Revisions

The latest revisions to this document have incorporated the following:

- Added EUIs to Rezoning Conditions section
- Added Mandatory Provisions and Prescriptive Requirements forms to page 1 checklist
  - Deleted Letter of Explanation requirement for Sections 8 & 10
- Rewritten Envelope Compliance/Trade-Off section to include envelope schedules
- Require insulation section to list Drawing/Page numbers for easier access & review
  - Added Sourcing of Mechanical Design inputs (Actual/Standards/etc)
- Relocated ECB Trade-Off List from Section 11 to mechanical and electrical sections
  - Easier Exempted Assemblies declaration process
  - Added LEED Letter Template check box to ECB checklist
- GHG Calculator: Expanded Renewable & High Performance Energy Sections
- GHG Calculator: Expanded Process section to allow for District Energy usage
  - GHG Calculator: Expanded Space Areas section
- GHG Calculator: Added Sourcing of Modeling Inputs section
- GHG Calculator Output: Updated BC Clean Electricity value
- GHG Calculator Output: Shows breakdown of High Performance, Plug, and Process
- GHG Calculator Output: Shows Regulated and Total GHG Emissions statistics

The City of Vancouver would like to thank those who have provided feedback while using this document. The City also encourages continued feedback to further the development of this document in hopes of improving the process.
City of Vancouver
Sustainable Buildings
ASHRAE 90.1 - 2007
Documentation Process
Acknowledgements

The City of Vancouver would like to acknowledge AIBC and APEGBC for their input and support throughout the development of this process.

The City of Vancouver would also like to thank ASHRAE (www.ashrae.org) for granting permission to the City of Vancouver for the use of ASHRAE’s forms, and for accommodating our specific needs with respect to our use of these forms.
Introduction

The ASHRAE 90.1 - 2007 Documentation Submission Checklist process is meant for new construction projects covered under Part 3, and Part 9 (non-residential), of the Vancouver Building By-Law. This process is also required for Reconstruction projects as defined by the VBBL, and Tenant Improvements where the TI is for the first tenants within each space of an existing core and shell. Submission of this documentation is mandatory for building permit issuance, and is encouraged for use in earlier stages.

The necessary documentation can be obtained by accessing and downloading the Excel-based Checklist (ASHRAE 90.1 - 2007 Documentation Submission Checklist) from the City of Vancouver website, wherein additional documents are linked as required.

The ASHRAE 90.1 Checklist comprises of a number of sections over two pages. The first page collects building data, Rezoning Conditions data, renewable/high performance energy systems data, compliance path options used, and the respective responsible party for each ASHRAE 90.1 section. The second page lists the required submission documentation associated with the appropriate compliance pathway. The majority of the checklist documentation is comprised of ASHRAE-generated documents associated with Sections 5 through 11 of the ASHRAE 90.1 - 2007 manual.

Additional requirements are to provide information on envelope components, system trade-offs, exempted assemblies, modeling, energy and GHG emissions.
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The ASHRAE 90.1 - 2007 Documentation Submission Checklist is an Excel based spreadsheet, designed to be user friendly by incorporating:
The ASHRAE 90.1 - 2007 Documentation Submission Checklist is an Excel based spreadsheet, designed to be user friendly by incorporating;

- Direct links to external documents,
The ASHRAE 90.1 - 2007 Documentation Submission Checklist is an Excel based spreadsheet, designed to be user friendly by incorporating:

- Direct links to external documents,
- Drop down menus,
**Checklist Properties**

The ASHRAE 90.1 - 2007 Documentation Submission Checklist is an Excel based spreadsheet, designed to be user friendly by incorporating:

- Direct links to external documents,
- Drop down menus,
- Colour-coded tabs,
Ashrae 90.1 - 2007 Documentation Submission Checklist

Checklist Properties

The Ashrae 90.1 - 2007 Documentation Submission Checklist is an Excel-based spreadsheet, designed to be user-friendly by incorporating:

- Direct links to external documents,
- Drop down menus,
- Colour-coded tabs,
- On-screen comments.

