

To: Building Community
From: Jeff Dickinson, Architect, LEED A/P, Biospaces Energy Consulting, Inc.
Re: Carbondale Commercial Energy and Green Code Update
Date: 6/16/2021

Purpose of Public Review Webinar on June 30th, 2021:

Review recommendations and get input on:

- IGCC 2018 Adoption and Amendments
 - Renewable Energy requirements
 - Beneficial Electrification for New Commercial Construction
- Incentives to go beyond code.
- Recommendations for future phases/roadmap

Introduction:

This is an update to the International Green Construction Code (IGCC) which was originally adopted in 2013. This applies only to New Commercial Construction. The purpose of this code/ordinance adoption is to outline a plan for moving forward to meet the goals of the Climate Energy and Action Plan, while making it clear to developers that the Town's intent is to wean ourselves off of fossil fuels and move toward a carbon free future. With technology changing quickly it is difficult to predict where we will be regarding energy efficiency and available technologies in the next 3-5 years. The science is clear that we must continue to take significant action, and while Carbondale has been on this path for many years, we must step up our efforts to reduce carbon emissions from buildings. Updating the code requirements regularly is the key to staying current with technological changes.

After receiving input from numerous groups including: Town of Carbondale Building, Parks and Planning Departments, City of Boulder, SWEEP, Colorado Energy Office, Colorado Code Consulting, Carbondale Environmental Board, CORE & CLEER, we have summarized some discussion points as well as drafting some recommendations for review.

History:

Carbondale has long been a leader in climate related initiatives. From the establishment of the Environmental Board in 1989, to the first adoption of Green Building Codes in 1995, to the first Climate Action Plan which was drafted in 2006. Carbondale has continued its environmental focus by updating the Climate Action Plan in 2017, and supporting the 2019 Net Zero for New Construction report, which outlines a phased strategy for increasing renewable requirements and adopting updated codes. In 2019 the Residential Efficient Building Program (REBP) was updated, and now we are working to update the codes and renewable energy requirements for commercial construction to support these goals.

Summary of Changes:

The IGCC has been in place for 8 years with its current release being not significantly different from the original. It has been reviewed in depth and amendments recommended. (see attached).

Two areas of change relate to renewable requirements and electrification. Background information regarding Net Zero construction, on-site vs off-site renewables, and Beneficial Electrification is provided below.

Net Zero Construction

Net Zero Building Definition:

A building that annually produces as much energy as it consumes for the heating, cooling, water heating, and basic electrical loads including lighting, plug loads and fans. A true Net Zero Building does not have any natural gas infrastructure connected to the building.

This definition assumes we are not including process loads, such as those used not for heating and water heating at this time.

It is not critical that we agree on a definition of Net Zero at this time, only that renewable calculations be based on building loads and not process loads.

Renewables (on-site and off-site)

With the continued greening of the grid, there is widespread perception that there is less of a need to provide on-site renewables. However, providing on-site renewables is an important part of the equation toward a carbon free future and a modernized utility grid.

In the currently adopted commercial energy code there is a 50% penalty for off-site renewables (10% on-site vs 15% off-site). Using this model, the recommended off-site requirements would be 37.5% with the recommended on-site requirement of 25% in 2021.

In evaluating future increases to the amount of renewables required, a valid concern is whether there will be sufficient space on-site for the incremental increases. Based upon this, we recommend that as the amount of renewables required increases every three years, the on-site portion can remain at 25% as long as the off-site makes up the difference (with no penalty for this portion being off-site). This can be reevaluated as the utilities progress towards more renewables in their fuel mix.

Beneficial Electrification

Building electrification, or the shift from gas appliances to all-electric appliances and technologies powered by an increasingly clean grid, is widely recognized as a critical pathway for achieving significant greenhouse gas (GHG) emission reduction. As grid-delivered electricity gets cleaner, the importance of building technologies grows. Transitioning away from direct use of fossil fuels (i.e. natural gas, propane) to renewables is the next step in the energy transformation.

We are recommending a phased approach that would incentivize elimination of gas lines to buildings in the current phase, while disincentivizing the inclusion of gas lines to buildings if used for Heating or Water Heating. Early adoption would allow gas for cooking and fireplaces, as the carbon impact of cooking or utilizing gas fireplaces is minimal compared to heating. All buildings would need to include provisions for adapting to all-electric (i.e., sizing of electrical panels), making them “Electric Ready”. Future code cycles could mandate the elimination of gas lines completely in new construction.

How do we encourage developers to go above and beyond what is mandated?

We recommend *incentives* to encourage building that goes above and beyond the code mandates including beneficial electrification, i.e. eliminating gas lines from buildings, ideas to present as possible 'carrots' to encourage more efficient building include:

- Rebate money from The Town or Utilities?
- Permit Fee reductions-propose 50% reduction in fees, maybe varies based on level of compliance?.
- Faster plan review process?
- Simplify code requirements, including language that allows projects that meet LEED Platinum or Zero Net Energy Option to opt out of all of the Energy Efficiency requirements of Chapter 7 in IGCC or perhaps for total Net Zero projects eliminating the IGCC completely?

Where do Electric Vehicles (EVs) fit into this plan?

Another important component of weaning off fossil fuels is the conversion to EVs.

EV charging stations are currently included in the town Unified Development Code (UDC) and the current requirements for the number of stations are recommended to be increased. This is recommended to be removed from the IGCC and placed in the UDC.

Recommendations:

We recommend adopting this roadmap for achieving goals with plans to revisit every 3 years or as needed. The Net Zero for New Construction report of 2019 laid out a plan for getting to Net Zero by 2030 and this plan expands on that. Below is a table of recommendations for review.

Please let us know if you have any questions prior to the webinar on June 30th, 2021. Send emails to: biospace@sopris.net

Table of Recommendations & Proposed Phasing Plan

	Pre 2021	2021	2024	2027	2030
Commercial Renewables	10% Renewables-on site with 50% penalty for off-site	25% Renewables On-site with 50% penalty for off-site (a) (b)	50% Renewables 25% on-site and balance off-site (c)	75% Renewables 25% on-site and balance off-site (c)	100% Renewables 25% on-site and balance off-site (c)
Commercial Electrification	None	Natural Gas (NG) allowed for process loads without penalty. 25% add'l renewables for NG HVAC. Incentives for beyond code. Electric ready.	Natural Gas allowed for process loads only with penalty. 50% add'l renewables if gas line installed for process loads. Incentives for beyond code.	NG allowed for process loads only with penalty. 75% add'l renewables if gas line installed for process loads. Incentives for beyond code.	No gas allowed.

- (a) We are recommending 3.0 watts of PV/SF (or equivalent) of construction for buildings under 5,000 sf, which should equate to approximately 25% renewables for regulated, non-process loads. Buildings over 5,000 sf have to do energy modeling and show 25% renewables, also based upon regulated loads only.
- (b) The current residential code requires 1.5 w/sf. PV, except buildings over 8,000 sf which require 2 w/sf. Multifamily projects require 1.0 w/sf.
- (c) Off-site Renewable requirements will be adjusted once annually based upon utility providers fuel-mix (i.e. percent of energy provided by renewables by the utility company)