**ANSI/ASHRAE/ICC/USGBC/IES Addendum j to ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017**

# Standard for the Design of High-Performance Green Buildings

## Except Low-Rise Residential Buildings

*The Complete Technical Content of the International Green Construction Code®*

Approved by the ASHRAE Standards Committee and the ASHRAE Board of Directors on February 5, 2020; by the International Code Council on January 7, 2020; by the U.S. Green Building Council on January 9, 2020; by the Illuminating Engineering Society on January 24, 2020; and by the American National Standards Institute on March 2, 2020.

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 ISSN 1041-2336

ASHRAE® ICC INTERNATIONAL CODE COUNCIL® U.S. GREEN BUILDING COUNCIL USGBC® IES Approved American National Standard ANSI www.ansi.org

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## FOREWORD

*This addendum updates the renewable energy requirements of Standard 189.1. The following changes are intended to address the following issues and concerns:*

- *Various options are now available to procure off-site renewable energy, including virtual purchase contracts, direct ownership of off-site systems, and community renewable systems. However, most of these methods are inadequate in the context of building standards without requirements to ensure additionality, permanence, and survival in the event of property sale.*
- *On-site renewable energy has many advantages to off-site procurement in terms of a long-term commitment, additionality, and financing. On-site systems also have informational and inspirational value because they are visible building assets. As a result, the standard should continue to require on-site renewable energy when feasible.*
- *The installed cost of on-site photovoltaic (PV) systems has declined significantly in the last couple of decades, and costs are continuing to decline. The current requirements were drafted around 2005 and are very modest. A robust solar infrastructure has also emerged to provide distributed generation to building owners. As result, the on-site requirement should become more stringent.*
- *Virtually all on-site renewable energy systems are PV, so the mandatory requirement should be written in terms of PV capacity but allow other forms of on-site renewable energy. This change will make it easier to show compliance with the mandatory required amount of PV for most buildings.*
- *The exception low solar insolation (4 kWh/m$^2$·day) threshold "accounting for existing buildings, permanent infrastructure that is not part of the building project, topography, or trees" is problematic. Data are available on average daily insolation, but there are no tools or procedures available to adjust insolation for local shading. Tools are available to determine the annual hours a particular spot on the site is shaded.*

*To address these issues and concerns and to respond to changes in the market for renewable energy, this addendum proposes the following modifications to the standard.*

- *The basic prescriptive requirement is that the sum of renewable energy produced on-site or procured off-site be greater than or equal to about half of the expected building energy use.*
- *A mandatory on-site PV system is required based on the portion of the building roof area that is unshaded and is not being used for public access or by a vegetated roofing system. The mandatory requirement is expressed in terms of the system capacity, as opposed to annual production.*
- *On-site renewable energy systems other than PV may meet the mandatory requirement if they produce an equivalent amount of annual energy to the required PV system.*

***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.

## Addendum j to Standard 189.1-2017

***Revise Section 3.2 as shown. Definitions not shown have not changed.***

**3.2 Definitions**

***community renewable energy facility:*** a facility that generates electricity energy with photovoltaic, solar thermal, *geothermal energy*, or wind systems and is qualified as a community energy facility under applicable state and local utility statutes and rules.

***renewable energy certificate (REC):*** a tradable instrument that represents the environmental attributes of one megawatt hour of renewable electricity generation and is transacted separately

from the electricity generated by the renewable energy source; also known as "energy attribute" and "energy attribute certificate."

***Delete existing Section 7.3.2 and replace with the following as shown.***

**7.3.2 On-Site Renewable Energy Systems.** *Building projects* shall contain on-site photovoltaic systems with a rated capacity of not less than 2 W/ft$^2$ (22 W/m$^2$) multiplied by the horizontal projection of the *gross roof area* over *conditioned spaces* and *semiheated spaces*. Documentation shall be provided to the *AHJ* that indicates an exclusive chain of custody and ownership of the *RECs* from the *on-site renewable energy system* to the building *owner*. *RECs* supplied from the *on-site renewable energy system* shall be conveyed to and retired on behalf of the entity who has financial or operational control over the building's electricity consumption. *RECs* shall be tracked per Section 10.3.2.1.6. Where the building *owner* cannot provide documentation on the chain of custody or ownership of the *RECs* from the *on-site renewable energy system*, the building *owner* may provide documentation to the *AHJ* of an alternate supply contract for an equal or greater quantity of replacement *RECs* from an alternate renewable energy source.

The building *gross roof area* used for calculation in Section 7.3.2 excludes the following:

a. Shaded areas that are defined as roof area where direct-beam sunlight is blocked by structures or natural objects for more than 1500 annual hours between 8 a.m. and 4 p.m.
b. Areas of vegetated terrace and roofing systems compliant with Section 5.3.5.5.
c. Areas designated for public occupancy. Parking areas shall not qualify for this exclusion.
d. Areas designated for helipads.

