Sent via Electronic Mail

Energy Ad-Hoc Committee
North Carolina Building Code Council
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December 9, 2021

Re: 2024 North Carolina Energy Conservation Code and Roof Alterations

Dear Chairperson Kim Humiston and Energy Ad-Hoc Committee Members,

In developing your recommendations for the Council regarding the 2024 North Carolina State Energy Conservation Code (NCECC), PIMA urges you to adopt the 2021 IECC without weakening amendments. In particular, we want to flag a weakening amendment that was approved as part of the 2018 NCECC that eliminated the insulation requirements related to commercial building roof replacement projects and represents a significant roll-back in comparison to previous versions of the NCECC and the International Energy Conservation Code (IECC).

The North Carolina amendment deleted the requirements applicable to roof replacements that now appear as Section C503.2.1 of the 2021 IECC and added “roof replacements” to the list of exceptions under Section C503.1, which lists the alterations that are excused from compliance with the energy code’s requirements. Section C503.1 of the 2021 IECC contains a list of exceptions, but that list does not (and has never) include roof replacements. By adding “roof replacements” to the list of exceptions, commercial low-slope roofs in North Carolina are not required to add insulation when they are replaced, even if there is currently no insulation in the roof. This amendment represents a significant lost opportunity to cost-effectively improve building energy efficiency. Given the significant negative impact of this change, North Carolina is unsurprisingly the only U.S. jurisdiction to exempt this type of building alteration from the energy code. If North Carolina adopts the unamended version of 2021 IECC-Commercial (specifically Chapter 5), then these requirements for roof replacements will be restored.

To better highlight the relevant language, copied below is section C503.1 of the 2021 IECC with two versions of exception 5:

- The red exception 5 is the unamended language from the 2021 IECC; and
- The blue exception 5 is the language reflected in the 2018 NCECC.

C503.1 General. Alterations to any building or structure shall comply with the requirements of Section C503. Alterations shall be such that the existing building or structure is not less conforming to the provisions of this code than the existing building or structure was prior to the alteration. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall not create an unsafe or hazardous condition or overload existing building systems.

Exception: The following alterations need not comply with the requirements for new construction, provided that the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Surface-applied window film installed on existing single-pane fenestration assemblies reducing solar heat gain, provided that the code does not require the glazing or fenestration to be replaced.
3. Existing ceiling, wall or floor cavities exposed during construction, provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. Roof recovery. [IECC Language]
6. Air barriers shall not be required for roof recovery and roof replacement where the alterations or renovations to the building do not include alterations, renovations or repairs to the remainder of the building envelope.

In addition, C503.2.1 of the 2021 IECC, which was deleted under the 2018 NCECC, should be restored. The 2021 IECC language is reprinted below.

C503.2.1 Roof replacement. Roof replacements shall comply with Section C402.1.3, C402.1.4, C402.1.5 or C407 where the existing roof assembly is part of the building thermal envelope and contains insulation entirely above the roof deck. In no case shall the R-value of the roof insulation be reduced or the U-factor of the roof assembly be increased as part of the roof replacement. [IECC Language]

Since 2000, the IECC has required roof replacements and other building alterations to meet the same or similar standards that are required for new buildings. The intent is to regularly improve building energy efficiency when it is most cost-effective to make those improvements. In addition to HVAC equipment, windows and lighting, roof replacements are one of the most common categories of building alterations and represents a significant opportunity for improving building energy performance. Approximately 3 billion square feet of commercial low-slope roofs are replaced or re-covered each year in the United States.

PIMA recently commissioned ICF International to quantify the energy and carbon emissions savings of energy code-compliant roof replacements. ICF’s report details the savings associated with roof replacements for 4 of the Department of Energy’s prototype commercial buildings in 7 cities that represent Climate Zones 2-6. The energy savings reported range from 2%-12%, depending on building type and climate zone. For example, primary schools in Climate Zones 3 and 4 would achieve a 6% and 10% savings and a cumulative energy cost savings of $227,000 and $363,000, respectively. Also, ICF found that code-compliant roof replacements are life cycle-cost effective under a range of conservative assumptions regarding costs and discount rates. The ICF report is available at: www.polyiso.org/page/EnergyCarbonSavingsAnalysis.

Lastly, we encourage you to coordinate your recommendations with the energy-related provisions under the NC Existing Building Code (NCEBC), specifically sections 708, 809, 907, and 1104 of the 2021 International Existing Building Code (IEBC). The current edition of the NC Existing Building Code has many of the same weakening amendments that are in the 2018 NCECC related to commercial building alterations.

Sincerely,

Justin Koscher
President