



Shaping Tomorrow's  
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January 31, 2024

Mr. Jeff Marootian  
Principal Deputy Assistant Secretary  
U.S. Department of Energy  
Office of Energy Efficiency and Renewable Energy 1000  
Independence Avenue SW  
Washington, DC 20585

**Re: National Definition for a Zero Emissions Building: Part 1 Operating Emissions Version 1.00,  
Draft Criteria**

Dear Principal Deputy Assistant Secretary Marootian:

Thank you for the opportunity to provide input on *the National Definition for a Zero Emissions Building: Part 1 Operating Emissions Version 1.00, Draft Criteria*. A national definition for zero-emission buildings will be essential in U.S. efforts to combat climate change, transform the building sector, and move towards a sustainable and resilient future. ASHRAE, founded in 1894, is a technical society advancing human well-being through sustainable technology for the built environment. The Society and its more than 53,000 individual members – comprising engineers, academics and other professionals in the buildings industry – focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability within the industry. ASHRAE responses to the RFI questions are provided below.

**A. Are the draft criteria clear and appropriate for the definition for a zero emissions building?  
Should any other criteria be considered for Part 1?**

The criteria are appropriate but need some clarifications.

Clarifications are recommended in the following areas:

- Need to clarify if purchasing electricity from an electricity grid that is not 100% emission free is not allowed, even if an equivalent amount of on-site clean, renewable energy is generated and fed into the grid.
- The phrase “measured whole-building energy use” needs to be defined. Does this include or exclude on-site renewable energy generation?

- The definition of the reference model national code needs to specify the edition of the model code. Specifically, the reference to the IECC code does not appear to be tied to a specific year, while the reference to Standard 90.1 is indicated in the footnote as 90.1-2022 because the national model codes are updated continuously to increase energy efficiency every three years. Without a reference to a baseline year, the requirement to have energy use 10% less than the latest code would continue to change with each most recent code and may make it not feasible. The codes are updated in 2-3 code cycles.
- The definition appears appropriate for the normal operation of buildings when electric power is available. Will the definition also restrict fossil fuel use for emergency power and heating use during power outages?

In addition, the definition needs to clarify whether onsite electric vehicle energy and landscaping equipment energy inside the buildings should be considered in Part 1. Please consider the definitions of ASHRAE Standard 228 on this topic, which is an ANSI standard.

## **B. Energy Efficiency Criteria**

**Should energy efficiency be considered a criteria for the definition of a zero emissions building?**

Yes.

**If the efficiency of an existing building should be considered, do you agree that requiring energy performance in the top 25% of similar buildings is an appropriate measure of energy efficiency for this definition? (ENERGY STAR® score of 75 or above.) Should it be higher or lower?**

Agreed that the top 25% is appropriate for zero emissions building but may want to correspond to the same climate zones.

**Are there other benchmarks or approaches that should be considered?**

One possibility is allowing 25% or better of similar buildings from the benchmarking ordinance data in different cities. Since ENERGY STAR data is limited and only updated periodically, each city's energy benchmarking data likely includes more of the latest buildings in that area for comparison. In addition, DOE/EPA should evaluate the statistical validity of the ENERGY STAR dataset subset for a given locality. This should not be used if it is not statistically valid.

**For an existing building, is one year of measured energy performance an appropriate requirement for demonstrating efficiency or is another approach appropriate?**

Given the weather data has been warming yearly, one year of measured energy performance should be normalized if compared to existing data. Several years of data provide better benchmarking.

**For new construction, are the draft criteria appropriate? The modeled building performance is at least 10% lower than the energy use according to the latest version of IECC or ASHRAE 90.1 ( e.g., model energy code) and the building is designed to achieve an ENERGY STAR score of at least 90 (for eligible buildings). Are there other benchmarks that should be considered?**

One possibility is allowing at least 10% lower than similar buildings inside the benchmarking ordinance data in different cities. Since ENERGY STAR data is only updated periodically, each city's energy benchmarking data likely includes more of the latest buildings in that area for comparison.

In addition, it is unclear if 10% more stringent than model codes' s equivalence with the ENERGY STAR score of 90 or above. We suggest DOE analyze code equivalency to the ENERGY STAR Score.

