

MINIMUM REQUIREMENTS FOR NEW CONSTRUCTION ENERGY STUDY

The following minimum requirements for a NC Energy Study are to be viewed as a set of core elements that BC Hydro expects to be addressed by the Consultant performing the study, and not a step by step protocol for the consultant to follow.

The Energy Study Report is to be submitted prior to tender drawings and purchasing the materials and equipment necessary to implement the energy-saving measures contemplated in the Energy Study Report. If there are changes to the energy-saving measures, building design or any other part of the Energy Study Report, the Energy Study Report is to be updated post-tender with post-tender costs and any other changes. The following items are to be included in the Energy Study Report.

1. Executive Summary

This summary is important, as it is used to provide the customer and BC Hydro with an outline of the NC Study's recommendations, including:

- Date of energy study completion.
- If applicable, description of integrated design process at the preliminary design stage and thereafter.
- A table of results for all energy-saving measures studied as part of this proposal (regardless of outcome). The table must include the following columns:
 - name and measure
 - incremental capital costs (including installation)
 - annual energy savings kWh/GJ (electricity, gas, other)
 - annual energy cost savings (\$/yr)
 - annual demand savings
 - annual maintenance cost savings
 - simple payback
 - discussion
- Recommended bundle of energy-saving measures to be considered for capital incentive and reason for selection of the energy-saving measures.
- Identification of non-energy benefits.

2. Building Description, type, size, number of floors, and number of residential units (if applicable)

- Occupancy pattern/schedules
- Design/setback temperatures
- HVAC, lighting and other applicable systems
- Mechanical system schedules
- Heating type (gas/elec/both)
- Percentage glass
- Plug load (W/ft²)
- Lighting density (W/m² or W/ft²)
- Ventilation rate

3. Energy Costs

Include the utility rates (energy and demand steps) used in the study.

4. Analysis

For the **Whole Building Design** option (where the scope of the study encompasses the entire building), include the following:

- Overall energy use (kWh/yr), and cost (\$/yr).
 - Although not required in the report, BC Hydro may request a list of modeling inputs and outputs to support energy use estimates.
- Overall energy use intensity (kWh/ft²yr), and cost (\$/ft²yr).
- Energy disaggregation (cooling, heating, interior lighting, HVAC equipment, plug loads, refrigeration, exterior lights, vertical transportation, DHW, cooking, and other), and peak electrical demand.

For the **Building System Optimization** option (where the scope of the study is focused on a building subsystem), include electronic copies of spreadsheets or other calculations used for detailed mechanical and/or lighting energy savings estimates.

For both the **Whole Building Design** and **Building System Optimization** options, and for each end use measure, include the following:

- Description of the energy savings opportunity and each energy-saving measure.
- Description of the baseline against which the measure is compared. This should be in accordance with current good design practice, current BC Building Code, or other applicable codes, standards and guidelines (i.e. City of Vancouver Energy utilization By-Law).
- Name of energy modeling tool used, specialized tools used, and other relevant issues.
- The annual energy use of both the baseline and proposed system, as well as the decrease (or increase) of estimated annual energy use for each associated utility (electricity, gas, steam, etc.). Energy and demand savings should both be estimated, and savings should be shown in energy units as well as dollars.
- The decrease (or increase) of estimated annual maintenance costs, and the basis of the cost estimate.
- Capital cost estimate must be performed by a Professional Quantity Surveyor or Contractor. The total capital cost estimate for each energy-saving measure/system for both, baseline and proposed system must be properly documented. Include any increases or decreases in costs associated with other related systems (e.g. decreases in transformer size when replacing electric baseboards).
- The simple payback of the measure based on incremental capital cost, incremental maintenance costs, and energy cost savings.
- Identify non-energy benefits of identified energy-savings opportunities (e.g. production/performance, occupancy, comfort, sales, construction cost reductions, environmental benefits such as reduced emissions, air quality, material selection, waste reduction, recycling, etc.).
- Complete and submit an electronic copy of BC Hydro economic analysis spreadsheet.

Isolate a recommended bundle of measures from the list of studied measures. Provide (in like manner to the individual measures above) the annual energy and maintenance savings, incremental capital and labour costs, and simple payback of the bundle of recommended measures and the estimated value of non-energy benefits. If applicable, this shall take into account savings interactions between measures. Provide read/write Excel electronic copy of the BC Hydro's life cycle cost analysis spreadsheets and if applicable, read/write electronic copies of mechanical and/or lighting detailed energy saving estimations.

5. **Lighting Systems**

Include the following:

- Types of systems.
- Lighting levels for significant areas.
- Include:
 - Luminaire inventory (explicitly describe type of luminaire, lamp and ballast combination including input wattage) for each option. For input wattage use BC Hydro approved data or provide updated manufacturer specifications.
 - Point-by-point lighting calculations and graphic outputs for upgraded lighting design in significant areas.

6. **Other Systems and Processes (example refrigeration)**

Include the following:

- Equipment data sheets (make, model number, design flow & pressure, performance curves, etc.) for all equipment under review.
- Estimated annual operating hours at various equipment capacities for all equipment under review.
- Equipment / system efficiencies.
- Control system and strategy.

7. **Study Coordinator**

- Include name and company of energy modeller.
- Name of Professional Engineer or Registered Architect responsible for Energy Study.
- Professional Engineer or Registered Architect's dated signature on the Energy Study.

8. **Timing of Submission**

- The Energy Study Report is to be submitted to BC Hydro for review and approval prior to tender drawings and purchasing the materials and equipment necessary to implement the energy-saving measures contemplated in the Energy Study Report. If the implemented energy-saving measures are different from the energy-saving measures approved by BC Hydro or there are changes to the building design or any other changes to any part of the Energy Study Report, the Energy Study Report is to be updated post-tender and the model and costs should be adjusted to reflect all changes. BC Hydro will review and approve the updated Energy Study Report and may recalculate the capital incentive based on the implemented energy-saving measures.