

## APPENDIX CC ZERO ENERGY COMMERCIAL BUILDING PROVISIONS

*The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.*

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**User note:**

*About this chapter:* Appendix CC provides a model for applying new renewable energy generation when new buildings add electric load to the grid. This renewable energy will avoid the additional emissions that would otherwise occur from conventional power generation.

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### SECTION CC101 GENERAL

**CC101.1 Purpose.** The purpose of this appendix is to supplement the *International Energy Conservation Code* and require renewable energy systems of adequate capacity to achieve net zero energy.

**CC101.2 Scope.** This appendix applies to new buildings that are addressed by the *International Energy Conservation Code*.

**Exceptions:**

1. Detached one- and two-family dwellings and townhouses as well as Group R-2 buildings three stories or less in height above grade plane, manufactured homes (mobile dwellings), and manufactured houses (modular dwellings).
2. Buildings that use neither electricity nor fossil fuel.

### SECTION CC102 DEFINITIONS

**CC102.1 Definitions.** The definitions contained in this section supplement or modify the definitions in the *International Energy Conservation Code*.

**ADJUSTED OFF-SITE RENEWABLE ENERGY.** The amount of energy production from off-site renewable energy systems that may be used to offset building energy.

**BUILDING ENERGY.** All energy consumed at the building site as measured at the site boundary. Contributions from on- site or off-site renewable energy systems shall not be considered when determining the building energy.

**COMMUNITY RENEWABLE ENERGY FACILITY.** A facility that produces energy from renewable energy systems and is qualified as a community energy facility under applicable jurisdictional statutes and rules.

**DIRECT ACCESS TO WHOLESALE MARKET.** An agreement by the owner and a renewable energy developer to purchase renewable energy from the wholesale market.

**DIRECT OWNERSHIP.** an *off-site renewable energy system* under the ownership or control of the building project owner.

**FINANCIAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (FPPA).** A financial arrangement between a renewable electricity 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" and "virtual power purchase agreement."

**GREEN RETAIL PRICING.** A program by the retail electricity provider to provide 100-percent renewable energy to the building project owner.

**MINIMUM RENEWABLE ENERGY REQUIREMENT:** the minimum amount of on-site or adjusted off-site renewable energy needed to comply with this appendix.

**OFF-SITE RENEWABLE ENERGY SYSTEM.** Renewable energy system which serves the building project and is not an *on-site renewable energy system*.

**ON-SITE RENEWABLE ENERGY SYSTEM.** Renewable energy systems located on any of the following:

1. the building,
2. the property upon which the building is located,
3. a property that shares a boundary with and is under the same ownership or control as the property on which the building is located, or
4. a property that is under the same ownership or control as the property on which the building is located and is separated only by a public right-of-way on which the building is located. .

**PHYSICAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT (PPPA).** A contract for the purchase of renewable electricity from a specific renewable electricity generator to a purchaser of renewable electricity.

**RENEWABLE ENERGY CERTIFICATE (REC).** A market-based instrument that represents and conveys the environmental, social, and other non-power attributes of one megawatt hour of renewable electricity generation and could be sold separately from the underlying physical electricity associated with renewable energy systems; also known as an energy attribute and energy attribute certificate (EAC).

**RENEWABLE ENERGY INVESTMENT FUND (REIF).** A fund established by the local government or other entity to accept payment from building owners to construct or acquire qualifying renewable energy (along with RECs) on their behalf.

**RENEWABLE ENERGY SYSTEM.** Photovoltaic, solar thermal, geothermal energy extracted from hot fluid or steam, wind, or other approved renewable energy production systems used to generate energy.

**SEMIHEATED SPACE.** An enclosed space within a building that is heated by a heating system whose output capacity is greater than or equal to 3.4 Btu/h × ft<sup>2</sup> of floor area but is not a conditioned space.

## SECTION CC103 MINIMUM RENEWABLE ENERGY

**CC103.1 Renewable energy.** On-site renewable energy systems shall be installed, or adjusted off-site renewable energy shall be procured to meet the *minimum renewable energy requirement*.

(Equation CC-1)

$$RE_{\text{onsite}} + RE_{\text{offsite}} \geq RE_{\text{min}}$$

where:

$RE_{\text{onsite}}$  = Annual site energy production from *on-site renewable energy systems* (see Section CC103.2), including installed *on-site renewable energy systems* for compliance with C405.13.1 and C406.5.

$RE_{\text{offsite}}$  = Adjusted annual energy production from *off-site renewable energy systems* that may be credited against the *minimum renewable energy requirement* (see Section CC103.3), including off-site renewable energy purchased for compliance with C405.13.2.

$RE_{\text{min}}$  = *Minimum renewable energy requirement*.

When Section C401.2.1(1) is used for compliance with the *International Energy Conservation Code*, the *minimum renewable energy requirement* shall be determined by multiplying the gross *conditioned floor area* plus the gross semiheated floor area of the proposed building by the prescriptive renewable energy requirement from Table CC103.1. An area weighted average shall be used for mixed-use buildings.

When Section C401.2.1, Item 2 or Section C401.2.2 is used for compliance with the *International Energy Conservation Code*, the *minimum renewable energy requirement* shall be equal to the *building energy* as determined from energy simulations.

