National Definition of a Zero Emissions Building: Part 1 Operating Emissions

Version 1.00, Draft Criteria

This draft is pre-decisional and for initial discussion purposes only.

Intent: A broadly accepted minimum definition of a zero emissions building, as well as a pathway for documentation, is foundational to efforts by public and private entities to transition the building sector to zero greenhouse gas emissions. The intent of the National Definition of a Zero Emissions Building is to create a standardized, consistent, measurable basis for zero emissions buildings. This clear market signal and consistent target, backed by measurable data, is intended to help move the building sector to zero emissions. The definition may serve as a framework that users can achieve through multiple pathways to influence the design and operation of buildings to substantially reduce building sector emissions.

Applicability: This definition can be applied to existing buildings and new construction of non-federally owned buildings. This definition is not intended for federally owned buildings, which are governed as a portfolio through statutory and executive guidance.

National Definition of a Zero Emissions Building: Part 1 Operating Emissions (Version 1.00), Draft Criteria

A zero operating emissions building is one that is:

- Highly energy efficient,
- Free of on-site emissions from energy use, and
- Powered solely from clean energy.

While Part 1 focuses on operational emissions, which have well-established measurement protocols, reducing the whole life cycle emissions of a building also requires minimizing the embodied carbon of the building as well as minimizing the impacts of refrigerants. Such emissions may be addressed in parts of the definition that will be released at a later date.

Definition, Draft Criteria

A zero operating emissions building meets the following criteria:

1. **Highly energy efficient**:

   The **existing building's** energy performance places it among the top 25% most efficient buildings in the market with a similar use, based on measured whole-building energy use.

The **new building's** estimated whole building energy use is at least 10% lower than the energy use according to the latest IECC[1][2] or ASHRAE[3][4] 90.1 model code, and the building is designed to achieve energy performance in the top 10% of similar buildings.

2. **Free of on-site emissions** from energy use:

   The building's direct greenhouse gas emissions from energy use equal zero.

3. Powered solely from **clean energy**:

   All the building's energy is from carbon-free sources (which can include onsite generation and off-site sources).

Method of Measurement, Draft

The definition applies to whole building operational emissions, including those from tenants. For existing buildings, an ENERGY STAR score of 75 or higher or measured whole building energy use intensity (EUI) at least 35% better than median EUI (for buildings ineligible for the ENERGY STAR score) meets these criteria.

For new construction, whole building energy use modeled to be at least 10% lower than the energy use according to the latest IECC or ASHRAE 90.1 model code and designed to achieve an ENERGY STAR score of 90 or higher (for buildings eligible for the ENERGY STAR score) meet these criteria. Building energy use includes energy used by tenants, if applicable.

Direct or Scope 1 greenhouse gas (GHG) emissions from energy use must equal zero, meaning that no fossil fuels may be combusted onsite. The only exception is for testing and use of backup generators when grid power is unavailable.

A building can meet the requirement to be powered solely by clean energy through any combination of on- and off-site clean energy, as long as its emissions equal zero. Qualified clean energy procurement shall meet at least one of the following:

- The requirements of ASHRAE Standard 228 Sections 8.3 to 8.5
- The U.S. Environmental Protection Agency's (EPA) Greenpower Partnership guidelines
- Green-e certified and surplus to regulation (if 100% green power product)

In addition, district energy must be generated from clean, emission-free sources. Carbon offsets are not permitted to meet this definition.

[1] International Energy Conservation Code: Digital Codes (iccsafe.org)
[2] For single-family and low-rise multifamily properties
ASHRAE Standard 90.1-2022—Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings
[4] For commercial buildings, including multifamily properties great than three stories

Consumption and production energy flows and associated emissions can be aggregated on an hourly basis, including following 24/7 methodologies, if data exist to show a cumulative sum of zero emissions.

Alternative measurement methods with 12 months of whole-building measured (or modeled, in the case of new construction) energy data may be used to meet the definition if those methods can show that they meet or exceed each of the three criteria and do not trade off among the criteria.

Verification

EPA's ENERGY STAR Portfolio Manager will generate standardized documentation that can be independently verified through licensed professionals and/or third-party certification bodies or others as determined by the organization using the zero emissions building definition. This documentation will include:

- ENERGY STAR score and/or percent below EUI national median (based on 12 months of measured whole-building data), or projected ENERGY STAR score (based on modeled whole building EUI).
- Onsite fuel use and associated emissions (documentation that these equal zero)
- GHG emissions from grid-based power used.
- Total "market based" GHG emissions from energy use.
- Green power information: vintage of renewable facility; REC certification status; REC location of generation; REC ownership/retirement.

Other approaches may be used to document that a building has met the definition if such methods:

- Meet or exceed the criteria.
- Are based on 12 months of whole-building energy use (measured for existing buildings; modeled for new construction).
- Document that the building has met each of the criteria independently, with no trade-offs.

Version 1.00 of the definition focuses on operational emissions only and does not require documentation of the use of low embodied carbon materials and low GWP[5] refrigerants. However, low embodied carbon materials, low GWP refrigerants, and grid-interactive equipment are necessary to transition the building sector to zero emissions. Documentation of those elements may be required in future versions.

While electric vehicle support equipment (EVSE) is not considered part of the building load, it is one of the key components supporting reduced transportation-related emissions.

[5] GWP: Global Warming Potential

Criteria Updates

The United States Government intends to periodically reevaluate the requirements for each criterion of the National Definition of a Zero Emissions Building and potentially revise them based on the market's response and the advancement of demonstrated efficiency, clean energy, and low carbon activity in buildings.