<table>
<thead>
<tr>
<th>Checklist</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASHRAE 90.1 - 2007 Compliance Path Options</td>
<td>Check and complete <strong>one</strong> of the following Section 5 Options; Prescriptive Building Envelope, Energy Cost Budget Method (ECB). Also, indicate the Options / Methods used.</td>
</tr>
<tr>
<td>Prescriptive Building Envelope</td>
<td>If Tenant Improvement, with no building envelope work or upgrade, then choose N/A for Section 5 options.</td>
</tr>
<tr>
<td>Energy Cost Budget Method (ECB)</td>
<td>ECB Software</td>
</tr>
<tr>
<td>ASHRAE 90.1 - 2007 Sections - Applicability &amp; Responsible Party</td>
<td>For the following;</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The ASHRAE 90.1 - 2007 Documentation Submission Checklist is an Excel based spreadsheet, designed to be user friendly by incorporating:

- Direct links to external documents,
- Drop down menus,
- Colour-coded tabs,
- On-screen comments,
- Automated titleblocks,
- Automated calculations (Building Energy & GHG Calculator only)

Source of Electricity

BC Hydro – 98.1% Clean Energy (BC Hydro, Annual Report 2012, p8)

GHG Emissions Ratio (BC)

Revised GHG Reduction - Electric (BC)

688.57 MBtu / Tonne CO₂

0.0 Tonne s CO₂
Software Requirements

ASHRAE 90.1 Checklist
Microsoft Office Excel 97-2003 Workbook
- Fill-able
- Save-able

ASHRAE 90.1 Compliance Documents
Adobe Acrobat or Reader Document (PDF)
- Fill-able
- Save-able

Excel for Macs
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Building Area, Performance and Energy (Renewable Energy Systems)

- Indicate if a TI (Tenant Improvement) project. See comment regarding Building Envelope applicability.
Building Area, Performance and Energy (Renewable Energy Systems)

- Indicate if a TI (Tenant Improvement) project. See comment regarding Building Envelope applicability.

- The City of Vancouver encourages the calculation of the Building Effective R-value to enhance understanding of actual building envelope performance.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

----------

Building Area, Performance and Energy (Renewable Energy Systems)

- Indicate if a TI (Tenant Improvement) project. See comment regarding Building Envelope applicability.

- The City of Vancouver encourages the calculation of the Building Effective R-value to enhance understanding of actual building envelope performance.

- LEED energy points “achieved” refers to points achieved on LEED EAc1 Letter Template submitted at Building Permit.
Building Area, Performance and Energy (Renewable Energy Systems)

- Indicate if a TI (Tenant Improvement) project. See comment regarding Building Envelope applicability.

- The City of Vancouver encourages the calculation of the Building Effective R-value to enhance understanding of actual building envelope performance.

- LEED energy points “achieved” refers to points achieved on LEED EAc1 Letter Template submitted at Building Permit.

- Renewable and/or High Performance energy systems not listed in drop down menu can be added manually in the fourth space provided on each line.
### Compliance Path Options

- Indicate the appropriate options and sub-options used for ASHRAE 90.1 compliance.

- Note that each option has an on-screen comment regarding its use and potential restrictions.

<table>
<thead>
<tr>
<th>Section 5 Options</th>
<th>Section 6 - HVAC Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriptive Building Envelope</td>
<td>Prescriptive HVAC Systems</td>
</tr>
<tr>
<td>Building Envelope Trade-Off</td>
<td>Building Envelope Trade-Off</td>
</tr>
<tr>
<td>ENVSTD Program</td>
<td>HVAC System Design</td>
</tr>
<tr>
<td>EPF Calculation</td>
<td>EPF Calculation</td>
</tr>
<tr>
<td>Energy Cost Budget Method (ECB)</td>
<td>Energy Cost Budget Method (ECB)</td>
</tr>
<tr>
<td>ECB Software</td>
<td>ECB Software</td>
</tr>
</tbody>
</table>

### ASHRAE 90.1 - 2007 Sections - Applicability & Responsible Party

- Checklist for all paths: Prescriptive HVAC, Building Envelope Trade-Off, ENVSTD, EPF Calculation, Energy Cost Budget Method (ECB), and ECB Software.
ASHRAE 90.1 - 2007
Documentation Submission Checklist

Applicability & Responsible Party

- Indicate if there is a CP on the project.

- For each Section and Modeling, indicate whether it applies (x), or does not apply (N/A), and the associated responsible party. (Note that professional input may be required from additional disciplines, so the responsible party may require a Schedule S from each. Schedule S’s are not required to be submitted to the City.)

- Letters of Explanation are for non-applicable ASHRAE 90.1 sections only. A responsible party may cover more than one section on a single Letter of Explanation, therefore making it necessary to indicate the total number of Letters submitted. All Letters need to be complete with letterhead, date, name and signature.
Choosing the Appropriate Checklist

- The appropriate page two of the checklist is accessed via the spreadsheet tabs, colour coded to correspond with the Building Envelope path option used for compliance.
Common Properties for All Options

- The titleblock fills automatically with the input from the first page.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

- The titleblock fills automatically with the information from the first page.