**Exceptions to 7.3.2:**

1. *Building projects* that have an annual daily average incident solar radiation available to a flat plate collector oriented due south at an angle from horizontal equal to the latitude of the collector location less than 1.2 kBtu/ft$^2$·day (4.0 kWh/m$^2$·day).
2. Renewable energy systems other than photovoltaic systems that result in an equal or greater annual energy production.
3. Capacity shall be permitted to be reduced to that required to provide at least 50% of the simulated annual *site* energy consumption of the proposed *building project* in accordance with Normative Appendix C.

***Delete existing Section 7.4.1.1 and replace with the following Sections 7.4.1.1 through 7.4.1.3 as shown.***

**7.4.1.1 Renewable Energy Systems.** The adjusted renewable energy provided to the project shall be equal to or greater than the gross conditioned and semiheated floor areas of the *building project* multiplied by the renewable energy requirement from Table 7.4.1.1. For allocations to multiple tenants within a building project, the requirements shall be assigned to each tenant based on the total of *gross conditioned* and *semiheated floor area* of each tenant space.

*Building projects* complying with the Alternate Renewables Approach shall comply with the applicable equipment efficiency requirements in Normative Appendix B, the water-heating efficiency requirements in Section 7.4.4.1, equipment efficiency requirements in Section 7.4.7.1, and the applicable ENERGY STAR® requirements in Section 7.4.7.3.2. For equipment listed in Section 7.4.7.3.2 that are also contained in Normative Appendix B, the installed equipment shall comply by meeting or exceeding both requirements.

Documentation shall be provided to the *AHJ* that substantiates procurement of renewable energy systems, of *renewable energy contracts*, or of a quantity of *RECs* required to meet the Exception to 7.4.1.1. *RECs* shall be tracked in accordance with Section 10.3.2.1.6.

Qualifying renewable energy systems are as follows:

a. *On-site renewable energy system*
b. Off-site renewable energy system
   1. Self-generation (an off-site renewable energy system owned by the *building project owner*). The system shall comply with Section 7.4.1.3.
   2. *Community renewable energy facility*—The system shall comply with Section 7.4.1.3.
   3. Purchase contract—The system shall comply with Section 7.4.1.3.

**Exceptions to 7.4.1.1:** *Building projects* that demonstrate to the *AHJ* that they cannot comply with Section 7.4.1.1 shall contract for renewable electricity products complying with the

**Table 7.4.1.1 Renewable Energy Requirement**

| | Standard Renewables Approach | | Alternate Renewables Approach | |
|---|---|---|---|---|
| **Building Type** | **kBtu/ft$^2$·y** | **kWh/m$^2$·y** | **kBtu/ft$^2$·y** | **kWh/m$^2$·y** |
| Office | 14 | 44 | 13 | 40 |
| Retail | 24 | 74 | 21 | 67 |
| School | 19 | 61 | 17 | 55 |
| Healthcare | 40 | 126 | 36 | 113 |
| Restaurant | 40 | 126 | 36 | 113 |
| Hotel | 34 | 108 | 31 | 98 |
| Apartment | 22 | 68 | 20 | 62 |
| Warehouse | 8 | 26 | 7 | 23 |
| All Others | 25 | 80 | 23 | 72 |

**Table 7.4.1.2 Multipliers for Renewable Energy Procurement Methods**

| Location | Renewable Energy Source | Renewable Energy Factor |
|---|---|---|
| On-Site | On Site Renewable Energy System | 1.00 |
| Off-Site | Directly Owned Off-Site Renewable Energy System | 0.75 |
| | Community Renewable Energy System | 0.75 |
| | Virtual PPA | 0.75 |

Green-e Energy National Standard for Renewable Electricity products of not less than 1.2 MWh/ft$^2$ (12.6 MWh/m$^2$) of *gross floor area* of *conditioned spaces* and *semiheated spaces*, or an amount equal to 100% of the modeled annual energy use multiplied by 20 years, whichever is less. A combination of renewable electricity products and renewable energy systems shall be permitted to demonstrate compliance. *RECs* shall be tracked per Section 10.3.2.1.6.

**7.4.1.2 Adjusted Renewable Energy.** Each source of renewable energy delivered to or credited to the *building project* shall be multiplied by the factors in Table 7.4.1.2 when determining compliance with Section 7.4.1.1.

