



**BSR/ASHRAE/IES Addendum aq
to ANSI/ASHRAE/IES Standard 90.1-2022**

Public Review Draft

Proposed Addendum aq to Standard 90.1-2022, Energy Standard for Sites and Buildings Except Low- Rise Residential Buildings

**First Public Review (September 2024)
(Draft Shows Proposed Changes to Current Standard)**

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This proposal increases the required on-site rated capacity from 0.5 W/sf to 0.75 W/sf. The changes made here are to ASHRAE Std 90.1-2022 including addendum K. This proposal fixes unit conversion errors in Table 10.5.1.3 and defines the units used in equation for TRE_{OFF} , the total off-site renewable energy. This proposal also updates the reference to the Green-e standard for qualifying RECs to its latest version.

A cost-effectiveness evaluation was conducted comparing the installed cost of a photovoltaic system with a capacity of 0.75 W/sf applied to the areas of the three largest floors for the ASHRAE prototypes for all climate zones. The first cost of the photovoltaic system divided by the annual operating cost savings was less than the scalar ratio threshold and thus was cost-effective. The energy cost savings value is conservative as it does not include any value for electricity that might be exported.

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard 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 changes.]

Addendum aq to 90.1-2022

Modify Section 10.5 as shown

10.5 Prescriptive Compliance Path

10.5.1 Renewable Energy Resources. Buildings shall be served by *renewable energy resources* in accordance with either Section 10.5.1.1 or Section 10.5.1.2 or a combination thereof in accordance with Section 10.5.1.2.

Exceptions to 10.5.1:

1. Buildings or additions in which the sum of the *gross conditioned floor area* of the three largest floors of the building or addition is less than 10,000 ft² (930 m²).
2. Alterations.
3. Projects meeting the requirements of Section 10.5.1.4.

10.5.1.1 On-Site Renewable Energy Capacity. The building site shall have equipment for *on-site renewable energy* with a rated output capacity of not less than ~~0.50~~ 0.75 W/ft² or ~~4.7~~ 2.6 Btu/h/ft² (8.1 W/m²) multiplied by the sum of the *gross conditioned floor area* for all floors up to the three largest floors.

[Note: I-P edition will have two capacity values as shown above. SI will only include the 8.1 W/m²]

Exceptions to 10.5.1.1: Buildings complying with Section 10.5.1.3 and not less than one of the following:

1. Buildings located where an unshaded flat plate collector oriented toward the equator and tilted at an angle

from horizontal equal to the latitude receives an annual daily average incident solar radiation less than 1.1 kBtu/ft²·day.

2. *Buildings* where more than 80% of the *roof* area is covered by any combination of planters, vegetated *space*, *skylights*, occupied *roof* deck, or *equipment* other than renewable energy systems.
3. *Buildings* where more than 50% of *roof* area is shaded from direct-beam sunlight by natural objects or by *structures* that are not part of the *building* for more than 2500 annual hours between 8:00 a.m. and 4:00 p.m.

Table 10.5.1.3 Annual Off-Site Renewable Energy Requirement (I-P)

Climate Zone	Annual Off-Site Renewable Energy, kWh/W or kBtu/(Btu/h)
1A, 2B, 3B, 4B 5B and 3C	1.75 (5.971)
0A, 0B, 1B, 2A,3A and 6B	1.55 (5.289)
4A, 4C, 5A, 5C, 6A, and 7, and 8	1.35 (4.606)

Table 10.5.1.3 Annual Off-Site Renewable Energy Requirement (SI)

Climate Zone	Annual Off-Site Renewable Energy, kWh/W
1A, 2B, 3B, 4B 5B and 3C	1.75
0A, 0B, 1B, 2A,3A and 6B	1.55
4A, 4C, 5A, 5C, 6A, and 7, and 8	1.35

10.5.1.2 Off-Site Community Renewable Energy. Renewable energy shall be procured for the *building* from a local *community renewable energy facility* in accordance with Sections 10.5.1.3. The *community renewable energy facility* shall be located within the same electric utility provider service territory as the *site* and comply with one or more of the following:

- a. The *community renewable energy facility* is located within the same county or an adjacent county.
- b. The *community renewable energy facility* is located within 60 mi (100 km) of the *site*.