ASHRAE 90.1 Compliance Documents

- All ASHRAE 90.1 documents listed are linked. Simply click the link to download the ASHRAE-generated pdfs.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

- The titleblock fills automatically with the information from the first page.

ASHRAE 90.1 Compliance Documents

- All ASHRAE 90.1 documents listed are linked. Simply click the link to download the ASHRAE-generated pdfs.

- The ASHRAE-generated documents are fillable and saveable, and are separated by ASHRAE Section, and Part.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

- The titleblock fills automatically with the information from the first page.

ASHRAE 90.1 Compliance Documents

- All ASHRAE 90.1 documents listed are linked. Simply click the link to download the ASHRAE-generated pdfs.

- The ASHRAE-generated documents are fillable and saveable, and are separated by ASHRAE Section, and Part.

- Each Section has an Info link to an ASHRAE-generated instruction document.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

Occupancy Permit Stage

The intent of this section is to indicate and update the building permit submission documentation listed above to accurately reflect any changes made during construction. Submit only the documents that have changed from the building permit submission.

- When no changes have been made during construction that would require the alteration of documentation, then indicate this in the box provided.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

Occupancy Permit Stage

- This Occupancy Permit portion is identical for all options in that it contains drop down menus listing the same sections and associated deliverables outlined in the building permit section above.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Common Properties for All Options

Occupancy Permit Stage

- This Occupancy Permit portion is identical for all options in that it contains drop down menus listing the same sections and associated deliverables outlined in the building permit section above.

- When changes during construction require the alteration of documentation, then resubmit to the City of Vancouver, any and all documents that have changed - this includes ASHRAE-generated forms, Insulation Package drawings, Trade-Off lists, and/or modeling outputs and GHG Calculator as necessary.
The intent here is to clearly demonstrate adherence with the Prescriptive standard for envelope assemblies.

- Indicate both the design performance characteristics and the Prescriptive requirements (from ASHRAE 90.1’s Table 5.5-5) on the envelope section drawings or envelope schedule.

- Indicate, for each assembly or insulation component, whether the performance meets or exceeds the Prescriptive requirement.
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Building Envelope Trade-Off Checklist (p2)

ASHRAE’s ENVSTD Software Output
- Produce and submit the output data sheets of ASHRAE’s envelope trade-off software (ENVSTDv6.0).

Envelope Compliance Test Results

Project Summary Information
Name: Vancouver_Building
Address: Street
City/State/Zip: Vancouver, BC
Climate Location: Vancouver Harbour C6, British Columbia
Standard Envelope climate data is used for compliance
Criteria Table: 4AB

Floor Area (m²): 5016
Gross Wall Area (m²): 3613
Window Area (m²): 1124
Window Wall Ratio: 0.320
Gross Roof Area (m²): 635
Skylight Area (m²): 0
Skylight Roof Ratio: 0.000

Door Area (m²): 0

Compliance Summary – PASSES

<table>
<thead>
<tr>
<th>EFF</th>
<th>Proposed</th>
<th>Standard</th>
<th>Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roofs</td>
<td>625</td>
<td>636</td>
<td>10</td>
</tr>
<tr>
<td>Skylights</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Exterior Walls and Windows</td>
<td>8098</td>
<td>8866</td>
<td>768</td>
</tr>
<tr>
<td>Below-Grade Walls</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Floors</td>
<td>391</td>
<td>588</td>
<td>197</td>
</tr>
<tr>
<td>Slabs</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Daylighting Potential</td>
<td>4953</td>
<td>5061</td>
<td>127</td>
</tr>
<tr>
<td>Total</td>
<td>14068</td>
<td>15170</td>
<td>1102</td>
</tr>
</tbody>
</table>

