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October 16th, 2012
SNRG 305

This research report investigates the saveONenergy program that focuses on High Performance New Construction (HPNC) buildings. This program is a major initiative in the Ontario Power Authority's overall mandate to promote electricity conservation and demand management throughout Ontario. It is intended to promote the design and build of more efficient commercial, industrial, agricultural, and multi-residential buildings. This report will detail the framework of and logistics involved with the HPNC program, as well as the processes involved with obtaining the related incentives.

HPNC Program Context

High Performance New Construction is a collection of design strategies and technologies for reducing energy consumption, improving an indoor environment and minimizing the environmental impact of a commercial, industrial, agricultural, or multi-residential building. The program targets new construction and major renovations in the planning stages, providing design assistance and substantial financial incentives for building owners and architects who exceed the electricity efficiency standards specified in the Ontario Building Code. These builders and their project decision makers are rewarded with incentives for offsetting the cost of energy-efficiency measures, achieving lower long-term operating costs, greatly improved marketability and enhanced occupant comfort. By implementing these measures, a homeowners building will cost less to operate, have lower environmental impacts, and essentially be a more comfortable space. [1]

The "saveONenergy" program for High Performance New Construction is administered by the Ontario Power Authority and local utility companies, such as Enbridge Inc. This program can be recognized as a carrot as its institution was intended to create opportunity for building owners to reduce their demand, as well as improve their conservation. Buildings, traditionally, were built with little to no consideration of efficiency. Beyond this, the enforcement of standards and regulations to mitigate the energy load that Toronto's consumers were bearing on the energy system ceased to exist. This resulted in increasing electricity peak loads and the province was struggling to meet the demand of its residents. In order to curb these ever-increasing peak demands, the Ontario Power Authority established the saveONenergy program, to provide an opportunity for energy consumers to manage their energy use and reduce their consumption. The High Performance New Construction program is expected to aid in conservation, by encouraging developers, architects, engineers, property owners, and others to build and design homes with energy-efficiency in mind.

[1] Ontario Power Authority. *High Performance New Construction Progtram.* https://saveonenergy.ca/Business/Program-Overviews/New-Construction.aspx

HPNC Program Structure and Mandate

The High Performance New Construction program rewards builders and their team for incorporating energy-efficiency measures. Projects that are approved are eligible for incentives in one of three program approaches. The following details the three approaches:

1. Prescriptive

The incentives for the prescriptive approach are based on standard efficiency measures that are calculated by using the OPA's prescriptive worksheets for lighting, motors, Unitary AC, variable frequency drives, synchronous belts, AEM service hot water, agribusiness, and alternative measures for space cooling and appliances. This approach encourages the incorporation of pre-approved technologies and the worksheets outline the incentive amount for each unit participant. For example, for reduced wattage on lamps there is a $1 incentive. [1]

2. Engineered

The engineered approach consists of a series of preset calculation worksheets that help to estimate reductions in peak demand and/or electricity consumption that apply to the installation of more energy-efficient equipment or solutions. Based on the reductions in peak demand and/or electricity consumption, the worksheets calculate the incentive amount. Below is a list of the engineered worksheets that are available through the saveONenergy website:

- Commercial Interior Lighting Engineered Worksheet
- Commercial Exterior Lighting Engineered Worksheet
- Commercial High Bay Lighting Engineered Worksheet
- Commercial Directional Lighting Engineered Worksheet
- Unitary AC Engineered Worksheet [2]

3. Custom

The incentives for the custom approach are based on assumed energy and demand savings from modeling software results. These results are used to determine the best energy-efficiency measures to incorporate in a new building or major renovation. The program supports up to 100% of the cost of using the modeling software to develop a model of a building for the building owner; up to $10,000 can be received to cover this modeling cost.

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[2] HPNC, Relevant Documents, https://saveonenergy.ca/Business/Program-Overviews/New-Construction/Relevant-Documents.aspx

The goals of this program are to promote conservation within the province and achieve electricity savings in a targeted area of at least 50MW by the end of 2012. The program pushes residents to recognize the steps that can be taken to reduce their energy use and ultimately their costs. As well as the promotion of conservation, the objectives of this program are to mitigate traditional supply and demand barriers and build awareness in the new build market. The goal of conservation is the smaller picture of a larger goal to reduce the province's peak demand of power. By promoting and incentivizing the building, designing, and purchasing of energy-efficient homes, the government is in turn fulfilling their mandate to promote electricity conservation and demand management, as well as manage the province's current and near-term electricity supply. [1]

HPNC Program Metrics

The available incentives vary depending on the incentive streams. The following is a breakdown of available incentive dollars under each stream:

Prescriptive Stream

Building Owners:
Up to $400/kW saved for lighting measures
Up to $800/kW saved for non-lighting measures
Up to $75 per appliance

Engineered Stream

Building Owners:
Up to $400/kW saved or $0.05/kWh of energy savings for lighting measures
Up to $800/kW saved or $0.10/kWh of energy saved for non-lighting measures

Custom Stream

There is potential to receive up to $10,000 to cover the cost of modeling a building for the building owner. As well, both building owners and their design decision-makers are eligible to receive incentives under the specifications provided below.

Building Owners:

Up to 25% above code: $400 for every verified kilowatt saved, or $0.05/kWh of energy saved.
Between 25% and 50% above code: $600 for every verified kilowatt saved, or $0.075/kWh of energy saved.
Greater than 50% above code: $800 for every verified kilowatt saved, or $0.10/kWh of energy saved.

