

ENERGY STUDY PROPOSAL REQUIREMENTS

Commercial Lighting and Mechanical

For each site, provide the following:

1. **General Building Information**
 - Building location
 - Building type (reference ASHRAE building types)
 - Building age and renovation years
 - Total conditioned area
 - Total area under review
 - Energy use of all fuels (electricity, gas, propane, etc.)
 - Hours of operation or occupancy pattern
2. **Energy Savings Potential**
 - Description of the lighting systems including any known problem areas
 - Description of the mechanical systems including any known problem areas
 - Energy conservation measures that have potential and will be studied as a result of the preliminary review of the building
 - A list of past energy conservation projects or energy management activities at this site
3. **Study Scope**
 - Include the BC Hydro Minimum Requirements for an Energy Study (Found after Terms and Conditions)
 - Where only specific systems are targeted, strike out the items that are not included in the study
 - Where appropriate, add items that will be included in the study not listed
4. **Methodology**
 - Proposed methodology in the analysis of each system
5. **Team Experience**
 - A list of team members and their areas of expertise
6. **Project Schedule**
 - Provide a schedule for the major project milestones
7. **Fees**
 - List all tasks along with hours (site and office) and hourly rate according to the following systems:
 - Lighting and lighting controls
 - Mechanical and mechanical controls
 - Other

Note: The consultant is required to be registered and approved with the Power Smart Alliance to conduct energy studies. Please refer to the Power Smart Program Guide for other program requirements.

TERMS AND CONDITIONS

To ensure consideration of your application for the Energy Study program, please note the following requirements:

Eligibility:

1. This Power Smart Program applies to existing facilities that must be located in the Province of British Columbia, within the area served by BC Hydro.
2. This application applies to existing facilities occupied for a minimum of six months. New construction projects, including expansions and additions, are not eligible.

Application process:

1. BC Hydro reserves the right to change or terminate this program at any time without notice, but shall continue to process applications submitted prior to the announcement of the changes or termination under the procedures existing at the time of submission of the application.
2. The submission of a completed application form by the Applicant to BC Hydro shall not in any way guarantee the granting of any Energy Study funding to the Applicant by BC Hydro. BC Hydro reserves the right to reject or accept, at its sole discretion, any applications submitted by the Applicant.
3. BC Hydro encourages the Applicant to obtain at least two proposals/quotations for the Energy Study and submit copies to BC Hydro. (At least one proposal/quote is mandatory).
4. BC Hydro will conduct an evaluation of the application within a reasonable time after submission. BC Hydro will not evaluate any applications until and unless all required program information is received by BC Hydro.
5. Once the application is reviewed and accepted, BC Hydro will send a Power Smart Energy Study Agreement to the Applicant. The Agreement must be signed by the Applicant and returned to BC Hydro within **30 days**.
6. BC Hydro reserves the right to determine whether or not an application is complete and all required information has been submitted and/or the level of Energy Study funding that will be offered to the Applicant.
7. The applicant may choose their own consultant subject to BC Hydro's acceptance of the consultant's qualifications. BC Hydro's acceptance shall not constitute endorsement of any particular consultant; nor any manufacturer, product, system design, supplier or installer of energy efficiency measures and/or products which may be recommended by the consultant.
8. If the Applicant engages more than one consultant, the Applicant will designate one consultant to coordinate the Energy Study and to prepare and submit the report.
9. The Study report and accompanying documents will be reviewed by BC Hydro engineers and consultants.

