

Finlayson, Ian (ENE)

From: Martyn Roetter <mroetter@gmail.com>
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Dear Commissioner Woodcock and DOER staff,

The following comments refer to your extensive work in updating the existing 'Stretch Building Energy Code' as well as developing the new 'Municipal Opt-in Specialized Stretch Energy Code' to meet the statutory requirements most recently updated by the Commonwealth's Climate Act Of 2021. There is much that is commendable in the latest versions of these codes. I greatly appreciate your efforts over the past several months in pursuit of this goal. My comments focus on areas where I believe significant improvements can and should be introduced, such as:

1. Elimination of the fossil fuel or more broadly any hydrocarbon or combustible fuel option (gas utilities are touting non-carbon hydrogen as a future alternative to methane for heating homes) in new construction,
2. Expanding requirements for pre-wiring buildings and installing solar panels wherever feasible in anticipation of much higher total demands for electricity regardless of the initial and short-term situations of new or renovated buildings, as the numbers of EVs grow and the value of behind-the-meter energy resources to supplement utility-scale variable renewable energy (VRE) power plants to meet these demands becomes more apparent,
3. Reintroducing embedded carbon requirements for materials used in new construction and renovations, since embedded carbon makes significant contributions to emissions, and lower carbon materials have been developed whose supply will be increased and costs reduced as demand for them grows.

My comments and suggestions are based on the work I have been doing in collaboration with colleagues in the Gas Leaks Allies and members of the MIT Alumni for Climate Action (MACA) with which I am associated (although not an MIT alumnus) but are my sole responsibility.

The traditional saying is that the first step towards getting out of a hole in which you are stuck is to stop any more digging. We are in a climate hole thanks to greenhouse gases produced by human activities. The equivalent of stopping digging is to prevent any further additions to our use of combustible polluting fuels, which are also harmful to our health when burned in our homes and other buildings, especially natural gas (methane). Methane is a very powerful greenhouse gas that is 80 times more powerful than carbon dioxide (CO₂) over a period of 20 years. Methane is spewing forth into the atmosphere from multiple leaks in its production, storage and distribution facilities. Based on new information these leaks are reportedly much larger than has been recognized until recently.

Moreover, methane produces CO₂ when it is combusted. This gas is a powerful “twofer” source of damage to the planet to be limited as rapidly as possible along a transition path to weaning ourselves off it as a source of energy.

Unfortunately, much misinformation is being propagated that is aimed at obscuring the reality of the urgency of transitioning off fossil fuels or hydrocarbons which when combusted are substantial contributors to the greenhouse gases responsible for Climate warming. In addition they have harmful consequences for our health such as increasing the incidence of asthma and other respiratory diseases.

Gas utilities are waging persistent and relentless marketing and lobbying campaigns to convince us that they have solutions to the problems and damage created by use of natural gas (methane), through its replacement by “renewable” or “fossil free” or “responsibly sourced” gas and/or green hydrogen. According to them, these other gases will ensure that goals for reduction in harmful emissions will be achieved at acceptable costs and without placing undue demands on the supply of electric power compared to scenarios in which gas as a source of energy for in building applications is largely or maximally replaced by electrified solutions. These campaigns or claims are not credible.

The gases the utilities are touting are either methane, so they will pollute just as natural gas does, and/or hydrogen. But the introduction of hydrogen into pipelines and residential and other non-industrial buildings will entail significant additional safety risks in these environments. They are uncontrollable compared to industrial facilities where hydrogen is present for which strict safety regulations and protocols and training for building occupants are in place. Moreover, hydrogen is itself a significant greenhouse gas and ironically its use will consume more electricity than direct electrification because the hydrogen must be manufactured with a minimum anticipated power consumption of some 41 kWh per kilogram of hydrogen.

The self-interest of these utilities in propagating this message is easy to understand, on the principle of “follow the money.” They receive guaranteed healthy annual rates of return on their investments in gas pipelines, which they are loath to give up and are seeking to perpetuate regardless of the consequences. They are the pied pipers of pipelines, not the responsible stewards and suppliers of energy for our society and economy that I wish they were.

I hope the DOER recognizes these facts and the motivation behind the gas utilities’ arguments. The claims and comments they and their independent consultants present about the valuable roles gas through pipelines to renovated buildings and through new connections and even additional pipeline infrastructure to serve new buildings can play are deceitful. It is hard to understand how these organizations themselves can believe them to be correct, unless they pay no attention to the laws of chemistry and the body of knowledge we have built up in atmospheric science and on the impact of regular exposure to various gases and the products of their combustion for human health.

For their part some (not all) builders or developers emphasize alleged increases in total initial building costs of all-electric buildings compared to those which make significant use of gas. This cost premium has come down substantially and even been eliminated in some situations in recent years. Moreover, operational savings from electric solutions ensure that the payback period for any premium that may exist in some situations is short. Put another way the total cost of ownership for a buyer or the total cost a renter will incur will be lower in an all-electric building, a positive message that must be emphasized.

In summary there is no justification for including in the opt-in stretch code an optional fossil fuel or more broadly combustible gas pathway in new construction.

At the same time, I recognize that opposition to allowing new gas connections as an option is insufficient on its own. It must be accompanied by recognition of the needs for more and clean electricity to enable new and expanded solutions to take the place of hydrocarbons in buildings and the transport sector (gasoline and diesel), including heating buildings and delivering traction power to vehicles. Inevitably per capita consumption of electricity will increase substantially, and the management of the operation of the electric power grid (to be dominated by VRE sources) will have to change and its capacity increased.

Very approximately one EV may require about one third as much electric energy annually as the average annual electricity consumption of a residential household in the US. Other expanded uses of electricity in homes (e.g., more heat pumps) and in business or commercial buildings may foreseeably lead to a doubling of total electricity demand within a city such as Boston and other municipalities. Pre-wiring buildings to cope with future in building demands for electricity will be insufficient unless the grid itself (transmission and local distribution networks) is upgraded as well. A chain is only as strong as the weakest link.

While I realize that this brief discussion of the grid raises complex issues that go well beyond the purview of the DOER and the new proposed building codes, I hope that this DOER effort to formulate new building codes will stimulate wider recognition of what will be required of the energy sector, and especially electricity, to meet the demands of an increasingly electrified economy. Integrated, holistic planning across the energy sector, coordinated and interacting with overall economic and development planning is imperative, to replace the siloed organizations and outdated regulatory structures and fragmented planning processes which prevail today.

I conclude with a news item from where I grew up illustrating an outcome we must seek to avoid, which we will only be able to ensure if we adopt a more cohesive and comprehensive approach to planning - <https://on.ft.com/3BJ3MqY> ("West London faces new homes ban as electricity grid hits capacity").

Thank you for your attention and the forums you have made available to provide both written and oral testimony.



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Martyn Roetter
144 Beacon Street
Boston, MA 02116-1449 USA
Cell: [+1 617 216 1988](tel:+16172161988)
Twitter@[mroetter](https://twitter.com/mroetter)
Skype ID: martynroetter