EM&I Engineering

Guideline – Social Housing Energy Savings Program (SH-ESP) Incentive Application

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1 List of Acronyms

ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers

DR – Demand Response

EE – Energy Efficiency

EM&I Engineering – Energy Management and Innovation Engineering

FS - Feasibility Study

GHG – Greenhouse Gas

HP – Heat Pump

LD – Load Displacement

LCE – Low Carbon Electrification

SH-ESP – Social Housing Energy Savings Program

LCE – Low Carbon Electrification

OA – Opportunity Assessment

2 Introduction.

This guideline is intended to support Social Housing Building customers as they prepare a Social Housing Energy Savings Program (SH-ESP) Incentive Application to implement Energy Measures (EM) with or without an approved SH-ESP Feasibility Study.

The scope involves energy efficiency (EE) measure. Solar and battery load displacement (LD) measures should be pursued through the Solar Panels and Battery Storage Rebate Program. EV Charging measures should be pursued through the EV Charger Rebate Program. These measures are not included in this SH-ESP Incentive application.

3 Purpose.

The incentive Application provides the information necessary for BC Hydro to determine the Project Incentive amount. Project incentives are a mechanism intended to lower customer's capital requirements to improve payback and/or meet investment criteria for implementing the energy projects. These projects involve investments in residential or common space (not commercial space, for mixed-use buildings) end-use systems, and may be hard wired/permanent in nature.

4 Rebate and Custom Pathways

The pathway is determined based on whether measures are Rebate or Custom, as defined below. Multiple measures can be in one application and can have rebate and/or custom measures.

4.1 Rebate Pathway

The rebate pathway is a streamlined approach to rebates suitable for equipment additions or replacements without significant re-design. A SH-ESP Workbook is to be populated with basic information on the existing system and proposed measures, upon which eligible rebate amounts and associated energy impacts are immediately calculated. Custom energy impact calculations are not required. Rebate measure can apply for rebates without a Feasibility Study; However, measures can still be studied at the customer's discretion.

A list of qualified Rebate Measures is listed below:

1. Domestic Hot Water
   1.1. Central air source HP water heater, NEEA Tier 2 or 3**
   1.2. In-suite all-in-one air source HP water heater with supplemental electricity*
2. HVAC
   2.1. Cold climate packaged terminal heat pump or single packaged vertical heat pump*
   2.2. Cold climate air source HP (mini-split)*
   2.3. Cold climate air source HP (multi-split)*
   2.4. Central cold climate HP (multi-split or variable refrigerant flow, outdoor unit located in common area serving multiple suites)
   2.5. Rooftop HP MUA with supplemental electric heating
   2.6. Low ambient rooftop HP MUA with electric preheat (HP operational down to -12°C with electric preheat)
3. Envelope
   3.1. Glazing (for electrically heated building, existing system must be single glazed or double glazed with non thermally broken frames)

4. Mechanical
   4.1. Parkade CO - HVAC controls
   4.2. Variable speed drive for motors
5. Lighting
   5.1. Like-for-like lighting replacements
   5.2. Lighting controls
6. In-suite measures
   6.1. In-suite lighting*
   6.2. In-suite fridge*

* Must cover a substantial portion of the building suites. This offer is not for individual, in-suite upgrades.

** Central heat pump water heating systems with supplemental gas-fired heating are not accepted.

4.2 Custom Pathway

The custom pathway is reserved for complex measures in which a Feasibility Study will need to be completed first to define the project scope, energy impacts and costs prior to incentive application.

Measure(s) are considered as custom if they are not a rebate measure. In general, custom measures may meet any of the following criteria:

1. Any building envelope upgrades other than glazing-only retrofits.
2. Central hydronic or domestic hot water heat pumps with custom supplemental electrical resistance heating (supplemental gas fired heating is not accepted).
3. Central heat recovery: Includes heat recovery from sewage or wastewater or exhaust air heat recovery.
4. Central hydronic or domestic hot water heating that is electric resistance only.
5. Heat pumps that aren't air-to-air systems, i.e. they're water-to-air, air-to-water, or water-to-water.
6. Lighting redesign that includes changes to the light quantity and/or mounting locations, or projects that add a networked lighting control system.

5 Submission Requirements.

The application must meet the following requirements:

- The EE measures must use proven technology that are NOT rebate measures.
- The project performance must be measurable and sustainable.
- The project must have a greater than 1-year simple payback.

5.1 Rebate Pathway Applications

All measures must be a qualified rebate measure, per Section 3.1. The application must include the following:

- **Completed SH-ESP Workbook (In-suite, Lighting and/or Mechanical tabs)** – A workbook with populated information of the building and proposed rebate measure(s) selected for implementation. Measures to be implemented must be selected as "Yes" in the "Selected for Implementation" column of the Lighting and Mechanical tabs. At the application stage, project costs entered into the workbook must meet the accuracy criteria outlined in Section 6 (+/- 30%).
- **Document(s)** – Supporting Information including past studies/audits outlining the proposed rebate measures, reference documents and equipment specifications.

