



**ADVANCED ENERGY MODELING FOR LEED
ONLINE TRAINING COURSE**

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
ENERGY SPECIALIST CURRICULUM





**ENERGY MODELING REQUIREMENTS-3
FOR ENERGY PROFESSIONALS**

KRISHNAJI PAWAR, LEED AP BD+C, GSAS CGP, ISO 14001:2015, GCP
ENERGY SPECIALIST CURRICULUM



WHAT SHOULD YOU LEARN



**Comparison of Modeling
Requirements for ASHRAE 90.1
and California Title 24**



ENERGY MODELING REQUIREMENTS

✓ The methodology described in ASHRAE 90.1-2016, Appendix G, and California Title 24-2019 involves the generation of two energy models: one representing a baseline minimum-standard building and the other representing the proposed building with all its designed energy enhancements.



ASHRAE 90.1.2016

California Title 24

Process Energy

Baseline Case

Process loads must be identical to proposed case. Occupancy and equipment schedules may not be changed. However, variations of power requirements, schedules, or control sequences are allowed based on documentation that installed equipment in proposed design represents equivalent, verifiable departure from conventional practice, using engineering calculation method.

LEED - CS

For tenant spaces, model separate meters for tenant plug loads and process loads. Use values indicated in Table G-8 to model tenant plug loads or provide documentation for modeled loads.

LEED - CI

Model process energy identically to proposed building, but exclude cost from calculation. If Eac 1.4 is pursued, the plug load may be modeled using a higher plug load value reflecting the occupancy type within the project space and existing plug load values for the balance of the segment.

Alternative baseline case: Use a higher plug load value reflecting occupancy type for entire segment area.

LEED - CI

LEED for Retail: New Construction

Exceptional calculation method may be used to document measures that reduce process loads. Project teams can use spreadsheet calculators provided in LEED Online to calculate process energy savings for commercial kitchen equipment and refrigeration equipment. These calculators include many industry standard baseline conditions that have been defined in Tables 1-4 in LEED for Retail-NC v2009. For equipment not covered in Tables 1-4, describe and document clear baseline to compare proposed improvements in process load categories.

Proposed Case

ASHRAE 90.1-2016 User's Manual, Table G-8, provides accurate reference power densities for typical occupancy types, which can be incorporated into building energy models when proposed building energy inputs (e.g., elevators, escalators, lifts, and other process equipment) are unknown. Model other process energy inputs (e.g., elevators, escalators, lifts, and other process equipment) separately, using reasonable schedules of operation. Total process energy cost must be at least 25% of baseline building performance. If process energy cost is less than 25%, provide substantiating documentation.

LEED - CI

Use actual process loads in project space, and use field-verified loads for rest of building equipment. Credit cost from calculation for energy reduction.

Baseline Case

Proposed Case

Process loads must be identical to baseline case. Process energy use should be at least 25% of baseline building total. If less than 25%, provide substantiating documentation.

LEED - CS

Same as ASHRAE 90.1-2016.

ASHRAE 90.1.2016

California Title 24

Energy Rates

Baseline Case

Use same rates for both baseline and proposed cases.

LEED - CS

For tenant spaces, energy-using components are metered and apportioned and/or billed to tenant. Tenant pays for components.

Proposed Case

Rates from local utility schedules are default option for computing energy costs. However, intent is to encourage simulations that help owners minimize energy costs. If local utility rate schedule for energy rate schedule approved by local ASHRAE 90.1-2016 adopting authority is unavailable, use energy rates listed in state average prices, published annually by Energy Information Administration (<http://www.eia.doe.gov>). Whichever source is used, model same rate schedule in both baseline and proposed cases; if average EIA rates are used, apply them for all fuel types in model.

Baseline Case

Proposed Case

Rates from local utility schedules are default option. If local utility rate schedule is unavailable, use state average energy prices published by EIA for commercial building customers; if average EIA rates are used, apply them for all fuel types in model.

LEED - CS

Same as ASHRAE 90.1-2016.

ASHRAE 90.1.2016		California Title 24	
Service Hot Water System			
Baseline Case	Proposed Case	Baseline Case	Proposed Case
Use same energy sources as proposed building. Model system-related specific parameters as indicated in Table G3.11. LEED-CI May be modeled, but omit cost from calculation for energy reduction Note: * Process energy includes office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).	Reflect actual system installed or designed. Meet mandatory provisions in Section 7.4. LEED-CI May be modeled, but omit cost from calculation for energy reduction		Reflect actual system installed or designed. Major difference from ashrae 90.1-2016 For high-rise residential or lodging uses, domestic water heating consumption from UTIL-1 report must be multiplied by virtual utility rate to calculate energy cost.



THE WORLD'S 1ST GREEN TECHNOLOGY
MARKETPLACE
