| v4 - LEED v4

Minimum energy performance

Required

Glossary

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

Whole-building energy simulation

Demonstrate a 5% improvement in the proposed performance rating over the baseline performance rating. To determine total energy cost savings, create two models, one for building energy cost and the other for IT equipment energy cost. 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 for the whole building and data center modeling guidelines.

Determine the power utilization effectiveness (PUE) value of the proposed design.

For this prerequisite, a minimum of 2% of the 5% energy savings must come from building power and cooling infrastructure.

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 ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.), and data center modeling guidelines.

For data centers, regulated energy includes cooling units for computer and data processing rooms, critical power conditioning equipment, critical distribution equipment, heat rejection plants, and mechanical and electrical support rooms.

Include in process loads both the unregulated load and the IT equipment load. The IT load comprises critical systems and electrical power transformation, which may include servers, storage and networking power use, and operations affecting monthly server CPU utilization percentages.

Develop two sets of IT load models using two scenarios, one at the maximum estimated IT load rating and the second at the startup IT rating expected at the time of commissioning.

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, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2010, G2.5) to document measures that reduce unregulated loads.

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 improvement in energy performance is required to meet the Prerequisite, and the same points for 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 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.

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.

Pilot ACP Available

A pilot alternative compliance path is available for this prerequisite. See the pilot credit library for more information.
EApc92: EA Pilot ACP: Advanced Buildings™ New Construction Guide