September 25, 2018

From: Hank Keating, AIA, PHMA Board

To: EEAC

CC: Office of the Massachusetts Attorney General

RE: 9/14/18 Draft of the Three-Year Energy Efficiency Plan 2019-2021

In the EEAC’s Resolution of July 31, 2018 commenting on the PAs 3/30/18 Draft Plan, the Council requested “...additional detail to understand how the PAs planned efforts will translate into spending and savings, what volume of production is expected, and whether the general strategies presented will yield significant results. The Council requests more specificity in how ZEBs and Passive House will be supported beyond education and trainings.”

We are pleased to state that from the point of view Passive House Massachusetts (PHMA), the 9/14/18 draft does go a long way toward answering the Council’s questions, but does not go far enough to assure that the more detailed “strategies will yield significant results”. This Three-Year Plan is seen by all as a significant “...pivot point where the Program Administrators will embrace a broader, holistic energy system view...” and “...find ways to mine savings from more difficult, costly, and challenging projects and markets segments.” If these goals are to be realized for Passive House projects, critical details must be filled in as the final Term Sheet is developed and adopted. To be clear, the majority of these comments / suggestions are about large, multifamily (25 units+) projects, not single family homes. At the end of this document we have included suggested incentives for single family passive house projects.

The good news is that both the Residential New Homes and the C&I New Buildings Programs are proposing Passive House Incentives for Modeling, Design Team Incentives, a Design Charrette, an “Adder” for Certification, and Performance incentives for modeled kWh and therms saved. The problem is that the monetary values of most of these incentives are not defined, making it nearly impossible to determine if these programs will yield significant results. In correspondence to the EEAC dated 9/19/2018, (attached) we suggested values for these project milestones. We understand that the PAs do not intend to fund 100% of these extraordinary costs and want development teams to have “skin in the game” by paying a reasonable share of these costs.

For Modeling we suggested $8000. Given that any Passive House project will have to be modeled in both the PHI PHPP or the PHIUS +WUFI and the eQuest or Energy + model that the Residential or C&I programs use, it’s clear that the development team will have to spend more than the $8000 incentive. By the way, both the Residential and C&I Passive House Incentive charts mention the “Warme Und Feuchte Instationar or Passive House Planning Package” models – this is confusing. We assume that the intent is to identify both the PHIUS and the PHI modeling tools. If so it would be much clearer to refer to the PHIUS + WUFI model or the PHI, PHPP model.

For the Design Team Incentive we suggested $10,000 rather than $/kWh and /or $/therm saved. Everyone involved recognizes that the upfront commitment of the design team is critical to the success of a passive house project. If you assume that this incentive is going to be shared between the architect, the HVAC engineer, the electrical engineer, the plumbing engineer, and the structural engineer and you
assume an average billing rate of $150/HR, the $10,000 will fund just over 13 hours for each discipline. It is clear that they will have to spend more than 13 hours so the developer will also have to fund additional design team hours.

For the Design Charrette we suggested $7500, an amount which is probably 50% lower than the actual cost of such a charrette. Assuming a full day, 8 hour charrette with representatives from the owner, architect, HVAC, electric, plumbing, and structural engineers, CPHC, Rater, contactor and major subs, and lenders / agency representatives, again assuming an average hourly rate of $150, the cost will exceed $14,000.

This brings us to the Performance Incentive and what is now been identified as the Certification Subsidy. At the Passive House Stakeholder’s meeting on 7/19/18, the ICF representative indicated that the per unit passive house incentive based upon modeled savings would probably be somewhere between $1400 and $1800. Everyone agreed that these projections were too low, probably because the models being used do not capture the full benefits of passive house performance in general and specifically with regard to infiltration.

As we understand it, air sealing is not even an approved measure for savings calculations. This is a serious disconnect between your current programs and passive house. The established air sealing requirements of passive house which must be demonstrated for the whole building via a final blower door test are a critical component of not only energy saved, but the durability of the building envelope. In addition, multifamily unit compartmentalization must pass air leakage testing. As codes and your programs push buildings toward tighter envelopes, it becomes all the more important that air leaks be minimized to approaching zero: air leaks into super-insulated wall sections can definitely cause condensation and damage. Passive house construction has demonstrated that the extremely low infiltration rates required can be achieved consistently with good detailing and sub-contractor training. Regardless of passive house, your programs ought to give serious consideration to requiring whole building blower door testing and unit compartmentalization.