General:

1. The Applicant warrants that he/she meets all requirements established by BC Hydro and that he/she complies with all qualifying requirements, including WCB requirements.
2. BC Hydro decisions relating to product or customer eligibility, energy savings potential of the proposed projects, amount of Energy Study funding or other issues will be final and binding on all parties.
3. BC Hydro shall have no obligation, risk, title or interest in connection with any energy-efficient measures adopted or recommended by the Applicant whether BC Hydro has assisted in the application or otherwise.
4. BC Hydro, not being a designer or manufacturer of energy-efficient products or a designer of buildings, makes no representation or warranty whatsoever, express or implied, as to the fitness, quality of design practices or capability of the material, equipment or workmanship, nor warrants that any design or product will satisfy the requirements of any law, rule, specification or contract whether BC Hydro has assisted in the application or otherwise.
5. The Energy Study shall be undertaken upon receipt of approval by BC Hydro of this Energy Study request. Within 120 days of such approval, or the proposed completion date as specified on the consultant's proposal, the energy study will be submitted to BC Hydro.
6. BC Hydro is not responsible for any tax liability imposed on the customer as a result of the receipt of any Energy Study funding.

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MINIMUM REQUIREMENTS FOR AN ENERGY STUDY

The following minimum requirements for an Energy Study are a set of basic elements which must be included in the Energy Study but these requirements are not intended as a step by step protocol for the Consultant to follow.

1. Applicant Information:

- Applicant company name and address
- Site contact person (Facility Owner/Manager)
- Contact name, telephone and email
- Facility type (reference ASHRAE building types)
- For Adaptive Street Lighting Program only: Roadway lighting types analyzed (residential, collector, major, freeway, etc.)
- Date of energy study report completion

2. Executive Summary

- List of energy saving options
- Measure description
- Provide anticipated energy savings in kWh
- Indicate anticipated demand reduction in kW
- \$ Saved and estimated costs to implement options
- Other fuel savings
- \$ Saved and estimated costs to implement options
- Simple paybacks
- Attach a copy of the Opportunity Assessment with recommendation for an Energy Study (as submitted with the Energy Study proposal) as required for end-use

The executive summary is important as it will be used to provide the Applicant and BC Hydro with an outline of the Energy Study's recommendations.

3. Facility(ies) Description

- Age and renovation years
- Floor area and number of floors
- Internal space use and layout (sketches optional)
- Physical condition
- Occupancy pattern
- In some cases, the Lighting Opportunity Assessment (with recommendation for an Energy Study) could be used to supplement this section

4. Mechanical System Description

- Types of systems and areas served
- Inventory of equipment
- Operating schedules
- Sequences of operations
- Maintenance schedules
- Equipment conditions
- Equipment efficiencies
- Energy use baseline (in Excel Spreadsheet format)

5. Lighting System Description

- Types of lighting systems
- Lamp and luminaire inventory (including ballast type for fluorescent luminaires)
- Lighting levels (mainly for under/ over-illuminated conditions)
- Perform lighting audit area-by-area
- Consultants shall use BC Hydro provided or BC Hydro approved Power Smart Partner energy savings lighting calculator.

For Street Lighting System

- Type of roadways analyzed (local(residential), collector, major, freeway, etc - use IES RP8 classifications

- for Roadway type)
 - Types of lighting systems - describe each lamp, luminaire and ballast type
 - Lamp inventory (area by area)
 - Lighting levels (area by area) - site measurements or by calculation - provide details
 - Pedestrian conflict/activity levels and patterns
 - Existing obtrusive light/light pollution potential
 - Maintenance schedules
 - Use BC Hydro provided spreadsheet lighting calculator for adaptive street lighting to show energy savings, dimming patterns and equivalent input wattages. Provide CD copy with read/write Excel electronic copy (PDF not allowed) with the Energy Study Report
 - Provide overall report output in electronic format

- 6. **Control Equipment Description**
 - System applications
 - Equipment inventory
 - DDC system points
 - Maintenance schedule
 - Age
 - Operating strategies
 - For Adaptive Street Lighting Program only: Types of circuits/feeders for the considered roadway lighting

- 7. **Other Electrical Load Description**
 - Description and inventory
 - Estimate of plug loads

- 8. **Energy Use Analysis**
 - Energy rate schedules for each fuel
 - Annual energy consumption history for all fuels
 - Annual peak demand
 - Energy Use Analysis
 - Energy consumption break-down by end-use
 - Electrical consumption break-down by end-use