5.2 Custom Pathway Applications

If no approved Feasibility Study has been conducted, the application must include the following:

- **Summary Information** – A summary of the application and proposed projects. The submitted information should cover the technical content outlined in section 5. This information can be captured in a prior Energy Study, Energy Audit, End-use Assessment or Customer Site Investigation Report, the applicant must ensure the following criteria:
  - All parameters related to the measure(s) (baseline system, operating hours, energy impact, project costs, etc.) are still representative at the time of the application and provide updated information if necessary,
  - The report must not be more than 2 years old,
  - Report must meet the accuracy criteria outlined in section 6, and
  - Report must be signed and sealed by a Professional Engineer.
- **SH-ESP Workbook[1] (Custom tab)** – A summary of project impact on energy, demand, and cost. Measures to be implemented must be selected as "Yes" in the "Selected for Implementation" column of the "Proposed Measures" tab. At the application stage, project costs entered into the workbook must meet the accuracy criteria outlined in Section 6 (+/- 30%).
- **Energy Calculation Spreadsheets[1]** – Calculations to determine the project impacts shown in the SH-ESP Custom Workbook.
- **BC Hydro Lighting Calculator** – Only required for applications involving lighting re-design or network lighting controls. Summary of lighting project electrical energy and demand savings.
- **Document(s)** – Supporting Information including reference documents and equipment specifications.

[1] If the proposed measure is lighting only then the SH-ESP Workbook and energy calculation spreadsheets are not required. Only submit the BC Hydro Lighting Calculator.

If an approved SH-ESP Feasibility Study[2] has been completed, the necessary site information and document(s) will have already been provided. However, the SH-ESP Workbook needs to be updated to show the measures selected for implementation. This is defined in "1-Proposed Measures" tab under "Selected for Implementation".

6 Technical Application Contents.

This section outlines the technical requirements for submission of a custom measure without having completed a SH-ESP Feasibility Study. The applicant is expected to adopt a logical and transparent approach and document all assumptions and conclusions. If there is uncertainty in how best to proceed, please discuss any proposed modifications with EM&I Engineering before proceeding.

6.1 Site Information.

Report on current site energy usages that will be influenced by the proposed measure(s), which may include:

- Annual electricity consumption (kWh/year)
- Fossil fuel consumption (GJ/year)[3]
- Monthly average electrical demand (kW, kVA)[4]
- Annual peak electrical demand (kW, kVA)[5]
- Electricity and fossil fuel cost ($/year)

6.2 Baseline and Proposed System Description.

For each measure, include the basis of design used in developing the proposed EM. This includes information such as, but not limited to:

- Description of the existing and proposed systems, as well as the measure scope
- Design and equipment pre-selection to demonstrate measure intent, such as:
    - Performance specifications (capacity, flows, demand, efficiencies, etc.)
    - Electrical specifications
    - Make and model used for calculation and cost estimates
    - Reference to cut sheets for major equipment attached as appendices
    - System schematics

[2] Study must have completed Innovation & Delivery Engineering review with building systems representative of the site's current state.

[3] Include self-generation as applicable.

[4] Monthly average electrical demand is an average of the 12 monthly peak demands (the highest rate of electricity use during a 1-hour period during a calendar month), in a normal operating year.

[5] Annual peak electrical demand is the highest peak demand during any 1-hour period experienced during a normal operating year.

- Identify and verify feasible equipment location(s) and their implications on cost estimates provided
- Installation considerations that substantially influence overall project costs, such as structural upgrades, abatement and electrical connections (implications of connecting to suite vs. common area service)
- Permit considerations (installation requirements may trigger additional permit requirements)

6.3 Energy Impact.

For EE measures, populate Table A of Custom tab in the SH-ESP Workbook impact values:

- Annual electricity (kWh/year)
- Annual fuel consumption (GJ/year)
- Monthly average electrical demand (kW, kVA)
- Annual peak electrical demand (kW, kVA)
- BCH peak demand (kW, kVA)[6]

6.4 Cost Impact

Provide cost estimate details and quotations, where applicable, for the following:

- Engineering,
- Equipment, including shipping and taxes,
- Demolition,
- Installation,
- Commissioning and training,
- Operation and maintenance (O&M).
-

Populate SH-ESP Workbook Table B cost impact values:

- Project capital cost ($)
- Project incremental cost ($)[7]
- O&M cost excluding energy ($)
- Customer interconnection costs ($)[8]

[6] BC Hydro electrical Peak demand during (Nov 1 to Feb 28 - 5-9PM)

[7] Cost difference between the proposed and baseline case. This is required for new plant/new construction projects or new equipment projects. It is not required for lighting projects. If the baseline conditions are for an existing system, the baseline capital cost estimates may be $0. If the system is considered end of life (per ASHRAE Equipment Life Expectancy chart) the baseline capital cost used must meet the current ASHRAE Standard 90.1 or local building by-laws.

7 Accuracy.

The confidence intervals for energy and emissions impacts and cost estimates for all opportunities must be provided. The expected accuracy for electrical energy impacts is (+/-10%) and implementation costs is (+/-30%)[9].

If meeting the accuracy requirements outlined above is not feasible, the application should provide supporting information and rationale.

8 BC Hydro EM&I Engineering Review.

The application will be reviewed by the BC Hydro EM&I Engineering team. The reviewer will look for reasonable assumptions, appropriate methodology and results that are consistent with sound engineering judgement and similar project experience. If opportunities for significant improvement come to light the consultant will be informed and given every opportunity to revise the report.

EM&I Engineering will not analyse reported results in enough detail to verify all calculations.

The consultant retains all responsibility for the analysis and report.

[9] Association for Advancement of Cost Engineering International, Recommended Practice No. 18R-97. www.aacei.org.

Appendix I – Definitions

Energy Efficiency (EE) is the use of less energy to perform the same task or produce the same result.

Load Displacement (LD) describes customer-based electricity generation, behind the electricity meter, whose main purpose is to displace the electrical load normally supplied from the grid, and results in no net increase in GHG emissions.

LD technologies must be categorized as simple cycle, combined cycle, combined heat and power, or renewable (solar, wind, hydro, geothermal, biomass).

Low Carbon Electrification (LCE) is the reduction of GHG emissions using clean electricity instead of GHG emitting forms of energy such as natural gas, diesel, propane, and gasoline.

Disclaimer