

New Construction Program orientation manual

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Contents

- Program introduction 1
- Purpose of this manual 1
- BC Hydro contacts 1
- Whole Building Design offer 2
 - 1 Offer introduction 2
 - 2 Eligibility 2
 - 2.1 Project eligibility 2
 - 2.2 Consultant qualification requirements 2
 - 3 Incentives 3
 - 3.1 Study incentive 3
 - 3.2 Capital incentive. 3
 - 4 Energy study 4
 - 4.1 Project baseline 4
 - 5 Program process 5
- Review by BC Hydro 8
- Project Site Inspection. 8
- Energy study Q&A 9
- General Q&A 10

- Other Requirements and Resources:
- [Appendix A — Baseline HVAC systems table](#)
 - [Appendix B — Program deliverables](#)
 - [Appendix C — Lead consultant application form](#)

Program introduction

The purpose of the BC Hydro Commercial New Construction Program (“the program”) is to assist in the design and construction of new high performance and energy efficient institutional, commercial, and multi-unit residential buildings in B.C.

A key program objective is to encourage the mainstream design and development industry to adopt integrated design process and building performance modelling as standard practices, and as a result, promote higher performing and more energy efficient buildings at lower cost.

The program encourages developers and their design teams to adopt energy-efficient design early in the design process, and provides them with a range of tools and potential financial incentives. The program’s Whole Building Design offer (“the offer”) provides funding support to assist with capital equipment costs that help model buildings as complete and integrated systems, and continually optimize performance and energy consumption.

Purpose of this manual

This manual has been prepared to serve as a guide for consultants participating in the New Construction Program. It may help to:

1. Orient consultants on the overall program concept, objectives, and approach.
2. Inform consultants how to apply for pre-qualification.
3. Identify the program process and required deliverables.

BC Hydro contacts

To obtain further information about the program:

- Contact your BC Hydro Key Account Manager
- Call **604 522 4713** in the Lower Mainland or **1 866 522 4713** elsewhere in B.C. or visit [bchydro.com/construction](https://www.bchydro.com/construction).

Whole building design

1 Offer

An important part of designing energy-efficient buildings is choosing the most suitable components and systems. Using integrated design process and energy modelling software in the earliest design phase, the program's design teams will look at different alternatives and create a business case for the best options, accounting for life cycle cost (ongoing energy and maintenance cost), energy savings, and payback period. The potential incentive offer will help fund both the energy modelling studies and implemented energy conservation measures (ECMs).

2 Eligibility

2.1 Project eligibility

To be eligible for the offer, the project must:

- Be new construction or major building renovation.*
- Offer potential annual electrical energy savings of at least 50,000 kWh per year.
- Be located in the BC Hydro service territory, including New Westminster.
- Be in the conceptual/early design stage.

2.2 Consultant qualification requirements

LEAD CONSULTANT

All lead consultants must be pre-qualified. The lead consultant role is to coordinate the project's deliverables, such as the Energy Study Proposal and Energy Study Report, in addition to acting as a project manager in charge of building design on behalf of the client. The lead consultant can be an energy modeller, mechanical consultant, or architect.

In order to qualify, a lead consultant must:

- be a member of the BC Hydro Alliance of Energy Professionals ("the Alliance"). This requires \$2M in liability insurance, references for proven track record, and a safety background check from WorkSafeBC. Contact alliance@bchydro.com to join.
- complete and submit the Lead Consultant Application Form.

*Major building renovations are defined as one of the following, all of which require building permits and certified buildings plans by a licensed professional:

- Change of use and reconstruction of an existing building space or space within; or
- Change construction work of a nature requiring the building or space within to be out of service for at least 30 consecutive days; or
- The renovations are worth at least 50% of the existing building's value and impact the building envelope.

APPROVED MODELLER

A modelling (or mechanical engineering) consultant company must demonstrate that the modeller designated to perform energy modelling work has the appropriate training and experience. The modeller does not need to be an Alliance member to qualify.

The consulting company must submit the following documents to our Conservation and Energy Management engineering department:

- Modeller's CV that briefly outlines overall technical and building performance modelling experience.
- Two to three page summary that outlines three recent building performance modelling projects that they have worked on. The project description should include modelling scope, methodology, and software.