- 9. **Recommended Energy Conservation Measures ("ECM")**
 - Description of each ECM and the work required to accomplish implementation
 - Number of units affected
 - Estimated service life
 - Annual kWh and kW savings per measure (include other fuel savings, such as natural gas)
 - Material and commissioning requirements
 - Estimate of capital cost to accomplish implementation including design, material and commissioning
 - Annual dollar savings
 - Estimate payback
 - Provide a description of the energy analysis methodology, calculations and major assumptions to ensorse electricity and fuel savings estimates
 - Provide calculations for the energy analysis, identify other energy (natural gas, propane etc.) savings and non-energy savings (maintenance, occupancy comfort etc.) unit and dollar savings
 - Organize the mechanical measures according to the following categories:
 - Retrofit
 - Operational
 - Maintenance

- 10. **Lighting Redesign Calculations**
 - Consultants shall recommend lighting redesign strategies for optimal energy efficiency: combination of advanced lighting design (includes technology upgrade, luminaires layout and/or quantity changes) AND lighting control upgrades (includes occupancy, daylight harvesting and dusk-to-dawn lighting controls). Lighting control savings shall represent not less than 10% but no more than 70% of the total lighting energy savings
 - Consultants shall use BC Hydro provided or BC Hydro approved Power Smart Partner energy savings

lighting calculator

- Consultants that have established calculators in spreadsheet format may request BC Hydro to provide them with the developer package so they can upgrade their spreadsheet and submit to BC Hydro for approval. Upgrading costs will be the Consultant responsibility
- Complete energy savings calculations by filling in the BC Hydro calculator with the audit and ECM data. Provide CD copy with read/write Excel electronic copy (PDF not allowed) with the ES report

11. Project Definition

- Reason for selection of the preferred measures
- Total investment required
- Annual energy savings
- Project simple payback

Any energy saving measures being recommended for implementation must adhere to current ASHRAE and/or Illuminating Engineering Society design guidelines and calculation procedure (RP8 for Adaptive Street Lighting Program).

For Energy Performance Contract Projects the following additional requirements must also be included in the Energy Study

12. Energy Savings

- Provide anticipated Energy Savings (kWh) with a minimum target of 10% in electrical energy reduction

13. Measurement and Verification

- Consultant submits an M&V plan with the Energy Study / concept report that complies with the BC Hydro EPC Measurement and Verification Guidelines as outlined below
- Consultant provides a baseline and energy model for BC Hydro review before the contract is executed
- Consultant / Customer / BC Hydro agree to the M&V plan and baseline
- Consultant submits M&V reports including baseline adjustments ("BLA") at the same frequency to BC Hydro as to the customer

14. EPC Measurement and Verification Guidelines For Energy Performance Contracts for Schools, Universities, Colleges, Hospitals and Commercial

BC Hydro's M&V activities are predicated on IPMVP and FEMP protocols. Consequently, M&V methodologies will comply with these documents. Specifically, all EPC companies will be required to meet the following guidelines:

- Option "A" - Stipulation/ Engineering Calculations
Option "A" can only be used to account for less than 10% of total project savings. For example, if a project includes 20 buildings with 1,000,000 kWh savings, then Option "A" can only be used to account for 100,000 kWh of savings.
- Option "B" - Retrofit Isolation
Option "B" requires that all parameters are measured, namely before and after kW and hours of operation. M&V plan is to identify meter points. However, BC Hydro will allow stipulation of fixture wattage and measurement of the hours of operation for a lighting measure.
- Option "C" - Whole Building
Option "C" can only be used if the building electrical energy savings are at least 10% of the overall building's electrical energy consumption. All baseline adjustment records and data must be provided and include all calculation, assumptions, and measurements to determine the adjustment. Metrix software is to be used as the whole-building utility accounting package. The EPC must provide read/write electronic copies of the fully populated Metrix files to BC Hydro.
- Option "D" - Calibrated Computer Simulation
Option "D" involves calibrated computer simulation models of the component or whole-building energy consumption.