**7.4.1.3 Off-Site Renewable Energy Requirements.** Off-site renewable energy delivered or credited to the *building project* to comply with Section 7.4.1.1 shall be subject to a legally binding contract to procure qualifying off-site renewable energy. Qualifying off-site renewable energy shall meet the following requirements:

a. Documentation of off-site renewable energy procurement shall be submitted to the *AHJ.*
b. The purchase contract shall have a duration of not less than 15 years. The contract shallbe structured to survive a partial or full transfer of ownership of the building property.
c. *RECs* associated with the purchase contract from an off-site renewable energy shall be assigned exclusively to the building *owner* for a period of not less than 15 years and tracked in accordance with Section 10.3.2.1.6.
d. The energy source shall produce electricity from solar, wind, or *geothermal energy*.

**Exceptions to 7.4.1.3(d):**

1. Captured methane from feed-lots and landfills are permitted to be used to generate electricity for the purposes of this section.
2. Hydropower from new generation capacity on a nonimpoundment or new generation capacity on an existing impoundment that meets one of the following conditions:

   a. The hydropower facility complies with the *Low Impact Hydropower Certification Handbook* and is certified by a nationally recognized accreditation organization.

b. The hydropower facility complies with UL 2854 and is certified by an organization that has the standard in its ISO 17065 scope of accreditation.

c. The hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

For facilities falling under Exception (2)(a) or (2)(b), only output generated during the period of certification is eligible for *RECs* sale in accordance with the provisions of this section. Renewables from new impoundments of water are not eligible.

e. The generation source shall be located where the energy can be delivered to the building *site* by any of the following:

1. By direct connection to the off-site renewable energy facility
2. By the local utility or distribution entity
3. By an interconnected electrical network where energy delivery capacity between the generator and the building *site* is available (***Informative Note:*** Examples of interconnected electrical networks include regional power pools and regions served by Independent System Operators or Regional Transmission Organizations.)

f. Records on renewable power purchased by the building *owner* from the off-site renewable energy generator that specifically assign the *RECs* to the building *owner* shall be retained or retired by the building *owner* on behalf of the entity demonstrating financial or operational control over the building seeking compliance to this standard and made available for inspection by the *AHJ* upon request. (***Informative Note:*** Refer to Sections 10.3.2.1.6 and 10.3.2.1.7 for tracking and allocation requirements.)

g. Where multiple buildings in a *building project* are allocated energy procured by a contract subject to this section, the owner shall allocate for not less than 15 years the energy procured by the contract to the buildings in the *building project*. (***Informative Note***: Refer to Section 10.3.2.1.7 for allocation requirements.)

***Add these new sections to Section 10 as shown.***

**10.3.2.1.6 Renewable Energy Certificate Tracking.** For multitenant buildings where *RECs* are transferred to tenants, the plan for operation shall include procedures for tracking the quantity and vintage of *RECs* that are required to be retained and retired in compliance with Sections 7.3.2 and 7.4.1.1 of this standard. The plan shall include provisions to transfer the *RECs* to building tenants or to retire *RECs* on their behalf in proportion to the *gross conditioned* and *semiheated floor area* leased or rented. The plan shall include provisions to use a *REC* tracking system that meets the requirements of Section V.B of the Green-e Framework for Renewable Energy Certification. The plan shall describe how the building *owner* will procure alternative qualifying renewable energy in the case that the renewable energy producer ceases operation.

**10.3.2.1.7 Renewable Energy Allocation to Multiple Buildings.** Where renewable energy is allocated to multiple buildings in compliance with Section 7.4.1.3 (g), the plan shall indicate how renewable energy produced from on-site or off-site systems that is not allocated before issuance of the certificate of occupancy will be allocated to new or existing buildings included in the *building project*. The plan shall indicate who will be responsible for retaining the documentation for allocations and where it will be stored so that it can be made available for inspection by the *AHJ* upon request.

Where multiple buildings in a *building project* share a common utility interconnection and are served by the same *on-site renewable energy system*, the building *owner* shall allocate for not less than 15 years the annual *REC* generation of the on-site renewable energy system to the *buildings* served by the system. The annual generation vintage date of delivered *RECs* shall be allocated to the same 12 month reporting year, up to six months prior, or up to three months after the calendar year in which the electricity is used in the building. The annual allocation of *RECs* shall be documented as part of the plan. The plan shall indicate who will be responsible for retaining the documentation and where it will be stored so that it can be made available for inspection by the *AHJ* upon request.

***Modify Section 11as shown.***

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Version 1.0, July 7, 2017 Green-e Framework for Renewable Energy Certification

**Low Impact Hydropower Institute (LIHI)**
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Version 2.03, December 20, 2018 Low Impact Hydropower Certification Handbook

**Underwriters Laboratories, Inc. (UL)**
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First edition, January 25, 2018 UL 2854 Standard for Sustainability for Renewable Low-Impact Electricity Products

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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.

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**Standard 189.1 and the International Green Construction Code**

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