An approved modeller must supervise and review all modelling work prepared by a non-approved modeller. If the approved modeller is not a Professional Engineer (P.Eng.), the modelling report must be read and signed-off by the P.Eng. in-charge of the building design

3 Incentives

3.1 Study incentive

If eligible the study incentive will co-fund the cost of completing the required energy study. We will pre-approve the cost of the study based on the project scope provided in the Energy Study Proposal.

If eligible the study incentive will be paid upon our approval of the energy study and review of invoices. The applicant (building owner, developer, general contractor or customer) must provide copies of invoices with proof of payment for modelling costs within 6 months of study report approval.

We will pay up to 100% of the energy study funding to a maximum of \$15,000 for private development projects, and up to a \$30,000 maximum for public healthcare, education and government projects.

3.2 Capital incentive

If eligible, a capital incentive will be offered for projects to reduce the incremental cost of the ECM(s) to a payback period of no less than two years. A flat incentive rate is applied for projects that save electricity over the baseline.

A life cycle cost (LCC) analysis spreadsheet is provided as a part of the Energy Study Workbook to assist with the financial calculations in the energy study. As a part of the study, any combination of energy saving measures may be included. Only measure bundles with electricity savings greater than 50,000 kWh will be eligible for capital incentives.

Completing a study is not a guarantee of capital incentives. All capital incentives are subject to program funding and our internal cost-effectiveness tests, and are solely at our discretion.

The capital incentive will be paid upon completion of a project site inspection to verify energy savings measures.

4 Energy study

The purpose of the energy study is to promote integrated design practices early in the design process and identify feasible, cost-effective ECMs. Once reviewed and approved by us, the study is also used to calculate the level of capital incentives that we may offer.

It's also possible that the study will show energy savings at lower capital cost, using only better design practices, or alternative systems.

The study should be comprehensive and happen early in the design. All submissions must use the latest version of the Energy Study Proposal and Report Workbook.

The study must be performed using 8,760-hour whole building computer simulation software. The list of approved energy simulation software and additional energy modelling requirements can be found in the Energy Modelling Guideline.

4.1 Project baseline

The project baseline must be agreed upon before any work begins. The baseline is the benchmark of standard practice against which we will measure the energy savings for a project. The baseline will be calculated with the following considerations:

- Applicable legislation or by-laws—any applicable building code energy requirements.
- ASHRAE 90.1 2016, or
- NECB 2015.
- BC Building Step code—if enacted by municipal government By-Law, or
- City of Vancouver Rezoning Policy (ZEB Policy) where applicable.
- BC Hydro's New Construction Baseline Table for HVAC Systems.
- Special cases to be reviewed by our program team.

The baseline HVAC Systems will default to BC Hydro's Baseline Table, which references (with some exceptions) ASHRAE 90.1, Appendix G performance method rating requirements. Check the New Construction Energy Modeling Guideline document for more detailed project baseline modeling requirements.

Energy performance guidelines or building labelling targets (such as LEED), unless required by current legislation, code, or by-law, are considered voluntary guidelines to be followed and would not affect our approved project baseline.

5 Program process

Step 1: Design team kick-off meeting

It's essential for the success of the study to have a design team kick-off meeting with client, design team, and our program representatives to ensure a good understanding of program's requirements and deliverables. This step is highly recommended before submitting the Energy Modelling Study Proposal.

Step 2: Application and Energy Study Proposal

If the project meets program requirements, the applicant must complete and submit a complete application along with an Energy Study Proposal Workbook to their BC Hydro Key Account Manager.

The purpose of the workbook is to communicate the project details, including design team to be involved in the study, building baseline, scope of work, and the study cost breakdown for funding approval. Please refer to Energy Modelling Guideline for more detailed study proposal submission requirements.

Once the proposal is approved, we will create an Energy Study Agreement.

Step 3: Energy Study

After the proposal has been approved and an Energy Study Agreement with the applicant has been signed, work may begin on the Energy Modelling Study. The program by default requires only one study, submitted to us during the project design development stage. The Energy Study Report must be submitted in Study Report Workbook format. Please refer to the Energy Modelling Guideline document for more detailed study report submission requirements.