Opaque Construction Schedule

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Net Area/Length</th>
<th>U-factor</th>
<th>HC</th>
<th>R-Cav</th>
<th>R-Shitt</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>User Defined-Wall, Above Grade-Metal Framing-Other-Sprandel (User Defined)</td>
<td>103</td>
<td>0.750</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-2</td>
<td>User Defined-Wall, Above Grade-Metal Framing-5.5 in. (152 mm) studs at 16 in. (400 mm) o.c.-XFSP (User Defined)</td>
<td>0</td>
<td>0.750</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-4</td>
<td>User Defined-Wall, Above Grade-Mass-Solid Concrete-No Framing-90_Shell Angle (User Defined)</td>
<td>410</td>
<td>0.410</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-5</td>
<td>User Defined-Wall, Above Grade-Mass-Other-B9_shelf_angle_half_wall (User Defined)</td>
<td>490</td>
<td>0.420</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-7</td>
<td>User Defined-Wall, Above Grade-Mass-Framing-5.5 in. (152 mm) studs at 16 in. (400 mm) o.c.-B16_shelf_angle (User Defined)</td>
<td>518</td>
<td>0.370</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-8</td>
<td>User Defined-Wall, Above Grade-Mass-Framing-5.5 in. (152 mm) studs at 16 in. (400 mm) o.c.-B16_shelf_angle_half_wall (User Defined)</td>
<td>13</td>
<td>0.390</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-9</td>
<td>User Defined-Wall, Above Grade-Mass-Conc. Masonry Units, Partial Grout-No Framing MB (User Defined)</td>
<td>513</td>
<td>0.490</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-10</td>
<td>User Defined-Wall, Above Grade-Mass-Solid Concrete-No Framing-C (User Defined)</td>
<td>0</td>
<td>1.000</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-11</td>
<td>User Defined-Wall, Above Grade-Mass-Solid Concrete-Metal Clips at 24 in. (600 mm) o.c. Horiz. and 16 in. o.c. (400 mm) Vert.-F4.2 (User Defined)</td>
<td>24</td>
<td>0.680</td>
<td>n.a.</td>
<td>0.00</td>
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</tr>
<tr>
<td>C-12</td>
<td>User Defined-Roof-Insulation Entirely Above Deck or Mass-Roof_Deck (User Defined)</td>
<td>635</td>
<td>0.268</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-13</td>
<td>User Defined-Roof-Insulation Entirely Above Deck or Mass-R2 (User Defined)</td>
<td>0</td>
<td>0.268</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>C-14</td>
<td>User Defined-Floor-Mass-Spray-on Insulation-Soffit (User Defined)</td>
<td>592</td>
<td>0.300</td>
<td>n.a.</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>
ASHRAE 90.1 - 2007 Documentation Submission Checklist

Building Envelope Trade-Off Checklist (p2)

ASHRAE’s ENVSTD Software Output

- Produce and submit the output data sheets of ASHRAE’s envelope trade-off software (ENVSTDv6.0).

- Ensure the envelope analysis is accurate and produces a successful Compliance Summary (Passes).

<table>
<thead>
<tr>
<th>Compliance Summary -- PASSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPF</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Roofs</td>
</tr>
<tr>
<td>Skylights</td>
</tr>
<tr>
<td>Exterior Walls and Windows</td>
</tr>
<tr>
<td>Below-Grade Walls</td>
</tr>
<tr>
<td>Floors</td>
</tr>
<tr>
<td>Slabs</td>
</tr>
<tr>
<td>Daylighting Potential</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Opaque Construction Schedule

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Net Area/Length</th>
<th>U-fac</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>User Defined-Wall, Above Grade-Metal Framing-Other-Sprandrel (User Defined)</td>
<td>103</td>
<td>0.750</td>
</tr>
<tr>
<td>C-2</td>
<td>User Defined-Wall, Above Grade-Metal Framing-</td>
<td>0</td>
<td>0.750</td>
</tr>
</tbody>
</table>
Envelop Trade-Off Items Package

The intent here is to clearly identify the envelope areas that under-perform, meet, or over-perform with respect to the Prescriptive standards.

- Indicate both the design performance characteristics and the Prescriptive requirements (from ASHRAE 90.1’s Table 5.5-5) on the envelope section drawings or envelope schedule.

- Indicate, for each assembly or insulation component, whether the performance is below, meets, or exceeds, the Prescriptive requirements.
Envelop Trade-Off Items Package

Although ECB can trade-off across all ASHRAE 90.1 sections, the intent here is to clearly identify the envelope areas that under-perform and over-perform with respect to the Prescriptive standard.

- Indicate both the design performance characteristics and the Prescriptive requirements (from ASHRAE 90.1’s Table 5.5-5) on the envelope section drawings or envelope schedule.

- Indicate, for each assembly or insulation component, whether the performance is below, meets, or exceeds, the Prescriptive requirements.
Mech/Elec Trade-Off Items

Although ECB can trade-off across all ASHRAE 90.1 sections, the intent here is to clearly identify the mechanical and electrical components that underperform with respect to the Prescriptive standard.

- When applicable, indicate with an “x” then list the items within the space provided. (Note: The space is capable of containing more than can be seen on the printout)

- If not applicable, indicate “N/A” as shown (right).
## Energy Cost Budget Method (ECB) Checklist (p2)

### ECB Modeling Output

- Submit a completed building Energy Cost Budget Compliance document per ASHRAE 90.1 - 2007’s Section 11.

