



**BSR/ASHRAE/IES Addendum ck
to ANSI/ASHRAE/IES Standard 90.1-2016**

Public Review Draft

Proposed Addendum ck to Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings

**First Public Review (February 2019)
(Draft Shows Proposed Changes to Current Standard)**

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FOREWORD

This proposal adds language for Section 11 to address the new proposed renewable energy requirements in addendum BY. The proposed approach allows a proposed design that does not include renewable energy required by Section 10.5.1 a method of trade off against other prescriptive requirements in the Standard. In that case the renewable energy allowance included in the budget building design will be based on a horizontal photovoltaic array with a rated capacity equal but not to exceed the requirement in Section 10.5.1.1. For proposed designs that include an on-site renewable energy system the budget building design allowance will be based on the proposed renewable energy system design with a rated capacity equal but not to exceed the requirement in 10.5.1.1.

This addendum impacts an optional performance path in the standard designed to provide increased flexibility and therefore was not subjected to cost effectiveness analysis.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes. Only these changes are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.

Addendum ck to 90.1-2016

Revise the Standard as follows (IP Units)

11.4 Simulation General Requirements

11.4.1 Simulation Program

The *simulation program* shall be a computer-based program for the analysis of *energy* consumption in *buildings* (a program such as, but not limited to, DOE-2 or BLAST). The *simulation program* shall include calculation methodologies for the *building* components being modeled.

Exception

When approved by the *adopting authority*, a separate computer-based program shall be permitted to be used to calculate *on-site renewable energy*.

11.4.3 Renewable, Recovered, and Purchased Energy

11.4.3.1 On-Site Renewable Energy and Site-Recovered Energy

Site-recovered energy shall not be considered *purchased energy* and shall be subtracted from the *proposed design energy* consumption prior to calculating the *design energy cost*. *On-site renewable energy* shall be subtracted from the *proposed design energy* consumption prior to calculating the *design energy cost* provided that the building owner either:

1. owns the *on-site renewable energy system* or
2. has signed a lease agreement for the *on-site renewable energy system* for at least 15 years or
3. has signed a contractual agreement to purchase *energy* generated by the *on-site renewable energy system* for at least 15 years.

The reduction in *design energy cost* associated with *on-site renewable energy* that exceeds the *on-site renewable energy* required by Section 10.5.1.1 shall be no more than 5% of the calculated *energy cost budget*.

On-site renewable energy included in the *budget building design* shall be subtracted from the *budget building design energy* consumption prior to calculating the *energy cost budget*.

11.4.3.2 Annual Energy Costs

The *design energy cost* and *energy cost budget* shall be determined using rates for *purchased energy* (such as electricity, gas, oil, propane, steam, and chilled water) that are approved by the *adopting authority*. Where *on-site renewable energy* or *site-recovered energy* is used in excess of what is required in the *budget building design* by Table 11.5.1, the *budget building design* shall be based on the *energy* source used as the backup *energy* source, or electricity if no backup *energy* source has been specified. Where the proposed design includes *on-site electricity generation systems* other than *on-site renewable energy systems*, the baseline design shall include the same generation systems excluding its *site-recovered energy*.

Table 11.5.1 Modeling Requirements for Calculating Design Energy Cost and Energy Cost Budget

15. On-site renewable energy

On-site renewable energy in the proposed design shall be determined as follows:

- a. Where a complete system providing on-site renewable energy exists, the model shall reflect the actual system type using actual component capacities and efficiencies.
- b. Where a system providing on-site renewable energy has been designed, the system model shall be consistent with design documents.
- c. Where no system exists or is specified to provide on-site renewable energy, no system shall be modeled.

On-site renewable energy shall be included in the budget building design when required by Section 10.5.1 and shall be determined as follows:

- a. Where a system providing on-site renewable energy has been modeled in the proposed design the same system shall be modeled in the budget building design with a rated capacity meeting the requirements of Section 10.5.1.1. Where more than one type of on-site renewable energy system is modeled the total capacities shall be allocated in the same proportion as in the proposed design.
- b. Where no system exists or is specified to provide on-site renewable energy in the proposed design, on-site renewable energy shall be modeled as an unshaded photovoltaic system with the following physical characteristics:
 - Size: Rated capacity per Section 10.5.1.1
 - Module Type: Crystalline Silicon Panel with a glass cover, 15% nominal efficiency and temperature coefficient of -0.47 %/°C. Performance shall be based on a reference temperature of 77°F (25°C) and irradiance of 317 Btu/ft²-hr (1,000 W/m²).
 - Array Type: Rack mounted array with installed nominal operating cell temperature (INOCT) of 103°F (45°C).
 - Total System losses (DC output to AC output): 14 %
 - Tilt: 0-degrees (mounted horizontally)
 - Azimuth: 180 degrees

If the on-site renewable energy system cannot be modeled in the simulation program Section 11.4.5 shall be used.

Section 11.4.3.2 is also modified by addendum bk which is not yet published. If both addenda are published, the section will appear as follows. Text that did not appear in addendum bk or in the previous sections of this draft, are shown below in strikethrough/underline:

11.4.3.2 Annual Energy Costs

The *design energy cost* and *energy cost budget* shall be determined using rates for *purchased energy* (such as electricity, gas, oil, propane, steam, and chilled water) that are approved by the *adopting authority*. Where *on-site renewable energy* or *site-recovered energy* is in excess of what is required in the *budget building design* by Table 11.5.1, the *budget building design* shall be based on the *energy source* used as the backup *energy source*, or electricity if no backup *energy source* has been specified. Where the proposed design includes *on-site electricity generation systems* other than *on-site renewable energy systems*, the baseline design shall include the same generation systems excluding its *site-recovered energy*.