July 31, 2018

From: Hank Keating, AIA , PHMA Board

To: EEAC

RE: Passive House incentive programs in the 3 Year Plan (2019-2021)

My name is Hank Keating. I'm an architect and recently retired developer of affordable multifamily housing. I'm longstanding member of Passive House Massachusetts (PHMA) and I'm currently on the Public Policy Committee of the PHMA board of Directors. I have substantial experience with Passive House (PH) design and construction, both single family and affordable multifamily projects.

I, along with several other PHMA Board members and affordable housing developers, have attended several EEAC meetings and offered public comments over the last several months. We have met to discuss potential options for PH incentive programs that could be detailed in the 3 Year Plan. We have reviewed the existing Mass Save programs, both C&I and Residential, and have had brief conversations with Ezra McCarthy and Kristen Simmons about the details of these programs and how they might fit with a PH incentive program. Several of us attended the 7/19/18 PH Stakeholders Workshop organized by Kristin Simmons of ICF regarding how the existing Residential High-rise and Low-rise programs fit with potential PH incentive programs. It was a great discussion that served to underscore the obstacles that will have to overcome to establish workable PH incentive programs. In addition, we reviewed the NYSERDA "Final Report, ASHRAE 90.1 Appendix G/ PHIUS+/ Passivhaus Comparison Evaluation for Multifamily Buildings" (ASHRAE / PHIUS / PHI Report) and the current NYSERDA Multifamily New Construction Program (MF NCP) Guidelines issued in January 2018.

Following all of these discussions and review of multiple documents, a few very basic conclusions emerged. First and foremost it is clear that the modeling tools that Mass Save uses to calculate energy savings and incentive payments clearly underestimate the energy savings that PH design and construction techniques offer. The ASHRAE / PHIUS / PHI Report has many variables and assumptions to consider, but it points to eQuest under-estimating PH savings by 20% to 40%. Everyone seems to acknowledge that the eQuest model that is used by Mass Save C&I is more sophisticated than the "modified" Energy Plus model used by the Residential Programs. This probably means that the discrepancies between the Energy Plus model and PH models could be even greater. At the PH Stakeholders Workshop, Kristen Simmons estimated that under the existing programs a PH high-rise would qualify for a $1400+/- incentive and a PH Low-rise might qualify for $1800+/-. These payments struck everyone in the workshop as being low, especially in comparison to the average incentives earned by typical better performing buildings.

How would existing Mass Save Programs have to be modified to more accurately reflect the $ and energy saved by PH multifamily projects? One approach would be to use the PHIUS or PHI PHPP modeling tools not only for the design as required, but also as the basis for the energy saved calculations for incentive payments. This might work, but it does not seem likely that Mass Save would be ready any time soon to accept this modeling tools as the basis for payment. Another option would be to use either the eQuest or the modified Energy Plus models to calculate savings but then increase the reimbursement rates from $.35/ KWH and $1.70 / Therm to something higher. Once again it does not seem likely that Mass Save would be interested in this approach.

Everyone recognizes that the eQuest and modified Energy Plus models do not take in to account either the extremely low infiltration rates of PH or the dramatic reduction of thermal bridging. However, PH design brings with it multiple Non Energy Benefits (NEB) which are as important as the straight forward energy saved. These NEBs include

Affordability – energy bills are a significant expense for low-income families

Health – the continuous fresh air supply, either through an ERV or an HRV, required by PH, assures indoor air quality is better

Comfort – noise reduction and thermal comfort by eliminating radiant cooling off of walls and windows

Resiliency – In the event of a power outage, residents can shelter-in-place, avoiding the upheaval and/or expense of relocating

Durability – PH design is focused on the building science of envelope construction – getting the air sealing and thermal bridge detailing right are critical to insuring that these buildings are durable.

Reduced complexity and maintenance of HVAC equipment – ASHPs are a proven technology with a long term record of reliability

Carbon Reduction – the low loads of PH and the tendency for these buildings to go to mostly or all electric reduces carbon production and thereby helps the State meet it's long term carbon reduction goals

Taken together these NEBs are very significant and ought to be encouraged and rewarded through PH incentives in the upcoming 3 Year Plan. Could an incentive program based on Comprehensive Custom Measures be put together to recognized these NEBs? Would it be easier for Mass Save to replicate something like the current NYSERDA MF NCP Guidelines that offer a $3500/ unit incentive for low income projects that reach their Tier 3 goals – this is what they expect PH projects to achieve. This incentive is "all in" meaning it includes both hard and soft costs. If Mass Save chooses to go in another direction they should at least build in reimbursements like those found in the C&I Program's Whole Buildings Solutions, Integrated Design Path including Energy Charrettes, Design Team Incentives, sharing the cost of modeling, especially since it is likely that both PH models and Mass Save models (eQuest or Energy Plus) will have to be paid for.

There are obviously a myriad of details to be sorted out for Mass Save to design PH incentive programs for the next 3 Year Plan. PHMA membership includes dozens of experienced PH professionals that stand ready to help in any way to design such programs as soon as possible. The goal should be to have operational PH programs in the first quarter of 2019.

We hope these suggestions are helpful and look forward to working with the EEAC to develop meaningful PH incentive programs.