### Energy Summary by End Use

<table>
<thead>
<tr>
<th>End Use</th>
<th>Proposed Building</th>
<th>Budget Building</th>
<th>Proposed / Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Type</td>
<td>(10^6 Btu/yr)</td>
<td>(10^6 Btu/yr)</td>
<td>Energy (%)</td>
</tr>
<tr>
<td>Lighting (conditioned)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lighting (unconditioned)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space heating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Space heating (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat rejection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fans (interior ventilation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fans (interior exhaust)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fans (parking garage)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service water heating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevators &amp; escalators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration (food, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking (commercial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Building Consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.*
**Energy Cost Budget Method (ECB) Checklist (p2)**

**ECB Modeling Output (LEED, if applicable)**

- Submit a LEED Letter Template (EAc1) complete with building energy performance modeling output (See sample on next slide).

<table>
<thead>
<tr>
<th>Section</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 (SWH)</td>
<td>Completed ASHRAE 90.1 Compliance Documents and other requirements;</td>
</tr>
<tr>
<td>9 (Lighting)</td>
<td>Completed ASHRAE 90.1 Compliance Documents and other requirements;</td>
</tr>
<tr>
<td>11 (ECB)</td>
<td>Completed ASHRAE 90.1 Compliance Documents and other requirements;</td>
</tr>
</tbody>
</table>

- If LEED energy points are required, then also submit the LEED Letter Template for EAc1 showing the building performance and LEED energy points.

**OCCUPANCY PERMIT STAGE**

- Building Permit stage submission of Deliverables is complete and accurate - No Revisions Required.
Energy Cost Budget Method (ECB) Checklist (p2)

ECB Modeling Output (LEED, if applicable)
- Ensure the analysis is accurate and produces a positive energy cost savings for the proposed building over the reference building.
- Also ensure that the required level of LEED energy points (if applicable) are achieved and indicated on page 1 of the Document Submission Checklist, to the satisfaction of all applicable City of Vancouver requirements for this project.
Exempted Assemblies Package

The intent here is to identify the areas within the envelope that have been exempted, and where their performance has been under-estimated or over-estimated for ease of calculation.

Although it is not required by ASHRAE 90.1, the City of Vancouver encourages the use of Effective R-values for adjacent assemblies when incorporating exempted assemblies, as this will more accurately reflect the actual building envelope performance.
Energy Cost Budget Method (ECB)

Building Energy & GHG Emissions Calculator

- Access this form via the colour-coded tabs of the ASHRAE 90.1 Documentation Submission Checklist.
**City of Vancouver**
**ASHRAE 90.1 - 2007**
**Documentation Process**

**ASHRAE 90.1 - 2007 Documentation Submission Checklist**

**Energy Cost Budget Method (ECB)**

**Building Energy & GHG Emissions Calculator**

- Access this form via the colour-coded tabs of the ASHRAE 90.1 Documentation Submission Checklist.

- The intent of the Building Energy and GHG Emissions Calculator is to re-evaluate the GHG emissions taking into account local district energy systems and/or BC renewable electricity.
Energy Cost Budget Method (ECB)

Building Energy & GHG Emissions Calculator

- Use the data from the building modeling output sheet to complete the Calculator form.

- Allocate the appropriate energy uses for the Proposed and Reference Buildings to the energy types within the Calculator.
Energy Cost Budget Method (ECB)

Building Energy & GHG Emissions Calculator

- Use the data from the building modeling output sheet to complete the Calculator form.

- Allocate the appropriate energy uses for the Proposed and Reference Buildings to the energy types within the Calculator.

- Include Regulated and Non-Regulated loads.

- Include Renewable Energies, District Energies, and Process loads as applicable.
Energy Cost Budget Method (ECB)

Building Energy & GHG Emissions Calculator

- Use the data from the building modeling output sheet to complete the Calculator form.

- Allocate the appropriate energy uses for the Proposed and Reference Buildings to the energy types within the Calculator.

- Include Regulated and Non-Regulated loads.

- Include Renewable Energies, District Energies, and Process loads as applicable.

- The Calculator automatically generates energy usage, savings, and emissions reductions statistics.
Submission Requirements

The ASHRAE 90.1 - 2007 documentation is to be submitted to the City for building permit application, in the usual manner as per other building permit application documentation.

The ASHRAE 90.1 Documentation Submission Checklist is to be submitted in hardcopy format at the application stage, then in digital format (preferably by email) directly to the associated plan checker for final review.

Note: Submission of the Insulation Package drawings, are to be submitted as signed and sealed drawings.