10.5.1.3 Off-Site Renewable Energy Procurement. Off-site renewable energy shall be procured for *buildings* in accordance with Sections 10.5.1.3.1 and 10.5.1.3.2 and shall be not less than the total off-site renewable energy determined as follows:

$$TRE_{OFF} = [(REN_{OFF} \times 0.50 \text{ W/ft}^2 \times FLRA) - IRE_{ON}] \times 15$$

(I-P edition)

$$TRE_{OFF} = ([0.75 \text{ W/ft}^2 \times FLRA] - IRE_{ON}) \times REN_{OFF} \times 15$$

or

$$TRE_{OFF} = ([2.6 \text{ Btu/h/ft}^2 \times FLRA] - IRE_{ON}) \times REN_{OFF} \times 15$$

where

- TRE_{OFF} = total off-site renewable energy to be procured in kWh or kBtu
- REN_{OFF} = annual off-site renewable energy requirement of renewable system capacity from Table 10.5.1.3, kWh/W per year or kBtu/(Btu/h) per year
- FLRA = the sum of the *gross conditioned floor area* of the three largest floors, ft²
- IRE_{ON} = ~~annual~~ *on-site renewable energy generation* installed capacity in W or Btu/h quantity in accordance with Section 10.5.1.1

(SI edition)

$$TRE_{OFF} = \frac{[(8.1 \text{ W/m}^2 \times FLRA) - IRE_{ON}] \times REN_{OFF} \times 15}{1000}$$

where

- TRE_{OFF} = total off-site renewable energy to be procured in kWh
- REN_{OFF} = annual off-site renewable energy requirement ~~of renewable system capacity~~ from Table 10.5.1.3, kWh/W per year
- $FLRA$ = the sum of the *gross conditioned floor area* of the three largest floors, m²
- IRE_{ON} = ~~annual on-site renewable energy generation~~ installed capacity in W ~~quantity in accordance with Section 10.5.1.1~~

10.5.1.3.1 Off-Site Renewable Energy Procurement Paths. The *building* owner shall procure and be credited for not less than the total amount of off-site renewable energy required by Section 10.5.1.3, using one or more of the following:

- a. A *community renewable energy facility* for projects complying with Section 10.5.1.2.
- b. A *physical renewable energy power purchase agreement* for projects qualifying for an exception to Section 10.5.1.1.
- c. A *financial renewable energy power purchase agreement* for projects qualifying for an exception to Section 10.5.1.1.
- d. An off-site renewable energy system owned by the *building* property owner for projects qualifying for an exception to Section 10.5.1.1.

Generation sources shall be located where the energy can be delivered to the building *site* by any of the following:

- a. Direct connection to the off-site renewable energy facility.
- b. The local utility or distribution entity.
- c. An interconnected electrical or pipeline network where energy delivery capacity between the generator and the building *site* is available.

10.5.1.3.2 Off-Site Renewable Energy Contract Terms. The total off-site renewable energy shall be delivered or credited to the building *site* under an energy contract with a duration of not less than ten years. The contract shall be structured to survive a partial or full transfer of ownership of the *building* property.

10.5.1.4 Renewable Energy Certificate Purchase. Where it can be demonstrated to the code official that the requirements of Sections 10.5.1.1 through 10.5.1.3 or a combination of the three cannot be met, either in part or full, and prior to the issuance of the certificate of occupancy, the *building* owner shall document a contract for delivery of *renewable energy certificates* certified in compliance with the Green-e® Renewable Energy Standard for Canada and the United States, or an equivalent *approved* standard, equal to three times the amount of total off-site renewable energy calculated in accordance with Section 10.5.1.3.

Informative Note: For building projects located in nations other than Canada or the United States, use the Green-e® Standard for that nation, or equivalent *approved* standard.

10.5.1.5 Energy Certificate Documentation. The property owner or owner's authorized agent shall demonstrate that for an *on-site renewable energy system* or off-site renewable energy *system* required by Section 10.5.1, either no *RECs* are associated with the renewable energy system, or the following provisions for *RECs* have been met:

- a. The *RECs* are retained and retired by or on behalf of the property owner or tenant for a period of not less than ten years.
- b. The *RECs* are created within a 12-month period of the use of the *REC*.
- c. The *RECs* are from a generating asset placed in service no more than five years before the issuance of the *building's* certificate of occupancy.

Modify Section 13 as shown.

13. NORMATIVE REFERENCES

<u>Reference</u>	<u>Section</u>
<u>Green-e® c/o Center for Resource Solutions</u> <u>1012 Torney Ave., Second Floor, San Francisco, CA 94129</u>	
<u>Green-e® Version 4.3 (2024)</u>	<u>10.5.1.4</u>
<u>Green-e Renewable Energy Standard for Canada</u> <u>and the United States</u>	