**CC103.2 Calculation of on-site renewable energy.** The annual energy production from *on-site renewable energy systems* shall be determined using ~~the PVWatts software or other~~ software approved by the code official.

CC103.2.1 Renewable energy certificates and other environmental attributes associated with the *on-site renewable energy system* shall be assigned to the initial and subsequent building owner(s) for a period of not less than 15 years. The building owner(s) may transfer renewable energy certificates to building tenants while they are occupying the building.

**CC103.3 Off-site renewable energy.** Off-site energy shall comply with Sections CC103.3.1 and CC103.3.2.

**CC103.3.1 Qualifying off-site procurement methods.** The following are qualifying off-site renewable energy procurement methods:

1. *Community renewables energy facility*
2. *Renewable energy investment fund*
3. *Financial renewable energy power purchase agreement*
4. *Direct ownership*
5. *Direct access to wholesale market*

6. Green retail pricing
7. Unbundled Renewable Energy Certificates (RECs)
8. Physical renewable energy power purchase agreement

**TABLE CC103.1  
PRESCRIPTIVE RENEWABLE ENERGY REQUIREMENT FOR BUILDING TYPES  
AND CLIMATES (kWh/ft<sup>2</sup>-yr)**

Climate Zone	Building Area Type											
	Multifamily (R-2)	Healthcare/hospital (I-2)	Hotel/Motel (R-2)	Office (B)	Restaurant (A-2)	Retail (M)	School (E)	Warehouse (S)	Grocery Store (M)	Laboratory (B)	Assembly (A)	All others
0A	13	35	23	10	129	17	16	3	27	41	5	17
0B	12	34	22	10	123	17	15	3	26	40	5	16
1A	11	32	20	9	113	14	13	3	24	36	4	15
1B	11	32	20	9	118	15	14	3	24	37	5	15
2A	11	32	20	8	114	13	12	3	22	34	4	14
2B	11	30	18	8	108	12	11	3	22	33	4	13
3A	11	30	18	8	117	13	11	3	21	31	4	13
3B	10	29	18	8	110	12	10	3	20	31	4	13
3C	9	28	18	7	100	10	9	2	18	27	3	12
4A	12	31	18	8	123	15	11	6	21	32	4	14
4B	11	29	18	7	113	12	10	4	20	30	4	13
4C	10	28	17	7	111	13	10	4	18	28	3	13
5A	12	31	19	8	133	17	11	8	22	34	4	15
5B	11	29	18	8	125	14	11	5	21	31	4	14
5C	10	29	17	7	116	13	10	4	18	27	3	13
6A	14	33	20	10	151	20	13	11	26	39	5	17
6B	13	33	19	8	137	17	11	7	22	34	4	16
7	14	37	21	9	164	20	13	10	25	37	5	18
8	15	40	22	11	190	23	16	10	28	43	5	20

**CC103.3.2 Requirements for all procurement methods.** The following requirements shall apply to all off-site renewable energy procurement methods:

1. The building owner shall sign a legally binding contract or other approved agreement to procure qualifying off-site renewable energy.

2. The procurement contract shall have duration of not less than 15 years and shall be structured to survive a partial or full transfer of ownership of the property.
3. RECs and other environmental attributes associated with the procured off-site renewable energy shall meet all of the following requirements:
  - 3.1 Are retained or retired by or on behalf of the property owner or tenant for a period of not less than 15 years.
  - 3.2 Are created within a 12-month period of the use of the REC; and
  - 3.3 Are from a generating asset constructed no more than 5 years before the issuance of the certificate of occupancy.4. The generating source shall be a *renewable energy system*.
5. The generation source shall be located where the energy can be delivered to the building site by any of the following:
  - 5.1. By direct connection to the off-site renewable energy facility
  - 5.2. By the local utility or distribution entity
  - 5.3. By an interconnected electrical network where energy delivery capacity between the generator and the building site is available
6. Records on power sent to or purchased by the building project shall be retained by the building owner and made available for inspection by the code official upon request.

**CC103.3.3 Adjusted off-site renewable energy.** The process for calculating the adjusted off-site renewable energy is shown in Equation CC-2.

(Equation CC-2)

$$RE_{offsite} = \sum_{i=1}^n PF_i \times RE_i = PF_1 \times RE_1 + PF_2 \times RE_2 + \dots + PF_n \times RE_n$$

where:

$RE_{offsite}$  = Adjusted off-site renewable energy.

$PF_i$  = Procurement factor for the  $i^{th}$  renewable energy procurement method per Section CC103.3.3.1.

$RE_i$  = Annual energy production for the  $i^{th}$  renewable energy procurement method.

$n$  = The number of renewable energy procurement methods considered.

CC103.3.3.1 Procurement Factors. When installed on-site renewable energy capacity is 7.5 W/ft<sup>2</sup> of roof area or greater, the procurement factor is 1.00, otherwise, the procurement factor is 0.75, except for unbundled renewable energy certificates which shall have a procurement factor of 0.20. A procurement factor of 1.0 may also be used when the conditions of exceptions 1, 2, or 3 to C405.13.1 are satisfied.