

CORE & SHELL ENERGY MODELING GUIDELINES

These guidelines are intended to ensure that projects in different markets approach the energy modeling requirements in a similar manner, and to establish a minimum benchmark for energy optimization. The energy modeling is based on the ANSI/ASHRAE/IESNA 90.1–2007 Building Performance Rating Method. This can be used for developing a whole building model when the core and shell work is known but the tenant space development is unknown.

Tenant space is defined as an area that meets all the following conditions:

- It is served by separate, exclusive components.
- Its components are specifically designed for the area.
- All appropriate energy-using components are metered and apportioned and/or billed to the tenant.
- The tenant will pay for these components.

The core and shell building is defined as the parts of the building that are not tenant space. Any constraints or guidance issued to the tenant, such as a maximum level of lighting density or restrictions on occupancy type, must be outlined in the tenant lease or sales agreement (see Appendix 4).

Step 1. Model the proposed building.

Core and Shell Building

- Model the heating, ventilation, and air-conditioning (HVAC) system as described in the design documents. If the HVAC system is not yet designed, use the same HVAC system as the baseline model, per ANSI/ASHRAE/IESNA Standard 90.1–2007, Table G3.1.1A.
- Model the building envelope as shown in the architectural drawings.
- Model the lighting power as shown in the design documents for all core and shell spaces.

Tenant Spaces

- If the team is pursuing any additional energy-saving opportunities not associated with the core and shell areas, outline the opportunities or requirements in the tenant lease or sales agreement (see Appendix 4). Tenant space occupancy numbers must be determined by using the default space occupancies outlined in Appendix 1.
- Model electric meters for lighting power in tenant spaces. Choose a space type classification for the building spaces in Appendix 1. Use lighting levels shown in ANSI/ASHRAE/IESNA 90.1–2007, Table 9.6.1 for the space type classification, or Table 9.5.1 for overall building type. If the tenant lighting is designed and installed as part of the core and shell work, the project team may model the designed lighting systems.
- Model separate meters for tenant plug loads and process loads. Use the values in Table 1 to model tenant plug loads, or provide documentation for the modeled loads (see the process energy section of EA Credit 1). These default plug loads do not necessarily reflect all process loads; the values are recommended but not required to achieve the 25% process loads.

CS APPENDIX 2

Table 1. Default Tenant Receptacle Loads, by Occupancy Type

| Occupancy Type | Receptacle Load (W/sf) |
|----------------------------|------------------------|
| General office | 1.5 |
| Retail, general | 1.35 |
| Retail, service | 1.35 |
| Restaurant | 0.8 |
| Grocery store | 2.5 |
| Medical office building | 1.5 |
| R&D or laboratory building | 1.4 |
| Warehouse, distribution | 0.65 |

Source: Derived from energy modeling exercises undertaken by OWP/P.

STEP 2. Model the baseline building.

Core & Shell Building

- Model the baseline building HVAC system per ANSI/ASHRAE/IESNA 90.1–2007, Table G3.1.1A.
- For the building envelope, comply with the prescriptive requirements of ANSI/ASHRAE/IESNA 90.1–2007.
- Model the lighting power by the space type classification of ANSI/ASHRAE/IESNA 90.1–2007, Chart 9.6.1.

Tenant Spaces

- Model separate electric meters for the lighting in the tenant spaces. Use the same lighting power as modeled in the proposed building, unless efficiencies can be supported by a tenant sales or lease agreement.
- Model separate meters for receptacle loads and process loads in the tenant scope. Use the same values for receptacle loads as used in the proposed building.

STEP 3. Perform energy simulations of the proposed building and the baseline building.

STEP 4. Compare the resulting annual energy costs.

From the simulation, determine the annual energy costs of the budget building and the design building, then calculate the percentage savings for annual energy costs.

Verify that at least 25% of the overall energy cost is process load. If process loads are less than 25% of overall energy cost, prepare supporting documentation or increase plug loads in the energy model to meet the requirement. Process loads greater than 25% are acceptable.

Renewable energy should be included in the energy model or accounted for using the exceptional calculation method.