ANSI/ASHRAE/IES Addendum k to
ANSI/ASHRAE/IES Standard 90.1-2022

Energy Standard for
Sites and Buildings
Except Low-Rise
Residential Buildings

Approved by the ASHRAE Standards Committee on March 27, 2024, by the Illuminating Engineering Society on March 15, 2024, and by and the American National Standards Institute on April 22, 2024.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 180 Technology Parkway, Peachtree Corners, GA 30092. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.
SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus Standard developed under the auspices of ASHRAE. Consensus is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this Standard as an ANS, as “substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution.” Compliance with this Standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Senior Manager of Standards of ASHRAE should be contacted for
a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
d. permission to reprint portions of the Standard.

DISCLAIMER

ASHRAE uses its best efforts to promulgate Standards and Guidelines for the benefit of the public in light of available information and accepted industry practices. However, ASHRAE does not guarantee, certify, or assure the safety or performance of any products, components, or systems tested, installed, or operated in accordance with ASHRAE’s Standards or Guidelines or that any tests conducted under its Standards or Guidelines will be nonhazardous or free from risk.

ASHRAE INDUSTRIAL ADVERTISING POLICY ON STANDARDS

ASHRAE Standards and Guidelines are established to assist industry and the public by offering a uniform method of testing for rating purposes, by suggesting safe practices in designing and installing equipment, by providing proper definitions of this equipment, and by providing other information that may serve to guide the industry. The creation of ASHRAE Standards and Guidelines is determined by the need for them, and conformance to them is completely voluntary.

In referring to this Standard or Guideline and in marking of equipment and in advertising, no claim shall be made, either stated or implied, that the product has been approved by ASHRAE.
(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

In many cases, on-site renewable energy requirements in ANSI/ASHRAE/IES Standard 90.1 can not be met with installed systems on every building or building site. Addendum k defines qualifying off-site sources of renewable energy that can be applied to the renewable energy requirements and under which conditions off-site procurement can be used. Certain requirements for tracking and disposition of renewable energy credits are included in the provisions. Because this addendum adds additional compliance options to the existing requirements, it was not subject to a separate cost-effectiveness analysis, but it is expected to either have no impact or improved cost effectiveness. The following flowchart explains the new requirement.

**Flowchart:**

1. **10.5.1 Is the building a new building or addition above 10,000 s.f.?**
   - **No**
   - **Yes**

   **Yes**
   - 10.5.1.1 Does the building have sufficient roof space and daylight for on-site solar?
     - **Yes**
     - **No**

   **No**
   - Exempt from Renewables Requirement

   **Yes**
   - Option 1: 10.5.1.1 Install 0.5W/s.f. on-site renewable energy or
   - Option 2: 10.5.1.2 Procure Local Off-site Community Renewable Energy

   **10.5.1.3 Is Qualifying Off-Site Renewable Energy Available?**
     - **Yes**
     - **No**

   **10.5.1.3 Procure equivalent amount of renewable energy off-site**
   **10.5.1.4 Purchase 3X equivalent RECS**

**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.
Modify Section 3.2 as shown (I-P and SI).

community renewable energy facility: a facility that produces energy harvested from renewable energy resources and is qualified as a community renewable energy facility under applicable regulations.

financial renewable energy power purchase agreement: a financial arrangement between a renewable energy generator and a purchaser wherein the purchaser pays or guarantees a price to the generator for the project’s renewable generation. Also known as a “financial power purchase agreement” or “virtual power purchase agreement.”

physical renewable energy power purchase agreement: a contract for the purchase of renewable energy from a specific renewable energy generator to a purchaser of renewable energy.

renewable energy resources: energy from solar, wind, biomass harvested at the building site, or hydro, or extracted from hot fluid or steam heated within the earth.

Modify Section 3.2 as shown (I-P).

renewable energy certificate (REC): a market-based instrument that represents and conveys the environmental, social, and other nonpower attributes of one megawatt-hour of renewable electricity generation or 3412 kBtu of renewable thermal energy or bioenergy production and could be sold separately from the underlying physical energy associated with renewable energy resources; also known as “energy attribute” or “energy attribute certificate” (EAC).

Modify Section 3.2 as shown (SI).

renewable energy certificate (REC): a market-based instrument that represents and conveys the environmental, social, and other nonpower attributes of one megawatt-hour of renewable electricity generation or renewable thermal energy or bioenergy production and could be sold separately from the underlying physical energy associated with renewable energy resources; also known as “energy attribute” or “energy attribute certificate” (EAC).

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 complying with 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. The building site shall have equipment for on-site renewable energy with a rated capacity of not less than 0.50 W/ft² or 1.7 Btu/ft² multiplied by the sum of the gross conditioned floor area for all floors up to the three largest floors.

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

1. Any building 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. Any building where more than 80% of the roof area is covered by any combination of equipment other than for on-site renewable energy systems, planters, vegetated space, skylights, or occupied roof deck, or equipment other than renewable energy systems.
3. Any building 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.
4. New construction or additions in which the sum of the gross conditioned floor area of the three largest floors of the new construction or addition is less than 10,000 ft².
5. Alterations.
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:

\[ \text{TRE}_{\text{OFF}} = [(\text{REN}_{\text{OFF}} \times 0.50 \text{ W/ft}^2 \times \text{FLRA}) - \text{IRE}_{\text{ON}}] \times 15 \]

where

- \( \text{TRE}_{\text{OFF}} \) = total off-site renewable energy to be procured
- \( \text{REN}_{\text{OFF}} \) = annual off-site renewable energy of renewable system capacity from Table 10.5.1.3
- \( \text{FLRA} \) = the sum of the gross conditioned floor area of the three largest floors
- \( \text{IRE}_{\text{ON}} \) = annual on-site renewable energy generation 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 **Renewable 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.
POLICY STATEMENT DEFINING ASHRAE’S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members’ activities on both the indoor and outdoor environment. ASHRAE’s members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE’s short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its Handbook, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system’s intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE’s primary concern for environmental impact will be at the site where equipment within ASHRAE’s scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.
About ASHRAE

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

To stay current with this and other ASHRAE Standards and Guidelines, visit www.ashrae.org/standards, and connect on LinkedIn, Facebook, Twitter, and YouTube.

Visit the ASHRAE Bookstore

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous edition. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at www.ashrae.org/bookstore.

**IMPORTANT NOTICES ABOUT THIS STANDARD**

To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit www.ashrae.org/standards to download them free of charge.

Addenda, errata, and interpretations for ASHRAE Standards and Guidelines are no longer distributed with copies of the Standards and Guidelines. ASHRAE provides these addenda, errata, and interpretations only in electronic form to promote more sustainable use of resources.