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To: Department of Energy Resources (DOER), Energy Efficiency Division
100 Cambridge Street, Suite 1020
Boston, MA 02114

Date: 28 June 2022

Subject: Stretch Code Straw Proposal Comments

Dear Members of DOER Stretch Energy Code Team:

In response to DOER's release of the Stretch Energy Code Straw Proposal earlier this year, I submitted the following comments (as an Individual) to stretchcode@mass.gov on 18 March 2022 in four separate email messages, separated by topic. Because I do not find them included in the Public Comments posted on the DOER website, I have prepared this memo comprising all my comments, with the hope that DOER can take them into account as the code language continues to be developed. After reviewing the recently released draft code language, I may send additional comments prior to 12 August 2022.

I am an Architect Emeritus in Massachusetts with expertise in building science. After retiring in 2021 from full-time employment as an architectural specifier, I have continued to be active in the Building Enclosure Council at Boston Society for Architecture and I serve on the AIA Building Performance Knowledge Committee; however, these comments reflect my own opinions. Since late 2020 I have been following the development of legislation and the building code to address climate change, and I have recently attended virtual presentations by DOER to AIA Massachusetts and the Public Hearing for Metro-Boston/ Northeastern MA on the Building Energy Code Straw Proposal.

I very much appreciate the development of this code structure to address the goals of the Commonwealth as expressed in legislation passed in 2021 to address climate change. While I understand the ardent voices of those who are impatient to see "net zero" as soon as possible, my 40 years of working as a licensed Architect help me to understand the complexities involved, and the need for step-by-step solutions. To move toward "net zero" in 2050, improvements like the ones you are proposing are truly needed in the building code. I also believe that certain other advancements are more appropriately dealt with by voluntary standards such as LEED that influence the market, or perhaps by separate legislation and local zoning regulations.

The following text focuses three topics: Discouraging widespread use of glazed curtain wall construction on building facades; Defining "Net Zero"; Avoiding the use of the word "Carbon".

Curtain Wall

Rather than writing specific energy performance requirements for curtain wall construction into the Energy Code, I believe it would be more appropriate to control the impact on building energy performance of all types of fenestration by simply prescribing a **maximum area-weighted U-factor for the entire above-grade building enclosure**. To meet such a requirement when curtain wall is desired for a portion of the exterior wall, all other portions of the exterior wall and the roof would need to significantly exceed the prescriptive performance values. This approach would reduce the amount of curtain wall that could realistically be included on building facades.

“Net Zero”

I suggest that our Energy Code recognize two distinct definitions, as shown below in bold italics, with bullet points for my further comments:

Zero Energy Building (ZEB): An energy-efficient building where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy.

- This definition was developed by the U.S. Department of Energy (DOE) and the National Institute for Building Sciences in consultation with a wide range of members of the design, construction, manufacturing and building ownership community.
- To avoid confusion, I think it is important that Massachusetts use this industry-wide definition.

Net Zero Economy (NZE): A state-wide community of energy users which together on an annual basis produce a quantity of greenhouse gas emissions no greater than the amount that can be absorbed by the natural environment within that community. The following strategies will be employed in the building sector to achieve NZE:

Energy efficiency: Minimum energy efficiency requirements will apply to all building construction, including additions to existing buildings, without exception and without trade-offs.

Zero Energy Buildings: To the greatest extent possible, incentives and locally adopted specialized code requirements will produce Zero Energy Buildings.

Electrification: Heating and cooling for new construction and retrofits will be powered by electricity, and fossil fuel-burning equipment and appliances will be phased out, as the electric grid moves toward 100 percent reliance on renewable energy.

Existing Buildings: (TBD)

- I have drafted this definition based on my reading of MA climate legislation and the excellent Massachusetts 2050 Decarbonization Roadmap. If you agree with my basic idea for the definition, I am sure the wording can be refined to more precisely reflect the Commonwealths’ goals.
- Requirements for retrofitting existing buildings to meet minimum energy efficiency goals need to be developed by DOER.

“Carbon”

Thank you for avoiding the use of the word “carbon” in the language shown in the slides for the straw proposal (aside from the slide about curtain wall, which I will write about separately). In place of “carbon”, I was glad to see the well-defined term Greenhouse Gas Emissions (GHG), measured in tons of carbon dioxide equivalent. I would like to comment on a couple of common uses of the term “carbon” which other advocates may want included in the code, but which I do not think belong there.

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“Embodied carbon” is a popular term used to quantify the impact of a construction material on the environment in terms of the GHG emitted during the manufacture, transport, installation, maintenance and disposal of that material. Even though I believe it is appropriate for our society to be concerned about this topic, I do not think it should be addressed or even mentioned in the building code in any way, for several reasons.

- For protecting public safety and welfare, as well as for lowering the environmental impact of a building over its life cycle, durability and performance are the critical criteria for material selection. These criteria should never become secondary to a measure of just one aspect of environmental impact.
- Even if we can obtain certified “embodied carbon” metrics for every material used in the building, how do we assign criteria for what is acceptable for meeting the code? From what I know, such criteria depend on a complicated calculation based on assumptions regarding the amount of each material, its performance and the service life of the building or building component, far beyond what I consider to be the appropriate scope of a building code.
- “Embodied carbon” measures only one aspect of environmental impact. Is the Building Code also going to require metrics for water usage, pollution of water and air and other ways in which the life cycle of a material can damage the environment?
- I do not think it is reasonable to burden local building officials with the need to evaluate this type of information above and beyond all the more appropriate requirements of the building code. I hope much of this concern will be dealt with in other ways, such as through regulation of industrial processes.

“Carbon offset” is another popular term that I am glad to see is not mentioned in the proposed code. As I understand it, this concept comes from an attempt to compensate for poor energy performance of a building by purchasing off-site renewable energy, or by investing in off-site forests or technology that absorb greenhouse gases from the atmosphere. A “carbon offset” usually relies on a contract between the building owner and another entity that is likely to have a limited lifespan. The purpose of the Building Code is to regulate how a building and its site are constructed, not what type of contracts the building Owner engages in over time.

Thank you very much for your work, and for your systematic efforts to obtain public comments.

Sincerely,

Greta

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