

Compliance Forms— Energy Cost Budget Method

The following pages describe information that must be submitted to the code official when documenting compliance with energy code following the ASHRAE/IES Standard 90.1 Energy Cost Budget Method (ECB, Section 11). An electronic version may be downloaded from ASHRAE’s website.

The documentation must meet requirements in Section 11.7.2 and make clear to the enforcement personnel what the building characteristics are and how the ECB Method has been applied.

Contact Information

This section records the building address and contact information of permit applicant, design professionals and energy modeler.

General Project Information

This section includes the following:

- a. Title and date for the design document package (drawings and specifications) that the proposed design model is based on.
- b. Whether submittal is for documenting minimum code compliance or above-code performance
 - a. The version of the simulation program and the link to the website that contains the ASHRAE Standard 140 results for the version used in accordance with Section 11.7.2(o).
 - b. Weather station used in the simulation and type of the weather file (e.g. TMY2, TMY3, etc.)
 - c. Project climate zone
 - d. Description of building areas and systems excluded from energy model, if any, as allowed by Table 11.5.1 #2.
 - e. Description of yet to be designed systems and components, if any (Table 11.5.1 Proposed Building Performance column #1(c).

Table 1 Building Area Summary

This section reports the different building uses included in the building as required in 11.7.2(c). The following must be provided for each building area type:

- a. Number of above and below grade floors
- b. Floor area broken out by space conditioning category as defined in Section 3 including conditioned, semi-heated, unconditioned and un-enclosed spaces.
- c. For each space conditioning category, new construction and alteration floor area are separately reported.

Table 2 Energy Sources

This section lists all purchased energy sources used in the proposed design such as electricity, gas, district steam and chilled water. (G3.1.2 m) For each energy source, the energy consumption units (e.g. kWh, MMBtu), energy demand units (e.g. kW, Btu/hr) are provided and utility rate structure used in the simulation is described, including but not limited to energy and demand charges, time of use charges and block rates. The source of utility rates must be included for each energy source (11.4.3.2 ,11.7.2 k).

Table 3 Advisory Messages

This section reports information from the simulation runs that is helpful in identifying modeling problems or special situations (11.7.2 l). It also includes the number of hours when heating and cooling loads were not met, to allow verifying compliance with requirements in 11.5.2 i.

Description of Proposed and Baseline Design Models

This section includes the detailed information about systems and components in the proposed design model, the corresponding mandatory requirements, and the component in the budget design model.

Sub-sections are required for building envelope, HVAC, service water heating, power, lighting and other equipment. The level of detail provided for each system and component must be aligned with that in the compliance forms for Sections 5 – 10.

In addition, there will be a sub-section describing any process equipment included in the simulation and a sub-section for any other special systems such as combined heat and power.

The details provided in each subsection must include the following:

- a. A list of the energy-related features that are included in the design and on which compliance with the provisions of Section 11 is based. This list must document all energy features that differ between the models used in the energy cost budget and the design (11.7.2 d)
- b. A list showing compliance for the *proposed design* with all the requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4 (mandatory provisions). (11.7.2 e)

Renewable Energy

The information included in this section describes the renewable energy systems in the proposed design including technology type, system location, system ownership and generation output capacity, to establish applicability of renewable energy requirements in Section 11.4.3.

Exceptional Calculations

The section includes the list of exceptional calculations and a checklist to confirm that required supporting documentation for each exceptional calculation method is submitted (11.4.5).

Table 4 Energy Use and Energy Cost Summary by Energy Source and End Use

This table reports the energy use breakouts by end use and by fuel type. It also shows the percent difference between the proposed and the budget building design model. When the percentage value is less than 100%, then the proposed design is better than the budget.

Table 5 Energy Summary by Energy Source

The table shows energy use and cost by fuel type, and percent difference between proposed and budget design.

Supporting Documentation Checklist

This section lists supporting documentation that must be included along with the filled out compliance form (11.7.2).

Energy Cost Budget (ECB) Compliance Report

Project Name:		
Project Address:		Date:
Designer of Record:	Email:	Telephone:
Contact Person:	Email:	Telephone:
City:		

General Project Information

Design Documents Used as Basis for Energy Models Name:		Date
Simulation Program Name:	Version:	Link to Standard 140 Results:
Weather Station Location:	Data Type:	File Name
Climate Zone:		

Building areas and systems excluded from energy model, if any.

Yet to be designed systems and components, if any

Table 1 Building Area Summary

Building Use	Conditioned Area (ft ² or m ²)		Semi-heated and Uncond. Area (ft ² or m ²)		Total Area (ft ² or m ²)		Unenclosed Space Area (ft ² or m ²)	Above Grade Floors	Below Grade Floors
	<i>New Const.</i>	<i>Alteration</i>	<i>New Const.</i>	<i>Alteration</i>	<i>New Const.</i>	<i>Alteration</i>			
Total Area									

Table 2 Energy Sources

Energy Source Type	Energy Consumption Units	Demand Units	Rate Type	Fee Structure Description

Table 3 Advisory Messages

	Proposed Design Model	Baseline Building Model	Difference: Proposed – Baseline
Number of hours heating loads not met			
Number of hours cooling loads not met			
Number of warnings			
Number of errors			
Number of defaults overridden			

Description of Proposed and Baseline Design Models

For each of the following subsections, provide the following:

- a. A list of the energy-related features that are included in the design and on which compliance with the provisions of Section 11 is based. This list must document all energy features that differ between the models used in the energy cost budget and the design (11.7.2 d)
- b. A list showing compliance for the *proposed design* with all the requirements of Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4 (mandatory provisions). (11.7.2 e)

1. Building Envelope

Complete Building Envelope Compliance Form 2019 in this User’s Manual to describe proposed design. Use the same tables to document corresponding component of energy cost budget model as required by 11.7.2 (d), and to demonstrate that project meets each applicable mandatory requirement as required by 11.7.2 (e)

2. HVAC

Complete HVAC Compliance Form 2019 in this User’s Manual to describe proposed design. Use the same tables to document corresponding component of energy cost budget model as required by 11.7.2 (d), and to demonstrate that project meets each applicable mandatory requirement as required by 11.7.2 (e).

3. Service Water Heating

Complete Service Water Heater Compliance Form 2019 in this User’s Manual to describe proposed design. Use the same tables to document corresponding component of energy cost budget model as required by 11.7.2 (d), and to demonstrate that project meets each applicable mandatory requirement as required by 11.7.2 (e).

4. Lighting

Complete Lighting Compliance Form 2019 in this User’s Manual to describe proposed design. Use the same tables to document corresponding component of energy cost budget model as required by 11.7.2 (d), and to demonstrate that project meets each applicable mandatory requirement as required by 11.7.2 (e).

5. Other Equipment

System Name	System Description	Prescriptive Requirements	Proposed Design Model Inputs	Baseline Model Inputs

6. **Process loads and special systems.**

Provide additional sub-sections for any major process equipment or special systems (such as combined heat and power) that are included in the simulation.

Renewable Energy

System Name:	Technology Type:	Located On-Site? <input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Building owner owns the <i>on-site renewable energy system</i> . <input type="checkbox"/> Building owner has signed a lease agreement for <i>the on-site renewable energy system</i> for at least 15 years. <input type="checkbox"/> Building owner has signed a contractual agreement to purchase <i>energy</i> generated by the <i>on-site renewable energy system</i> for at least 15 years. <input type="checkbox"/> Other.		

Exceptional Calculations

Name	Description	Reduction in Energy Cost by Fuel Type
Total		

The following supporting documentation is provided for each exceptional calculation (11.4.5):

- Step-by-step documentation of the exceptional calculation method performed, detailed enough to reproduce the results.
- Copies of all spreadsheets used to perform the calculations.
- A sensitivity analysis of *energy* consumption in which each of the input parameters is varied from half to double the value assumed.
- Theoretical or empirical information supporting the accuracy of the method.

Table 4 Energy Use Summary by Energy Source and End use*

End Use	Energy Type	Proposed Building		Budget Building		Proposed / Budget Energy (%)
		Energy 10 ⁶ Btu/yr (GJ/yr)	Peak 10 ³ Btu/h (kW)	Energy 10 ⁶ Btu/yr (GJ/yr)	Peak 10 ³ Btu/h (kW)	
Lighting—conditioned						
Lighting—unconditioned						
Space heating (1)						
Space heating (2)						
Space cooling						
Pumps						
Heat rejection						
Fans—interior ventilation						
Fans—interior exhaust						
Fans—parking garage						
Service water heating						
Office equipment						
Elevators and escalators						
Refrigeration (food, etc.)						
Cooking (commercial)						
Exceptional Calculations						
Total building consumption						

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

Table 5 Energy Summary by Energy Source*

	Proposed Building		Budget Building		Proposed / Budget	
	Energy (10 ⁶ Btu/yr or GJ/yr)	Cost (\$/yr)	Energy (10 ⁶ Btu/yr or GJ/yr)	Cost (\$/yr)	Energy (%)	Cost (%)
Electricity						
Natural gas						
Other fossil fuel						
District steam						
Total without renewable energy						
Renewable Energy						
Total including renewable energy						

* These results use assumptions for showing compliance during a typical year; actual energy costs may be substantially different.

- The reduction in *design energy cost* associated with *on-site renewable energy* is no more than 5% of the calculated *energy cost budget*.

Supporting Documentation Checklist

- Building elevations and floor plans (11.7.2 f).
- A diagram showing the *thermal blocks* used in the computer simulation (11.7.2 g).
- An explanation of any significant modeling assumptions (11.7.2 h).
- Backup calculations and material to support data inputs (e.g., *U-factors* for *building envelope* assemblies, NFRC ratings for *fenestration*, end-uses identified in Table 11.5.1, "1. Design Model," paragraph [a]) (11.7.2 i).
- Input and output reports from the *simulation program* or compliance software, including a breakdown of *energy* use by at least the following components: lighting, internal *equipment* loads, *service water-heating equipment*, *space-heating equipment*, *space-cooling* and heat rejection *equipment*, fans, and other HVAC *equipment* (such as pumps). The output reports must also show the amount of *unmet load hours* for both the *proposed design* and *baseline building design* (11.7.2 j).

Compliance Result

- The design detailed in the above-referenced plans complies with the mandatory provisions of ANSI/ASHRAE/IES Standard 90.1-2019 and the design energy cost does not exceed the energy cost budget. Therefore, this design **DOES COMPLY** with the ANSI/ASHRAE/IES Standard 90.1-2019 ECB compliance methodology.

Individual certifying authenticity of the data provided in this analysis:

Signature	Title
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