



ZERO Code Renewable Energy Appendix

Code Change Proposal CE264-19; **American Institute of Architects and Architecture 2030**
 Approved at the Committee Action Hearings, Albuquerque, 2019

July 16, 2019

This code addition is an appendix to the 2021 IECC to require that new commercial, institutional, and mid- to high-rise residential buildings install or procure enough renewable energy to achieve zero-net-carbon annually. The appendix encourages onsite renewable energy systems when feasible, but also supports offsite procurement of renewable energy through a variety of methods. This appendix does not allow renewable energy to be traded off against the energy efficiency required by the 2021 IECC. The provisions contained in this appendix are mandatory when specified as such in the jurisdiction's adopting ordinance.

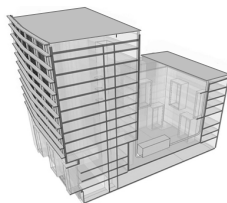
KEY POINTS

- Optional for jurisdictions to adopt**
- Compliance with 2021 IECC is required**
- Sets a minimum renewable energy requirement based on energy simulations or default values**
- Provides an incentive for buildings to be designed to be more energy efficient than code requires**
- Encourages onsite renewable energy when feasible**
- Supports offsite renewable energy procurement when necessary**
- 2021 IECC energy efficiency requirements cannot be traded with renewable energy**
- Establishes a consistent framework that local governments can modify for their specific needs and conditions**

MEETING THE CODE

1

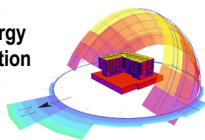
Design an energy efficient building in compliance with the 2021 IECC *or better*.



2

Establish the building's renewable energy requirement from:

an energy simulation



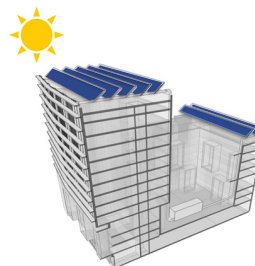
or

default renewable energy table

| Building Type | Climate Zone | | | | | | | | | | | |
|-----------------------|--------------|----|----|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Commercial | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| Institutional | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| Mid-rise Residential | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |
| High-rise Residential | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 |

3

Meet the requirement by integrating onsite renewable energy when feasible.



4

If necessary, procure offsite renewable energy.



Source: Architecture 2030
 Graphic adaptations: Sefaira; DOE, Green Ideas

Buildings are required to comply with the 2021 IECC using either the prescriptive or performance approach. When the prescriptive approach is used, the renewable energy required to be installed or procured is specified based on building type and climate zone in Table AX104.1. For instance, an office building in climate zone 3A would need renewable energy production of 29 kBtu/ft²-y. When the performance approach is used, the renewable energy requirement is based on energy modeling and the needed renewable energy can be reduced through energy efficiency measures that exceed code.

The Need

We are already seeing the consequences of 1 °C of global warming through more extreme weather, rising sea levels, rapid biodiversity decline, and diminishing Arctic sea ice. At the 2015 Paris accord, 195 nations agreed to a goal of under 2°C (preferably 1.5 °C) of temperature rise. A recent Intergovernmental Panel on Climate Change (IPCC) report warns that to achieve the 1.5 °C goal, we must reduce CO₂ emissions by 45 percent by 2030¹

Electricity generation is responsible for a large share of CO₂ emissions in the United States.² About 75% of the electricity produced is used to power our buildings, so designing them to be energy efficient and then offsetting energy use with non-combustible renewable energy is the most cost effective decarbonization strategy we can take.

States and cities across the country are pursuing policies to address climate change. More than 270 cities and counties and 10 states in the U.S. are signatories to the “We Are Still In” commitment supporting climate action to meet the goals of the Paris climate accord. To date, seventy cities have committed to being powered by 100% renewable energy and more are joining all the time. The ZERO Code Renewable Energy Appendix (ZC_{REA}) provides these communities with a powerful tool and a consistent policy option to accelerate the transition to a 100% clean electric grid. Standardization and consistency will speed the process toward meeting their carbon reduction goals. Manufacturers, builders, designers and others in the building industry will all be operating from the same playbook, as opposed to a patchwork of divergent local approaches that might otherwise emerge.

What makes the ZERO Code Renewable Energy Appendix unique is:

1. ***incorporation into the 2021 IECC***, a highly-efficient national building energy code;
2. ***availability of sophisticated easy-to-use code compliance tools and software*** such as COMcheck, EnergyPlus, and a multitude of private-sector energy performance programs;
3. ***a renewable energy default table and calculator***, for all U.S. locations, that determines the renewable energy required, and estimates the potential on-site renewable energy production and off-site renewable energy procurement needed to achieve zero-net-carbon; and
4. ***recognition of off-site renewable energy options*** that result in renewable energy generation that exceeds what utilities are already required to provide by their mandated renewable portfolio standards.

¹ https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

² Energy Information Administration, Annual Energy Outlook, 2018.