**Are the draft criteria appropriate for single family homes? Are there other benchmarks that should be considered for single family homes?**

If applied to single family homes, other usage beyond the building, e.g., landscaping, swimming pool conditioning, outdoor spa, etc., will need to be accounted for. Also, new single-family buildings should consider ASHRAE Standard 90.2 for new construction and ASHRAE Standard 100-2024 for existing homes.

#### **C. On-Site Emissions From Energy Use**

**Should there be an exemption allowed for emission producing emergency generation? Are any other exemptions needed?**

Yes. Consider allowing combustion on site for residential cooking, emergency generators, backup fossil fuel for space heating, and hot water heating in cold climates, especially during power outages.

#### **D. Clean Energy Generation and Procurement**

**Are the clean energy criteria provided appropriate for this definition? Are there other clean energy criteria that should be considered? Should community solar qualify for this requirement? If so, how?**

Community solar should be allowed for residential projects (refer to the 2022 Title 24 Residential Energy Code for more information). The definition will need to consider how to address renewable energy generation in campuses and facilities with large renewable energy generation within their internal electric grid serving multiple buildings. Considerations would include how to document how much renewable energy is assigned to each building.

## **E. Documentation is Important for Effective Implementation**

**Should organizations leveraging the definition be able to determine whether buildings have to meet it annually, one time, or on a different frequency?**

Annually, and a building should meet that requirement every year.

**If the definition is extended to single-family homes, what documentation should be required?**

Definition and application (certification, etc.) for single-family homes should be easy for homeowners to implement. If the definition is extended to single-family homes, please consider using a simplified version of ENERGY STAR or ASHRAE Standard 100-2024 for existing residential buildings and ASHRAE Standard 90.2 for new homes. Consider energy usage beyond the dwelling units in residential buildings (e.g., swimming pool conditioning, electric heater outdoors, landscape equipment, snow blowers, holiday lights, and other usages beyond the building).

**Are licensed professional and third-party certification bodies the appropriate parties to independently verify the documentation that a building has met the definition? Beyond existing government resources such as EPA's ENERGY STAR Portfolio Manager, are there other methods to verify meeting the zero emissions building definition?**

City benchmarking ordinances, such as the one in Chicago, will require independent registered professionals to certify the benchmarking data for commercial buildings.

**What time frame should be used for greenhouse gas (GHG) calculations ( *i.e.* hourly, monthly by year, annually)? Explain how this would be implemented effectively across the market.**

We do not believe the hourly data is available from all utilities nationwide to calculate the hourly GHG emissions.

**What other verification criteria are necessary to make this definition useful for the marketplace?**

We recommend adding the compliance or verification forms as in Standard 228 Appendix A, which documents the GHG emissions, energy use, and others of buildings.

**Are there any issues regarding conflict or synergy with regional, state or local energy and climate programs that ought to be addressed?**

Alignment with international definitions will be helpful, such as the Energy Performance Building Directive Zero Emission Building definition from the EU.

**F. Use Cases**

**Is it important for a national definition to cover all building types, including commercial, multifamily, and single-family?**

A national definition framework should cover all building types in general. Otherwise, it will show priority in the selected sector(s). The specifics may need to be different with different typologies.

**Are there any other recommendations that would help clarify and improve the definition?**

Refer to comments on Question A.

**While Part 1 of the definition focuses on operating emissions, what other areas should be considered in future parts of the definition, such as embodied carbon, refrigerant, and grid interactivity?**

The logical next step is to include refrigerant emissions since the calculation methodology is included in ASHRAE Standard 228. Embodied carbon calculations will likely need to be gradually introduced as the data and EPDs become available. We also encourage DOE to coordinate and collaborate with ASHRAE on the new standard development, i.e., Standard 242P, which aims to develop a methodology to standardize the calculation of building operational energy GHG emissions.

Thank you for your consideration of ASHRAE's input. As a global technical society that develops consensus-based building standards, grounded in the latest building science and technology, we would be happy to provide any additional assistance as you finalize this definition. If you would like any clarification on the submitted responses or have other questions, please contact [GovAffairs@ASHRAE.org](mailto:GovAffairs@ASHRAE.org).

Sincerely,



Ginger Scoggins  
2023-2024 ASHRAE President