

# Minimum energy performance

Required

## Intent

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

## Requirements

### Option 1. Whole-building energy simulation

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata ([or a USGBC-approved equivalent standard for projects outside the U.S.](#)), using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems.

The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata ([or a USGBC-approved equivalent standard for projects outside the U.S.](#));
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with Standard 90.1–2010, Appendix G, with errata ([or a USGBC-approved equivalent standard for projects outside the U.S.](#)).

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2010, G2.5). Alternatively, use the COMNET Modeling Guidelines and Procedures to document measures that reduce unregulated loads.

For Option 1, Whole-Building Energy Simulation, process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration are defined in Appendix 3, Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

## OR

### Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata ([or a USGBC-approved equivalent standard for projects outside the U.S.](#)).

Comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, and ducts and dampers, in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet (9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet (1 860 to 9 290 square meters);
- ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings; or
- ASHRAE 50% Advanced Energy Design Guide for Large Hospitals. Over 100,000 square feet (9 290 square meters)

For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

## OR

### Option 3. Prescriptive compliance: Advanced Buildings™ Core Performance™ Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata ([or USGBC approved equivalent standard for projects outside the U.S.](#)).

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and

the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ANSI/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

3.5 Supply Air Temperature Reset (VAV)

3.9 Premium Economizer Performance

3.10 Variable Speed Control

To be eligible for Option 3, the project must be less than 100,000 square feet (9 290 square meters).

Note: Healthcare, Warehouse or Laboratory projects are ineligible for Option 3.

## Alternative Compliance Paths (ACPs)

### Canada ACP - NECB

Projects in Canada may instead demonstrate a percentage improvement in the proposed building performance rating compared with the baseline according to the National Energy Code for Buildings (NECB) 2011. The same percentage cost improvement in energy performance is required to meet the Prerequisite, and the same points for cost percentage improvement in energy performance are applicable for the Credit.

The following conditions (where applicable) must be met. Note that unless otherwise noted, CanQUEST (the Canadian energy modelling software based on eQUEST that performs NECB 2011 compliance runs) does not implement many of these conditions correctly and would require corresponding modifications to the Reference case.

#### 1. Comply with mandatory requirements of ASHRAE 90.1-2010

ASHRAE 90.1-2010 mandatory requirements must be met, in addition to the performance path limitations referenced in the NECB 2011 Sections 3.4.1.2, 5.4.1.2 and 6.4.1.2. In cases where ASHRAE and the NECBC reference requirements concerning the same item, the more stringent requirement shall be adhered to.

The following exceptions apply:

▫ ASHRAE 90.1-2010 mandatory items 6.4.3.9, 9.4.1.2b, 9.4.1.4, 9.4.1.5, 9.4.3

#### 2. Apply fenestration area convention similar to ASHRAE 90.1-2010

Maintain the same FWR (as defined by NECB, including doors) for the Reference as exists in the Proposed Design, up to the prescribed maximum. If the Proposed Design's FWR exceeds the prescribed FWR, scale down the fenestrations in the Reference case accordingly.

#### 3. Apply skylight area convention similar to ASHRAE 90.1-2010

Maintain the same SRR for the Reference as exists in the Proposed Design, up to the prescribed 5% maximum. If the Proposed Design's SRR exceeds 5%, scale down the skylights in the Reference case accordingly.

#### 4. Model proposed and reference outside air similar to ASHRAE 90.1-2010

Proposed and reference (baseline) outside air rates shall be modeled as per ASHRAE 90.1 – 2010 (G3.1.2.6).

#### 5. Apply ASHRAE kitchen exhaust demand ventilation requirements

Provide for the same demand ventilation requirements as described in ASHRAE Appendix G3.1.1.d.

#### 6. Apply ASHRAE's chiller heat recovery requirements

Provide for the same chiller heat recovery requirements as applies to ASHRAE.

#### 7. Apply supply air temperature reset controlled based on warmest zone

Reset the minimum supply air temperature to satisfy the cooling requirements of the warmest zone, as stipulated in NECB Section 5.2.8.8. Note that this control setting is already corrected in CanQUEST for the Reference case.

#### 8. Account for uninsulated structural penetrations if they exceed 2% of net wall area

The 2% allowance may be applied, but based on the net opaque wall area, not the entire building envelope area.

#### 9. Follow ASHRAE/LEED rules for renovations to existing buildings

Model existing components consistent with ASHRAE and LEED provisions.

#### 10. Account for all anticipated energy use in building

Fully account for all energy end-uses in the energy performance modelling.

#### 11. DES Systems are to be modeled according to Option 1, Path 1 or Option 1, Path 2 as indicated in the LEED v4 Reference Guide

The following exceptions apply:

▫ Option 1, Path 1 - Do not apply ASHRAE 90.1-2010 requirements for purchased heating and cooling. Under this ACP, purchased heating and cooling (as applicable) are modeled as cost-neutral in the baseline and proposed case. Local rates

for purchased heating (fossil fuel based) and cooling are used to establish the purchased heating and cooling costs. The energy model's scope accounts for only downstream equipment, plus purchased heating and cooling. NECB clause 8.4.3.6 does not apply for LEED projects.

- Model baseline systems in accordance with NECB requirements, with DX coils replaced with chilled water coils if purchased cooling is present and fossil-fired furnaces replaced with hot water coils if purchased heating is present.
- Option 1, Path 2: Do not apply ASHRAE 90.1-2010 requirements for baseline systems. Model baseline systems in accordance with NECB requirements for onsite generated equipment (i.e. assume building is not connected to a DES and the proposed building is modeled with a virtual plant according to LEED v4 Reference Guide requirements).

### Pilot ACPs Available

The following pilot alternative compliance paths are available for this prerequisite. See the [pilot credit library](#) for more information.

[EApc92: Advanced Buildings™ New Construction Guide](#)

[EApc95: Alternative Energy Performance Metric](#)

[EApc107: Energy Performance Metering Path](#)

[EApc111: Alternative Performance Rating Method](#)

[EApc120: District Energy](#)