LIGHTING

The lighting ECMs should be coordinated with the electrical consultant and modelled along with other measures. Information on any exterior lighting measures, not explicitly modelled in the software, should also be included in the study report. When lighting design is finalized, prior to the project site inspection, the Calculator shall be completed and submitted along with lighting drawings and luminaire specification sheets. The lighting calculator and video tutorial can be downloaded from bchydro.com/nclighting.

The new Lighting Calculator also allows designers to choose compliance in these instances:

- **Compliance baseline***
 - ANSI/ ASHRAE/ IES Standard 90.1–2016, or
 - National Energy Code for Buildings 2015
- **Compliance methods**
 - Building Area Method (BAM), or
 - Space-by-Space method

*The same baseline must be used for all systems in one building or project. Therefore, if a building design complies with NECB 2015, then the lighting system must calculate baseline to that same standard, likewise with buildings and lighting systems that comply to 90.1–2016.

LIFE CYCLE COST ANALYSIS

An LCC analysis spreadsheet is provided as part of the Energy Study Proposal and Report Workbook. LCC encompasses financial indicators beyond simply the payback period. The program does not consider these additional indicators in the application, but they are still useful information for creating a business case for investing in ECMs.

Incremental Capital Costs (ICC) are also considered in the study. Each measure is calculated by the consultant and provided in the ICC Calculator, found in the Energy Study Proposal and Report Workbook.

Please refer to Energy Modelling Guideline document for more detailed study report submission requirements.

Step 4: Review and approval by BC Hydro

The completed study will be reviewed by us. At this time any additional information required will be requested. In certain cases we may request actual modelling files for detailed modelling review.

The project must meet our internal cost/benefit criteria (calculated by us), as well as minimum energy saving potential requirements (in terms of identified energy savings) in order to be eligible for capital incentives. Upon approval of Energy Study Report, we will create an agreement outlining the incentive amount and any other requirements that need to be met. Once a Capital Incentive Agreement has been signed, the applicant can then order and purchase ECMs eligible for incentives. Any purchases or orders placed prior to signing an agreement are not eligible for funding.

Step 5: Post-tender energy study update (if applicable)

A post-tender modelling update will be required in case that building design and/or building size has been significantly changed after the approval of pre-tender energy study, and in cases where some of the approved ECMs have been excluded by the applicant after the tender.

If the total energy study funding support has already reached the maximum amount as described in section 3.1, no further study funding will be provided. If not, the additional modelling fee can be submitted to us with a proper justification and estimate of additional modelling hours required for study update. However, the initial funding support plus the post tender update must not exceed the specified maximum amounts.

The results of the updated energy study will be used to adjust any capital incentives that were offered, if applicable, using the same LCC spreadsheet and process used to identify the incentive during the preliminary energy study, except with updated final values. After review and approval of the final energy study, we will complete a Capital Incentive Agreement Addendum with the applicant, incorporating the adjusted incentive amount based on the final energy study results.

Step 6: Project site inspection

The following project completion documents must be submitted within 36 months of signing the Capital Incentive Agreement:

- Completed BC Hydro Schedule B Installation Completion Document, which includes expected and actual costs for implemented ECMs.
- Completed BC Hydro Schedule C Invoice Reconciliation, which includes paid invoices, an invoice summary report, or a progress payment summary for the installed ECMs.
- Lighting Calculator spreadsheet (excel format), accompanied by a full set of as-built lighting drawings and luminaire specification sheets (PDF format).
- Building permit indicating date of issue.
- Occupancy permit.
- Refer to bchydro.com/construction under Resources and Appendix B – Deliverables for full list of Completion Documentation requirements.

Once the project completion documents have been reviewed and accepted by us, we will perform a site inspection. The following documents must be provided at the time of the inspection:

- As-built drawings and specifications (architectural, mechanical and electrical).
- Shop drawings associated with the installed ECMs.
- Operations and maintenance manuals.

Upon satisfactory completion of the site inspection, we will issue a cheque for the capital incentive. If the energy savings are less than the proposed savings, the incentive funding will be adjusted accordingly.

Review by BC Hydro

We will review the completed study, and request any additional information that we need. When we are satisfied with the results of the study, an offer may be made for suitable capital incentives. The project must meet our internal cost/benefit criteria, as well as minimum energy saving potential requirements (in terms of identified energy savings).