Design Decision-Maker (Architects, Engineers, Consultants, Etc.):

Less than 25% above code: $50 for every verified kilowatt saved, or $0.00625/kWh of energy savings.
Greater than 25% above code: $100 for every verified kilowatt saved, or $0.0125/kWh of energy savings.
Greater than 50% above code: $150 for every verified kilowatt saved, or $0.01875/kWh of energy savings. [1]

HPNC Program Application and Agreement Process

Applications should be directed to Toronto's Better Buildings Partnership Program. It is approximately a three-year application and pre-approval period with an additional two years to complete the build and review it. There are two parts to the HPNC process; part one revolves around the design process of the structure and part two the post construction process. In order to be considered for eligibility the following agreements, evaluations, and forms must be completed:

- Application and Participant Agreement
- Design Decision Maker Agreement
- Pre-Project Submission Form
- Post-Project Submission Form
- Final Evaluation

During the design process the applicant submits an application with all required support material to the HPNC. A project evaluator reviews this application and if they accept it, notifies the applicant. The post construction process involves the applicant submitting "as-built" modeling to HPNC. Once a project evaluator verifies the results, they complete a final report and incentive cheques are issued. [2]

HPNC Program Eligibility Requirements

Who must comply, if applicable?

It is not necessary for anyone to comply with this program. It is an incentive program that is intended to encourage the consideration of energy-efficiency. The ultimate goal, however; is to use these efficiency measures as mandatory standards.[1]

[2] Clinesmith, Susan. *High Performance New Construction.* http://www.mah.gov.on.ca/AssetFactory.aspx?did=5596

Who can apply, if applicable?

Commercial, institutional, industrial or multi-residential new buildings and major renovation projects in office buildings, industrial buildings, retail spaces, multi-residential buildings, housing complexes, colleges, universities, schools, hospitals, long-term care facilities, hotels/motels and agricultural buildings. (*Single-family dwellings are not eligible for this program*.)

To qualify, buildings/projects must:

- Exceed the electricity efficiency standards specified in the Ontario Building Code
- Comply with Part 3 (Fire Protection, Occupant Safety And Accessibility) of the Ontario Building Code
- Be in Ontario[1]

A case study " École secondaire Roméo Dallaire "

Building :

- Brand new facility, opened September 2009
- Located in Barrie, 70,800 ft^2
- LEED® Gold
- LEED specialist: Enermodal Engineering
- Architect: Robertson Simmons
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Reducing electricity use and peak demand measures:

- Geothermal exchange system for heating and cooling
- Heat recovery ventilators
- Occupancy controlled, variable volume ventilation
- Increased insulation levels in walls and roofs
- High performance windows
- Efficient lighting design
- Daylight and occupancy sensors to shut off or dim lights in response to actual needs
- Variable speed pumps

Projections:

- 1,123,059 kWh less annual electricity consumption than a reference school built to OBC 2006 (68% reduction)
- 125 kW less Summer peak electricity demand than the reference school
- Overall 54.57% less energy usage than the reference school
- 332 tons less CO2 emission per year

High Performance New Construction Program Application Outcome:

- The school board received an incentive of $50,040
- The designer received an incentive of $ 12,510
- $10,000 towards the cost of modeling building performance[3]

Specific Employment Opportunity

HPNC Technical Specialist [4]

The High Performance New Construction Program created a specific employment opportunity, HPNC Technical Specialist, for Building Science or Building Technology graduates.

Some of the responsibilities of an HPNC Technical Specialist are:

- Providing technical expertise to all participants
- Guiding and assisting program applicants and business partners
- Providing technical information to acquisition and document collection services
- Supporting Program Operations and the Program Sales Manager
- Conducting technical reviews of applications for program eligibility

Qualifications:

- Post-Secondary education in building science or building technology, or equivalent work related experience
- Understand basic principles of electricity and energy conservation
- Understand basic principles energy conservation
- Familiarity with energy industry
- Proven experience with information software such as Excel, Access, and SRM preferred
- Client focused, innovative, results oriented, team oriented, interpersonal skills, excellent oral and written skills
- "G" Driver's License[4]

[3] Ontario Power Authority. *École secondaire Roméo Dallaire - Le succès s'exprime en français*. http://www.hpnc.ca/Images/hpnc_romeo_dallaire_case.pdf
[4] Enbridge Toronto Level 2 Jobs, http://jobs.enbridge.com/toronto/level-2/jobid2806859-hpnc-technical-specialist-(external)-jobs

HPNC: An Encouraging Program

The High Performance New Construction Program encourages designers and building owners to design and build more energy efficient building[5], as well encouraging homeowners to consider conservation in the home. Between 2008 and 2009, three hundred and twenty-nine projects received incentives from Enbridge alone[6]. The High Performance New Construction Program has not only been encouraging, but also quite successful in achieving it's mandate of conservation and promotion of low energy buildings.

[5] Ministry of Agriculture, Food, and Rural Affairs. *High Performance New Construction (HPNC) Program*, 2012. http://www.omafra.gov.on.ca/english/food/industry/hpnc-program.htm

[6] Project Profile Search: All Market Sector; All Values, http://www.hpnc.ca/2008-2010/case_studies.aspx