M&V Plan Contents

The project M&V Plan in the Energy Study will include the following:

- Project descriptions and characteristics
- M&V method(s) to be deployed per building and/or measure
- Baseline equipment and conditions
 - Inventories
 - Assumptions and stipulations
 - Baseline adjustments methodology
- Post-installation equipment and conditions
 - Inventories
 - Assumptions and stipulations
- Metering equipment specified
 - Schedule
 - Duration
 - Responsibility
 - Data format
 - Sampling
 - Equipment to be used
 - Metering points
- Analysis
 - Analysis procedures
 - Calculations, equations
 - Assumptions
 - Inputs
 - Outputs
 - Accuracy and Q/A procedures
- Reporting
 - Format

For Green IT Projects the following additional requirements must also be included in the Energy Study

15. Green IT Energy Study Proposal

- The consultant will attach a scanned and customer signed copy of the original IT Opportunity Assessment Audit Tool on the first or second page of the Green IT energy study proposal
- The consultant will define the IT energy conservation measures to be included in the proposed energy study
- The consultant will provide their fee to complete the proposed energy study with a breakdown of their proposed hours of work and hourly fees in Canadian dollars
- The consultant will provide building square footage for each building included in the proposal
- The consultant will provide the energy study proposal in a timely manner to BC Hydro which is to be less than 15 working days from the time the customer requests the proposal
- The consultant will agree to a completion date for the submission of the Green IT Study Report with the Applicant and the BC Hydro Key Account Manager. The agreed upon date will be indicated in the proposal
- The consultant will not proceed with the energy study until officially notified by BC Hydro Power Smart to proceed

16. Green IT Energy Study

- The consultant's energy study objective is to deliver validated energy savings and demand reduction per each IT energy conservation measure the customer has selected for the study
- The consultant will attach a scanned copy of the original IT Opportunity Assessment Audit Tool on the first or second page of the energy study
- The consultant will attach, after the copy of the original IT Opportunity Assessment Audit Tool in the Study Report, a table showing their validated electrical energy (kWh/yr) savings and demand (kW) reduction per each IT energy conservation measure included in the energy study

- The consultant will provide in an Appendix and provide software copies of the original baseline inventory spreadsheets showing per building; the building name and the number, description and wattages of computers and/or laptops and/or any other computers, and servers as covered in the projects scope of work
- The consultant will complete and provide BC Hydro with a completed IT Calculator
- By completing the IT Calculator, the consultant will provide accurate kWh/yr electrical energy saving calculations per each IT energy conservation measure included in the energy study
- By completing the IT Calculator, the consultant will provide accurate kW electrical demand reduction calculations per IT energy conservation measure included in the energy study
- The consultant will not proceed with the energy study until officially notified by BC Hydro to proceed
- The consultant will send the first energy study report in draft form to BC Hydro
- BC Hydro will validate the draft energy study
- The consultant agrees to amend each draft per BC Hydro's request until the energy study is approved
- BC Hydro will notify the consultant when the IT energy study has been approved and the consultant may then proceed to bill the customer for the energy study
- The final Study Report will be delivered to the customer by their BC Hydro Key Account Manager

17. Additional supporting information is to be provided for Each Section of the Green IT Calculator and is to be included in the Study Report as outlined below:

- **Computers/Laptops and/or Thin Clients and/or Mobile Computers**
 - spreadsheet of baseline computer counts and model descriptions per site
 - metered average electrical demand in watts per baseline computer model type
 - metered average electrical demand in watts per ECM computer model type
 - baseline computer hours of operation per site and site zone
 - computer hours of operations following ECM deployment
 - 2-3 week full operational report and provide saved full console report
- **Servers**
 - increased server virtual machine counts per site
 - increased server virtual host counts per site
 - operational hours of reduction per server from server power management
 - UPS electrical KVA input and output loading
 - server virtualization (e.g. VMware) full operational report (if possible)
- **Plug Load**
 - spreadsheet of baseline plug load counts and model descriptions per site
 - metered average electrical demand (W) per baseline plug load model type
 - metered average electrical demand in watts per ECM plug load model type
 - replaced plug load model counts by ECM plug load model counts per site

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