Upon approval of the energy study report, we will create a Capital Incentive Agreement outlining the incentive amount and any other requirements that need to be met. Once the agreement has been signed by the applicant, eligible ECMs can be ordered or purchased. Any items ordered or purchased before the agreement is signed are ineligible for funding.

The following documents must be submitted within 36 months of the date the agreement is signed:

- A completed BC Hydro Schedule B Installation Completion Document, which includes expected and actual costs for implemented ECMs.
- A completed BC Hydro Schedule C Invoice Reconciliation, including paid invoices, a invoice summary report, or a progress payment summary for the installed ECMs.
- An occupancy permit.
- A building permit indicating date of issue.
- As-built drawings and specifications (if required and applicable).
- As-built lighting calculation spreadsheet, full set of lighting drawings, and luminaire specification sheets (if required and applicable).

Project site inspection

Once we've reviewed and accepted the documents, we will perform a site inspection. The following documents must be provided at the time of the inspection:

- Commissioning documents associated with the installed ECMs.
- Technical documents of the installed ECMs.

Once the site inspection is complete and the results are documented and approved, the incentive amount will be paid to the applicant. If the energy savings are less than the proposed savings, the incentive funding will be adjusted accordingly.

Energy study Q&A

Who should I contact if I have technical questions?

If you have any technical questions, or are unsure how a measure or system should be simulated, contact the program engineer we've appointed to the project. It's important that simulation issues be resolved early to avoid additional work later on. Don't hesitate to call or e-mail with any questions or clarifications.

How should we account for energy interactions between measures?

Interactions between systems will be accounted for in the computer simulation program. The inclusion or exclusion of individual measures will impact the savings of other measures.

Although the analysis procedure will be left up to the consultant, we recommended to analyze building envelope measures first, then lighting, and HVAC systems at the end. This will lead to more accurate savings analysis for individual measures. The final bundle, or bundles, of recommended measures will be simulated together to assess the combined savings impact.

Do we need to provide total capital costs, or just the incremental cost of the measure?

The LCC analysis will use the incremental costs. When submitting completion documents, we require total capital costs for both the baseline and the ECM, where these have been explicitly identified in the tender documents.

What level of costing detail is required?

The costing for the identified ECMs should be broken out in sufficient detail that we can review it and assess its accuracy. At minimum, major equipment should be broken out, as well as labour and materials. Incremental cost estimates must be provided by either:

- a registered Quantity Surveyor, or
- a qualified contractor selected by applicant.

General Q&A

What rate should we use for electricity?

All energy cost savings must be based on current rates for gas and electricity. This must include energy charges, demand charges, taxes, and any other applicable components of the rate structure.

What is the purpose of the LCC spreadsheet?

The spreadsheet provides a simplified LCC analysis that allows the applicant to evaluate economic returns over the life of the building. This is the way energy efficient measures should be examined, although in practice they rarely are. Since the program aims to change the way buildings are designed, it is important that design teams at least see the LCC analysis results.

My building may not meet the program's minimum 50,000 kWh electricity energy savings threshold and qualify for an energy study. Can I still participate?

To be eligible for participation, projects must meet this threshold of energy savings.

What simulation program can be used for whole building analysis?

Any programs that use 8,760 hour simulations and have been tested according to ASHRAE Standard 140 can be used. The list of the approved modelling software is provided in section 2.3 of the Energy Modelling Guideline.

Can multi-family buildings apply?

Yes, multi-unit residential buildings (MURBs) can apply, but in-suite energy saving measures are not eligible for capital incentives. MURBs must also meet the program's minimum 50,000 kWh electrical energy saving threshold. Generally, MURBs over 100,000ft² without gas fired heating can meet the 50,000 kWh electrical energy savings threshold.

Are gas saving measures eligible?

The applicant can study all potential ECMs in the energy modelling process, including gas-only energy saving measures. However, for the Capital Incentive Application and for the 2-year payback calculation, the bundle must only include ECMs that have some electricity energy savings. All associated maintenance cost savings of combined gas and electricity energy saving measures shall be included in the Capital Incentive Application for calculating the 2-year payback.

Can fuel switching be considered an energy saving measure?

No it cannot for this Program offer.

For more information on BC Hydro's New Construction Program, call us today.

604 522 4713 Lower Mainland

1 866 522 4713 elsewhere in B.C.

bchydro.com/construction

