bch-d66-f2017.pdf>

ⁱⁱⁱ Graham Henderson, BC Hydro, personal communication, July 23, 2019.

^{iv} BC Hydro, *Program Results* (2019). <https://www.bchydro.com/powersmart/business/programs/continuous-optimization/program-results.html>

^v Ibid.

^{vi} FortisBC Energy Inc. *Natural Gas Demand-Side Management (DSM) – 2018 Annual Report*, 31. https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/190329-fei-2018-dsm-annual-report-ff.pdf?sfvrsn=98547415_2

^{vii} *Demand Side Management Plan 2019/20*, 28.

^{viii} Ibid., 28.

^{ix} Ibid., 28.

^x Ibid., 28.

^{xi} Ibid., 28.

^{xii} *Demand Side Management Plan 2018/2019*, 53. https://www.hydro.mb.ca/docs/regulatory_affairs/pdf/natural_gas/general_rate_application_2019/07-3_appendix_7-3_2018_dsm_plan_and_2016-17-15_year_supplement.pdf

^{xiii} Enbridge, *2016 Demand Side Management Annual Report*, 117.

^{xiv} Ibid, 118.

^{xv} Union Gas, *2017 Demand Side Management Draft Annual Report* (2018), 113.

^{xvi} Ibid. 20.

^{xvii} IESO, *Energy Efficiency Programs Progress Report* (2019) 3, 4, 248. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation-reports/Quarterly/Q1-2019-Conservation-Progress-Report.pdf>

^{xviii} Ibid, 4.

^{xix} NMR Group Inc. and Nexant, *Evaluation of 2017 Business Programs* (2018), 251. <http://www.ieso.ca/-/media/Files/IESO/Document-Library/conservation/EMV/2017/2017-Business-Programs-Evaluation-Report.pdf?la=en>

^{xx} Ibid, 251.

^{xxi} Ibid, 252.

^{xxii} Énergir, *Plan Global en Efficacité Énergétique Horizon 2019-2023* (2018), 26. http://publicsde.regie-energie.qc.ca/projets/424/DocPrj/R-4018-2017-B-0153-DemAmend-Piece-2018_05_25.pdf

^{xxiii} Ibid., 27.

^{xxiv} Ibid., 27.

^{xxv} Ibid., 27.