

February 11, 2019

From: Hank Keating, AIA, PHMA Board

To: EEAC

RE: Final Passive House Incentive amounts

First, we at Passive House Massachusetts want to again congratulate and thank the EEAC for including a detailed framework for a meaningful Passive House Incentive program in the current Three-Year Plan. We understand that the actual incentive amounts are being finalized now so that they can be announced by the middle of March, substantially ahead of the once predicted timeframe of June. This too is very good news. The sooner the final program details are in place, the sooner developers can begin to seriously factor these incentives into their budgets for new projects. However, we are concerned that the final incentive amounts being considered may fall substantially short of the amounts needed to generate significant participation in the program. This Three-Year Plan needs to be the catalyst to spark the development community into adopting Passive House so that, by the end of 2021, real performance data can begin to substantiate the tremendous energy savings that Passive House will bring. An incentive program that falls short would be a terrible missed opportunity.

We understand that the incentive amounts being considered are very similar to the amounts that were discussed at Mass Save Passive House Stakeholders Workshop on July 19th, 2018. In our written submission to you on July 31st (attached) we made it very clear that the projected incentive amounts of \$1400 to \$1800 per unit were too low, especially in comparison to the average incentives earned by typical high performing buildings. This was all the more frustrating because everyone agreed that a Passive House building would save significantly more energy than predicted by the eQuest or Energy Plus models that would be used to calculate the Performance Incentive. Understanding that Mass Save would not be ready to switch to Passive House modelling as a basis for payment and that it would not want to change the reimbursement rates per KWH or Therm specifically for Passive House projects, we suggested that an incentive program based upon Non Energy Benefits might offer more flexibility and allow the program to target at least the \$3500/unit rebate that the successful NYSERDA program used. This approach was not taken, but a Certification Subsidy "add-on" was built-in to the proposed Passive House Incentive program. It seems that this add-on is now the only tool that Mass Save has to increase the total per unit incentive up into the range of \$3500 to \$4000 per unit, the level that we believe is necessary to insure robust participation in the program.

The MassCEC Passive House Challenge pilot program offered \$4000/ unit and the response from the affordable development community was very positive. It is worth putting this incentive amount into perspective. Although we believe that three years from now, after many Passive House projects have been built, the cost premiums associated with Passive House will fall, possibly even to parity with code minimum construction, we must recognize that the construction industry always adds premiums for anything new that is perceived as a risk. The MassCEC program aims to demonstrate that these current premiums can be kept within 3%. Across the Commonwealth, the typical multifamily, affordable housing unit costs between \$250,000 and \$350,000+ depending upon where they are being constructed. So a 3% premium equals \$7500 to \$10,500 and a \$4000 incentive only provides 53% to 38% of the premium incurred.

We believe targeting an incentive of \$4000/ unit is justified and needed to make this incentive program a success, and we urge you size the certification add-on to reach this goal. It would be tragic to look back three years from now and realize that we missed the mark and participation was disappointing.

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 underestimating 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 its 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 its 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 recognize 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.