

CE264-19

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Proponent: David Collins, representing The American Institute of Architects (dcollins@preview-group.com)

2018 International Energy Conservation Code

Add new text as follows:

AX 100 ZERO CODE RENEWABLE ENERGY STANDARD

AX101 PURPOSE The purpose of the Zero Code Renewable Energy Appendix is to supplement the International Energy Conservation Code and require renewable energy systems of adequate capacity to achieve zero-net-carbon.

AX102 SCOPE This appendix applies to new buildings that are addressed by the International Energy Conservation Code.

Exceptions:

1. Single-family houses, multifamily structures of three stories or fewer above grade in height, manufactured homes (mobile homes), and manufactured houses (modular).
2. Buildings that use neither electricity nor fossil fuel.

AX103 Definitions The following definitions 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.

ENERGY UTILIZATION INTENSITY(EUI). The site energy for either the baseline building or the proposed building divided by the gross conditioned floor area plus any semi-heated floor area of the building. For the baseline building, the EUI can be divided between regulated energy use and unregulated energy use.

RENEWABLE ENERGY SYSTEM. Photovoltaic, solar thermal, geothermal energy, and wind systems used to generate energy.

ON-SITE RENEWABLE ENERGY SYSTEM. Renewable energy systems on the building project.

OFF-SITE RENEWABLE ENERGY SYSTEM. Renewable energy system not located on the building project.

ZERO ENERGY PERFORMANCE INDEX(zEPI_{PB,EE}). The ratio of the proposed building EUI without renewables to the baseline building EUI, expressed as a percentage.

SEMI-HEATED 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*ft² of floor area but is not a conditioned space.

AX104 Minimum renewable energy On-site renewable energy systems shall be installed or off-site renewable energy shall be procured to offset the building energy.

$$RE_{onsite} + RE_{offsite} \geq \% \times E_{building}$$

where

RE_{onsite} = annual site energy production from on-site renewable energy systems (see Section AX104.2)

$RE_{offsite}$ = adjusted annual site energy production from off-site renewable energy systems that may be credited against building energy use (see Section AX104.3)

$E_{building}$ = building energy use without consideration of renewable energy systems.

When Section C401.2 (2) is used for compliance with the International Energy Conservation Code, building energy shall be determined by multiplying the gross conditioned floor area plus the gross semi-heated floor area of the proposed building by an EUI selected from Table AX104.1. Use a weighted average for mixed-use buildings.

When Section C401.2 (1) or C401.2 (3) is used for compliance with the International Energy Conservation Code, building energy shall be determined from energy simulations.

TABLE AX104.1 ENERGY UTILIZATION INTENSITY FOR BUILDING TYPES AND CLIMATES (kBtu/ft²-Y)

Building Area Type	Climate Zone																	
	0A/ 1A	0B/ 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8	
kBtu/ft ² -y																		
Multifamily (R-2)	43	45	41	41	43	42	36	45	43	41	47	46	41	53	48	53	59	
Healthcare/hospital (I-2)	119	120	119	113	116	109	106	116	109	106	118	110	105	126	116	131	142	
Hotel/motel (R-1)	73	76	73	68	70	67	65	69	66	65	71	68	65	77	72	81	89	
Office (B)	31	32	30	29	29	28	25	28	27	25	29	28	25	33	30	32	36	
Restaurant (A-2)	389	426	411	408	444	420	395	483	437	457	531	484	484	589	538	644	750	
Retail (M)	46	50	45	46	44	44	37	48	44	44	52	50	46	60	52	64	77	
School (E)	42	46	42	40	40	39	36	39	40	40	39	43	37	44	40	45	54	
Warehouse (S)	9	12	9	11	12	11	10	17	13	14	23	17	15	32	23	32	32	
All others	55	58	54	53	53	51	48	54	52	51	57	54	50	63	57	65	73	

AX104.1 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.

AX104.2 Off-Site Renewable Energy Off-site energy shall comply with Sections AX104.2.1 and AX104.2.2

AX104.2.1 Qualifying off-site procurement methods. The following are considered qualifying off-site renewable energy procurement methods:

1. Community Renewables: an offsite renewable energy system for which the owner has purchased or leased renewable energy capacity along with other subscribers.
2. Renewable Energy Investment Fund: an entity that installs renewable energy capacity on behalf of the owner.
3. Virtual Power Purchase Agreement: a power purchase agreement for off-site renewable energy where the owner agrees to purchase renewable energy output at a fixed price schedule.
4. Direct Ownership: an offsite renewable energy system owned by the building project owner.
5. Direct Access to Wholesale Market: an agreement between the owner and a renewable energy developer to purchase renewable energy.
6. Green Retail Tariffs: a program by the retail electricity provider to provide 100 percent renewable energy to the owner.
7. Unbundled Renewable Energy Certificates (RECs): certificates purchased by the owner representing the environmental benefits of renewable energy generation that are sold separately from the electric power.

AX104.2.2 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 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 be assigned to the building project for the duration of the contract.
4. The *renewable energy* generating source shall be photovoltaic systems, solar thermal power plants, geothermal power plants, and/or wind turbines.
5. The generation source shall be located where the energy can be delivered to the building site by the same utility or distribution entity; the same ISO or RTO; or within integrated ISOs (electric coordination council).
6. The *off-site renewable energy* producer shall maintain transparent accounting that clearly assigns production to the building. Records on power sent to or purchased by the building shall be retained by the building owner and made available for inspection by the code official upon request.

AX104.2.3 Adjusted Off-Site Renewable Energy. The process for calculating the adjusted *off-site renewable energy* is shown in the following equation:

$$RE_{\text{offsite}} = \sum_{i=1}^n PF_i \hat{RE}_i = PF_1 \hat{RE}_1 + PF_2 \hat{RE}_2 + \dots + PF_n \hat{RE}_n$$

where

RE_{offsite} = Adjusted off-site renewable energy

PF_i = Procurement factor for the i^{th} renewable energy procurement method or class taken from Table AX104.2.

RE_i = Annual energy production for the i^{th} renewable energy procurement method or class

n = The number of renewable energy procurement options or classes considered

TABLE AX104.2 Default Off-Site Renewable Energy Procurement Methods, Classes, and Coefficients

Class	Procurement Factor (PF)	Procurement Options	Additional Requirements (see also Section AX104.2.2)
1	0.75	Community Solar	

REIFs	Entity must be managed to prevent fraud or misuse of funds.		
Virtual PPA			
Self- Owned Off-Site	Provisions shall prevent the generation from being sold separately from the building.		
2	0.55	Green Retail Tariffs	The offering shall not include the purchase of unbundled RECs.
Direct Access	The offering shall not include the purchase of unbundled RECs.		
3	0.20	Unbundled RECs	The vintage of the RECs shall align with building energy use.

Reason: The new appendix deals with renewable energy and creates a path to a Zero energy design approach, similar to the zEPI that is already found in the 2015 IgCC. It is designed to build on top of the IECC which already sets the minimum energy efficiency requirement. By putting this information in an appendix, jurisdictions will have the option of adoption of these provisions in order to establish Zero as the energy target they wish to achieve.

Cost Impact: The code change proposal will decrease the cost of construction. The overall cost of construction and operation of buildings constructed using the Zero Annex will be lower than other comparable buildings.

Proposal # 5356

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