

Section 11 - Energy Cost Budget Method

- The ultimate trade-off method allowing you to trade-off across building systems through the use of annual, hourly simulation tools and a baseline building
- The only real way to deal with unique designs, renewables, high-efficiency equipment, etc.
- The basis of the energy portion of the LEED rating
- Limits allowable energy costs of the design to those of a building meeting the Standard
- Buildings must still meet all mandatory requirements (Section X.4)



Section	Mandatory Provisions				Prescriptive Option			
11	Envelope	HVAC	SWH	Lighting	Envelope	HVAC	SWH	Lighting

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- Tradeoff limited to building permit
- You have to have an approved building envelope design prior to ECB submittal
- You must meet all the X.4 sections AND the design energy cost cannot exceed the energy cost budget AND the energy efficiency level of components must meet or exceed the levels used to calculate the design energy cost
- You must document all this in great detail

Section	Mandatory Provisions				Prescriptive Option			
11.1	Envelope	HVAC	SWH	Lighting	Envelope	HVAC	SWH	Lighting

Section 11 *Simulation Method Requirements*

- Minimum 1400 hrs/year
- Hourly variations
- Thermal mass effects
- 10+ thermal zones
- Part-load performance
- Correction curves
- Economizers
- Model budget building
- Energy costs
- Design load calculations

Must be capable of whole building analysis

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You must use:

- a good and approved simulation program
- appropriate and approved climate data
- appropriate and approved purchased energy rates
- the same simulation program, climate data, and purchased energy rates for both the design energy cost and energy cost budget

Section	Mandatory Provisions				Prescriptive Option			
11.2	Envelope	HVAC	SWH	Lighting	Envelope	HVAC	SWH	Lighting

Section 11 - Energy Cost Budget Method

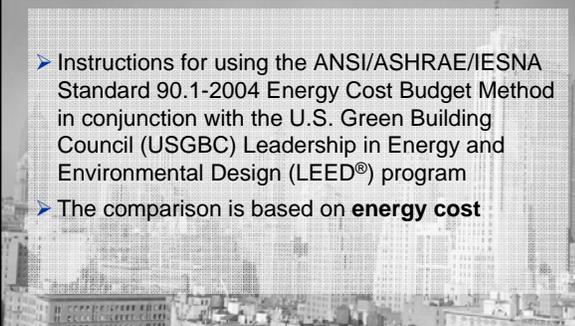
➤ If you are attempting to show that your building goes “above code” (say, for instance, for LEED® energy points) as opposed to simply using ECB as a very flexible and complex code compliance tradeoff option, be sure to see Informative Appendix G, which contains many of the same elements as Section 11, but with modifications to accommodate the needs of “above code” programs

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Appendix G - Performance Rating Method

➤ Instructions for using the ANSI/ASHRAE/IESNA Standard 90.1-2004 Energy Cost Budget Method in conjunction with the U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED®) program

➤ The comparison is based on **energy cost**



Informative Appendix	Mandatory Provisions				Prescriptive Option			
G	Envelope	HVAC	SWH	Lighting	Envelope	HVAC	SWH	Lighting

Appendix G and LEED®

- ECB Chapter 11 & Appendix G use slightly different approaches.
- 90.1 Chapter 11 uses the terms:
 - Energy Cost Budget (ECB) and
 - Design Energy Cost (DEC).
 - A building complies with the ECB if the Design Energy Cost (DEC) is less than or equal to the Energy Cost Budget (ECB)
- Appendix G energy rating system uses the terms:
 - *Baseline building performance* and
 - *Proposed building performance*.
 - The rating system goal is to show that the *proposed building performance* is better than the *baseline building performance* by some given margin, the performance goal.

How Appendix G Is Different – Part 1

1. The total energy consumption for all end uses is included.
2. Favorable building orientation receives credit and poor orientation is penalized.
3. Automatically controlled Internal or exterior shades may be modeled and credited in the proposed building.
4. Occupancy sensors and programmable timers for lighting controls can receive credit.
5. The rating authority may establish a baseline for plug loads and a method of crediting more efficient equipment.

How Appendix G Is Different – Part 2

6. For innovative systems, users can “substitute a thermodynamically similar component model” when the simulation tool can’t explicitly model a building feature.
7. Photovoltaic (PV) systems may be modeled and credited in the calculations.
8. Credit is offered for energy efficient fan systems.
9. Some credit is offered for natural ventilation for buildings that do not have cooling systems.
10. More credit is offered for HVAC system selection.

How Appendix G Is Different – Part 3

- The ECB in Chapter 11 is intentionally restrictive and is intended for code compliance with the minimum requirements of 90.1.
- Use of the ECB may be limited.
- The building performance rating system in Appendix G is much more flexible and intended for use on buildings intended to perform far better than the minimum code requirements.
- Appendix G is likely to be widely used.

SPC 189P ASHRAE/USGBC/IESNA
Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings

1. Purpose: The purpose of this standard is to provide minimum requirements for the design of high-performance, green buildings to:

- (a) Balance environmental responsibility, resource efficiency, occupant comfort and well being, and community sensitivity, and
- (b) Support the goal of the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

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2. Scope:

- **2.1** This standard provides minimum criteria that:
- (a) Apply to new buildings and major renovation projects (new portions of buildings and their systems): a building or group of buildings, including on-site energy conversion or electric-generating facilities, which utilize a single submittal for a construction permit or which are within the boundary of a contiguous area under single ownership.
- (b) Address sustainable sites, water use efficiency, energy efficiency, the building's impact on the atmosphere, materials and resources, and indoor environmental quality (IEQ).