So, if $1400 to $1800 per unit is too low, what should it be and how do we get there? We suggested $3500/ unit as is being used in the NYSERDA program. Can the difference be made up with the newly proposed Certification Subsidy? We have received mixed messages about what this certification subsidy might be – it is not defined. We’ve heard it may only be an amount to literally help pay for the cost of the certification process itself. Is so it would probably be on the order of $50,000 +/- or $830 / unit for our typical 60 unit projects used for sample calculations. On the other hand, we have heard it might truly be a bonus (unspecified) for achieving passive house certification. If this certification subsidy was established as $2000/ unit, then in combination with the predicted savings incentives of $1400 - $1800/ unit, the total would get to the $3500/ unit +/- we recommended. See the attached 9/19/18 comments to the EEAC for the projection of 2400 units of passive house within the Three-Year Plan. This would be a good outcome, but the details need to be specific in the final Term Sheet to make it happen.

In our 9/13/18 comments to the EEAC (attached), we suggested an alternative route to the same $3500/ unit incentive. We proposed a specific Comprehensive Custom Measures category be established for Passive House based on Non Energy benefits (NEBs). We think that this is a valid approach also – it’s a matter of what is the most comfortable fit with the EAEAC and PAs.
Regarding training, we are very glad to see the broad emphasis on it in the September 14th Plan. To respond to climate change we need to fundamentally change the way we design and construct buildings. This will require training at every level of the design and construction supply chain. Calling for the addition of 90+ Passive House professionals in the state over the next three years including Consultants, Designers, Builders, Raters and Verifiers is a meaningful goal. We also support the suggested outreach and education of architects, lenders and hands on trainings for installation contractors. However, at PHMA, we have been discussing the need for many various training modules aimed at specific professionals and trades people.

For example, a structural engineer does not need CPHC training or Builder training but they need a simple 2-3 hour training module on the importance of thermal bridging in passive house projects. With this they can contribute to a passive house design team without bringing in their typical details with multiple thermal bridges. Likewise a training module for HVAC engineers can familiarize them with the typical type of equipment selections that fit with passive house and the specific issues of oversized equipment, internal heat gains and humidity loads. Such a training ahead of the design charrette and schematic design would be invaluable to the design team. The same would be true for the plumbing engineer – hot water becomes one of the biggest remaining loads in a multifamily passive house and distribution losses become very significant – it’s a different way of thinking. Likewise for the electric engineer interior common lighting and its controls becomes another load that is relatively higher because the primary heating and cooling loads have been so dramatically diminished. PHMA is in a very good position to find the right individuals to help the Lead Vendors develop these type of trainings. Between architects and all of these type of consultants, the goal ought to be to provide 30 – 40 individuals in each category training for a total of 150 – 200 trainings over the Three-Year Plan.

In addition to architects and lenders, a training module aimed directly at developers / property owners is critically needed. Outreach through organizations such as ULI, BOMA, NAIOP, SIOR NE Chapter will be required to get the message about passive house to this critical market segment. PHMA and PHIUS have offered specific trainings aimed at developers with limited success because the outreach has not seemed to get them to the trainings. We have concluded that we need to bring the trainings to them through their own organizations. Within PHMA, we have developers that would be in a very good position to work with the Lead Vendors to create and deliver such trainings to the development community. The goal ought to be training sessions offered before 100 to 150 developers / property owners at their respective trade organizations over the course of the Three-Year Plan.

The Plan also mentions trainings for the residential real estate market, homebuyers, code officials appraisers and mortgage bankers. All of this would be good, but these market segments ought to be prioritized. If we offer effective trainings to residential developers, they will create effective marketing plans for the use of residential brokers for market rate rental or homeownership. These plans would be founded on comfort, health, indoor air quality, resiliency (you and your family will not have to relocate during a power outage) and reducing you individual carbon footprint, in addition to energy savings. Appraisers look for comps - comps will be created by developers demonstrating higher values or rents over time. Mortgage bankers may lend more based upon lower operating costs but the multifamily passive house industry does not have enough built projects and actual use data for consistent
underwriting. This raises the point that all funded passive house projects should require benchmarking and tracking for a minimum of three years so that the real data is available in the future.

Regarding incentives for single family passive house projects, we think that the overall incentives payments ought to total around $12,000. This will not cover all of the costs associated with achieving passive house certification including consultant fees, filing fees, rater fees, testing, construction upgrades for windows, insulation and air sealing. If this could be a simple per unit incentive for a certified passive house that would be the most straightforward approach. If that approach cannot work, then modifications to the existing Single Family BSA Incentive Calculation matrix might work if you could include $4000/unit Certification Adder plus a $1500/unit Rater incentive and another $4000/unit for consultants, modeling, filing fees etc.

This is a lot of information to consider in a short time. We really hope that between the PAs, the EEAC, DOER, and the Attorney General’s office, the type of details we have suggested above can be integrated into the final Three-Year Plan and the Term Sheet that supports it.

