



DENVER AMENDMENT PROPOSAL FORM FOR PROPOSALS TO THE 2019 DENVER BUILDING CODE AMENDMENTS AND THE 2021 INTERNATIONAL CODES

DENVER
THE MILE HIGH CITY

2021 CODE DEVELOPMENT CYCLE

1) **Name:** Courtney Anderson **Date:** 10/12/2021
Email: Courtney.Anderson@denvergov.org **Representing (organization or self):**
City Staff Proposal (check box):

2) One proposal per this document is to be provided with clear and concise information.

Is a separate graphic file provided ("X" to answer): ___ Yes or No

3) Highlight the code and acronym that applies to the proposal

<u>Acronym</u>	<u>Code Name</u>	<u>Acronym</u>	<u>Code Name</u>
DBC-AP	Denver Building Code–Administrative Provisions	IPC	International Plumbing Code
IBC	International Building Code	IRC	International Residential Code
IECC	International Energy Conservation Code	IFGC	International Fuel Gas Code
IEBC	International Existing Building Code	IMC	International Mechanical Code
IFC	International Fire Code	DGC	Denver Green Code

AMENDMENT PROPOSAL

Please provide all the following items in your amendment proposal.

Code Sections/Tables/Figures Proposed for Revision:

Instructions: If the proposal is for a new section, indicate (new), otherwise enter applicable code section.

R404.4

Proposal:

Instructions: Show the proposal using ~~strikeout~~, underline format.

Place an "X" next to the choice that best defines your proposal: Revision New Text Delete/Substitute Deletion

Add the following sections and renumber the following equations:

Add definitions as follows:

ALL-ELECTRIC PROPERTY. A property that contains no permanently installed equipment or appliances that utilize combustion, plumbing for fuel gas or fuel oil or fuel gas utility connection installed within the building(s) or site, except for emergency power systems and standby power systems.

COMBUSTION. In the context of this code, refers to the rapid oxidation of fuel accompanied by the production of heat or heat and light.

EMERGENCY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection and ventilation systems in the event of a failure of the primary power. Emergency power systems are required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.

STANDBY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required building, hazardous materials or ventilation systems in the event of a failure of the primary power. Standby power systems are required for electrical loads where interruption of the primary power could create hazards or hamper rescue or fire-fighting operations.

R404.4 Minimum renewable energy system capacity. *New dwelling units shall be provided with an onsite renewable energy system(s) capable of producing annual renewable energy of no less than 2.4 kbtu/yr (0.7 kWh/yr) per square foot of conditioned floor area of the dwelling unit. System specifications and system renewable energy production calculations demonstrating that the system meets the requirements of this section shall be included in the construction documents. Onsite renewable energy system(s) used to comply with this section shall not be included in the calculations for Section R405 or Section R406.*

Exceptions:

1. All-electric properties
2. Buildings that achieve 9 energy efficiency credits from Table R408.1 in addition to the requirements of Section R408.1.
3. Buildings that achieve an ERI not less than 5 points lower than the requirements of section R406.
4. Buildings with a proposed energy use that is 9 percentage points lower than required by R405
5. Dwelling units with a conditioned floor area of less than 1000 sf.

Modify the table as follows:

**TABLE R405.2
REQUIREMENTS FOR TOTAL BUILDING PERFORMANCE**

SECTION	TITLE
Mechanical	
<u>R404.4</u>	<u>Minimum renewable energy system capacity</u>

Modify the table as follows:

**TABLE R406.2
REQUIREMENTS FOR ENERGY RATING INDEX**

SECTION	TITLE
Mechanical	
<u>R404.4</u>	<u>Minimum renewable energy system capacity</u>

Supporting Information (Required):

All proposals must include a written explanation and justification as to how they address physical, environmental, and/or customary characteristics that are specific to the City and County of Denver. The following questions must be answered for a proposal to be considered.

Purpose: What does your proposal achieve?

This proposal requires buildings to acquire a minimum percentage (20%) of their annual energy consumption from renewable energy, from either on-site renewable energy production or from Denver's Distributed Solar Support Fund.

Reason for Working Group Revisions:

The Residential Working Group met over a series of 4 meetings and one additional special session with a subset of the working group. The WG recommended several modifications to the original proposal, including:

- **Definition of All-Electric Property.** The definition of “all-electric property” was modified to explicitly allow combustion for emergency and standby power. The WG wanted explicit clarity about how these systems fit into all-electric buildings. This was done in the definition since it was seen as useful for all building types, even residential occupancies, and because it was seen as the place that would provide the most clarity for users.
- **Exceptions.** The code committee had been concerned about the high bar for the exception to the onsite renewable energy requirement, particularly the inclusion of off-site renewable energy. Under the original proposal, the exception required 2 of three options, including all-electric design, additional efficiency and off-site renewables. The WG simplified the exception by removing off-site renewable energy as an option and requiring only all-electric design OR additional efficiency.
- **Modified requirement.** The Working Group was generally supportive of a minimum renewable energy requirement, but had concerns about the level of renewable energy required. The WG was less concerned about homes with renewable energy systems and more about homes that could not install a renewable energy system due to site conditions and would not go all-electric. The WG was concerned about whether those homes would be able to implement the additional efficiency required by the exception. Therefore, the proposal was revised to require 10% onsite renewables and the additional efficiency required by the exception was modified accordingly.
- **Further modification to the ERI path exception.** One question the WG had was how the additional efficiency requirement would impact home design, particularly in the ERI path. A sub-group took a closer look at how an additional 9 efficiency credits compared to a nine-point reduction of ERI beyond the base code requirement. The sub-group found that a five-point improvement of ERI was more reasonable and achievable and aligns closely with DOE Zero Energy Ready homes

Original Reason Statement: Why is your proposal necessary?

Denver’s 100% Renewable Electricity Action Plan sets a goal that renewable electricity will provide 100% of new building energy use for buildings permitted under the code by 2030. XCEL has targets to provide 80% of the electrical supply on its grid from non-carbon sources by 2030. Therefore, in order to meet the Renewable Electricity Action Plan for 2030, new buildings will need to be provided with renewable energy equivalent to 20% of their annual energy use.

Substantiation: Why is your proposal valid? (i.e. technical justification)

This proposal creates a requirement for all buildings to be provided with an onsite renewable energy system sized to provide 20% of their annual energy use. The requirement corresponds to 20% of the site EUI of a home that meets the energy performance goal for this code cycle from the *Implementation Plan*. This target is based on the average performance of a home built to the Denver Energy Code. Since specific projects may not have exactly the same EUI as the average for the code the system can be sized either prescriptively or through modeling that determines the actual annual energy usage of the building.

Recognizing the carbon emission impact that building electrification will have in new buildings (in most building types in Denver, an all-electric building will provide a similar or greater carbon emissions impact than an onsite renewable energy system that meets this requirement), all-electric buildings are exempted from the requirement in order to encourage electrification.

The proposal is also structured to provide alternate options for buildings that cannot physically accommodate an onsite renewable energy system that can meet these requirements. Buildings can also comply by implementing any two of the following options: all-electric construction, offsite renewable energy and additional efficiency through Section R408 (the latter is predicated on Denver adopting a credit-based approach as is being proposed this code cycle).

The credit target for the R408 option is set at 17 credits. This target was set because it represents the efficiency gains needed to have the same carbon emissions impact as the lifetime impact of a renewable energy system sized to meet this requirement (at the 1 credit per 1% performance improvement ratio used in the R408 credits proposal, a straight efficiency conversion would have been 80 credits).

The proposal also includes definitions and requirements for off-site renewable energy production. The off-site renewable energy requirement is based on a 5-year agreement, therefore the numbers in Table C405.13.1(2) are 5 times those in Table C405.13.1(1) in order to make the total energy comparable. It also includes definitions of different kinds of off-site renewable energy systems in order to provide

clarity about what kind of offsite renewable energy will meet the requirement and provide certainty to the City that offsite renewable energy options are credible:

- FINANCIAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT. 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."
- PHYSICAL RENEWABLE ENERGY POWER PURCHASE AGREEMENT. A contract for the purchase of renewable electricity from a specific renewable electricity generator to a purchaser of renewable electricity.
- COMMUNITY RENEWABLE ENERGY FACILITY. A facility that produces energy harvested from renewable energy resources and is qualified as a community energy facility under applicable jurisdictional statutes and rules.

The proposal also includes modifications to R405 and R406 to ensure that this requirement is included in all compliance paths.

A Denver Green Code accompanying proposal was not created because the DGC compliance options require ZERO Energy which requires renewables be installed in order to get there. Therefore this proposal is not needed in the DGC.

Bibliography and Access to Materials (as needed when substantiating material is associated with the amendment proposal):
None

Other Regulations Proposed to be Affected

***For proposals to delete content from the 2019 Denver Green Code in conjunction with adding it to other mandatory Denver codes and/or regulations, only.**

Please identify which other mandatory codes or regulations are suggested to be updated (if any) to accept relocated content.

None

Referenced Standards:

List any new referenced standards that are proposed to be referenced in the code.

None

Impact:

How will this proposal impact cost and restrictiveness of code? ("X" answer for each item below)

The proposal will increase the cost of construction. However, by providing multiple options for compliance, project teams will be able to choose the option that is the most cost effective for that particular project.

Cost of construction: Increase ___ Decrease ___ No Impact

Cost of design: Increase ___ Decrease ___ No Impact

Restrictiveness: Increase ___ Decrease ___ No Impact

Departmental Impact (City use only):

This amendment proposal increases/decreases/is neutral to the cost of plans review.

This amendment increases/decreases/is neutral to the cost of inspections.