Thank you for your consideration. Hank Keating, AIA and the PHMA Board
September 13, 2018

From: Hank Keating, AIA, PHMA Board

To: EEAC

RE: Suggested Passive House incentive program for 3 Year Plan

After the PHMA Board meeting on 9/11/18, we decided that we ought to follow-up on our written submission of July 31, 2018 as we understand that the next Draft Plan is due out soon and the Final Plan is due out in early October. We really hope that in addition to the $1M of training funding that has been requested, the Final Plan will include a meaningful incentive program for certified multifamily passive house projects. It would be extremely disappointing if this opportunity was missed and we had to wait for the next 3 Year Plan to implement such a program.

Assuming that residential projects are going to remain within the MassSave Residential, we would recommend that those programs be modified to include up front incentive payments like those provided by C&I Whole Buildings Solutions, Integrated Design Path Programs for Energy Charrettes and Design Team incentives. In addition, we recommend that these programs include a specific Comprehensive Custom Measures category for certified Passive House projects based not only on the recognition that they will provide deep energy savings, but the they include multiple and significant Non Energy Benefits (NEBs) including:

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

We think it is reasonable to quantify this incentive for Passive House certification at $3500/ unit like the NYSERDA Program has done in New York.

We urge you to seriously consider these recommendations.
September 19, 2018

From Hank Keating, AIA, PHMA Board

To: EEAC

RE: Funding for suggested Passive House Incentive program outlined in 9/13/18 memo

Since the 9/13/18 memo regarding a suggested incentive program for multifamily passive house projects in the Final 3 Year Plan, we have given additional thought to quantifying the amount of funding that should be allocated for these programs in the Plan.

We have requested $1M for passive house (PH) training and believe that is a good amount and will be critical in accelerating the adoption of PH in both the affordable and market rate markets. PHMA is sponsoring a PH Builder’s training at the end of September and it was sold out immediately leaving a waiting list. We need more and different trainings and training for trainers so that we can meet the demand. PHMA is ready to develop the trainings needed and even has a training space in Newton for this purpose.

Originally we requested $5M for affordable PH projects and then we followed up with the request for an additional $5M for market rate PH projects. Following that, at one point we suggested that the combined markets could absorb much more than the $10M, perhaps up to $30M. We have reviewed these numbers in the context of the Comprehensive Custom Measures plan we suggested on 9/13/18 and realized the original ask for $5M for affordable and $5M for market rate was very realistic.

Here is how we arrived at these numbers:

MassCEC just issued an RFP for their Passive House Challenge program that is offering an incentive of $4000/unit for certified, affordable PH projects. All indications are that the response from the affordable housing developers will exceed the one-time $1.8M allocation within the first month of the RFP being available. This in conjunction with LIHTC funding from DHCD will produce 400+ affordable PH units. The demand is there!

DHCD funds approximately 1300 new affordable units each year. If 400 of those were PH projects, they could produce 1200 PH units during the 3 Year Plan. It seems reasonable to assume that market rate developers could produce a similar demand for 400 PH units per year, 1200 units over the 3 Year Plan.

So, the math produces 1200 + 1200 = 2400 x $3500 = $8,400,000. for the Comprehensive Custom Measures.

In addition, similar to the C&I Whole Buildings Solutions that funds Charrettes, Design Team Incentives and Modelling expenses, we are suggesting that these critical upfront expenses be compensated as they occur. The compensation amounts for these categories is not specific and often related to modelled savings. This gets us back into the questions we raised in our 7/31/18 and 9/13/18 memos regarding the compatibility of the eQuest and/or Energy Plus models with the accepted PH models. Rather than trying to resolve the variances, we think that you ought to simply assign reasonable values to these tasks. We are suggesting $7500 for the Charrette, $10,000 for the Design Team incentive and $8,000 for the modelling. These total $25,500, per project. If we assume that the average multifamily project is 60 units then the math for the upfront payments is as follows:
2400 unit divided by 60 units / project = 40 projects at $25,500. / project = $1,020,000. upfront payments

$8,400,000 for Comprehensive Custom Measures + $1,020,000 for upfront incentive payments = $9,420,000. Reasonable to round to $10M, $11M with training. This would be a very modest allocation within the 3 Year Plan and we sincerely believe that it will open the path to “mining savings from more difficult, costly and challenging projects and market segments”.

We hope that this level of detail regarding suggested funding will facilitate your adoption of a meaningful Passive House incentive program.

As we have previously offered, we at PHMA stand ready to help fashion and implement both training workshops and the Comprehensive Custom Measures program we are suggesting.

Thank you for your serious consideration of these proposals.