

EEAC 2019-2021 Year Plan Comments

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Comments by Michael Duclos

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Thank you for the opportunity to offer comments on the EEAC 2019-2021 plan.

As a Certified Passive House Consultant responsible for designing, inspecting, commissioning and monitoring energy use and indoor environmental performance, including Indoor Air Quality, I believe we have amply demonstrated that the approach utilized by Passive House technology, cleverly and aggressively targeting thermal loads for dramatic energy use reduction, using Primary (Source) Energy as a proxy for operational energy related GHG emissions delivers remarkable results, although there is a learning curve.

I've worked on three certified PH in MA, and two more currently in the final stages of certification, including what will be the first multi-family Passive House in NH. I have detailed energy use and environmental data on some of these, as well as comparable but not certified 'passive house inspired' buildings documenting their delivered performance.

Here are my comments on the 2019-2021 EEAC plan published in April of 2018.

Global Warming Solutions Act - GWSA – EEAC has not been assigned responsibility for delivering quantified CO₂e savings targets each year, as a contribution to the puzzle of how MA would meet the GWSA requirements. I think EEAC should be directed to do so, and I will include that idea in my comments on the Comprehensive Energy Plan. It appears to me to meet the GWSA goals will require a highly focused and numerically quantified, committed effort by us all, and I'd encourage EEAC to consider signing up for a GWSA target going forward.

Passive House connects hard goals for Primary Energy to source CO₂e emissions, and with the extensive body of knowledge developed here and abroad, is a rich and deep source of expertise to utilize in meeting the GWSA goals. We are fortunate to have in Passive House Massachusetts a group of accomplished practitioners who are willing and eager to share their expertise, including that of their network, which extends across the US.

The EU has recognized in their GHG reduction plan that load reduction will be a very substantial portion of meeting their 2050 80% GHG reduction goal, and so they use Passive House extensively for that purpose.

Those not experienced in the fine points of Passive House tend to equate it with higher levels of insulation, better air tightness, better windows, etc. – and some assume that building codes will incrementally eventually achieve this performance by prescriptive means.

This is a fundamental misunderstanding of PH technology, design and verification process, and the resulting qualities of very low heating loads, greatly improved indoor air quality and passive survivability in the event of a grid outage, allowing occupants to shelter in place.

Better education on what Passive House is really about is strongly indicated, it is in many ways far superior to net zero, can be had at a comparable cost in the multifamily space, and will produce much more than 6% thermal savings immediately – not delayed to 2030.

I'd encourage the EEAC to utilize Passive House trainers with first person experience – those who have actually designed, inspected, verified and measured the energy and environmental performance of Certified Passive House, since that 'end to end' experience provides a comprehensive understanding of the entire process and implications of fine design details that is important to addressing the many questions of those being trained, as well as the unexpected implementation details that surface when we diverge from 'business as usual' construction.

Mass New Construction Incentive Program - I think we should redirect the MassSave NC - New Construction program back to something like the Tier I, Tier II and Tier III (Tier III is not quite PH, but close enough that a Tier III home is part of the solution, not part of the problem) discourage Tier I and Tier II with lower (or no) incentives, and restore the \$8K Tier III incentive. The Tier I threshold was 15% savings over code, Tier II 30% and Tier III 45%.

The MassSave NC has transitioned from the Tier system to "Pay for Performance," providing incentives for the amount of energy saved over a code house, as long as the new house is 5% better than code. It appears to me this is being done so the Program Administrators (PA) can 'claim more savings' and meet their energy use deliverables, but without quantified accountability for GWSA targets deliverables. This means that not only are 5% savings houses rewarded for being part of the energy demand problem from now through 2050, but the MA government is giving tacit approval by awarding the incentives, and so sending the wrong message, i.e. that 5% better than code is 'good enough.' I realize the GWSA targets are not currently the EEAC's – but I think they should, and eventually must be. I think the Total Resource Cost calculation will need to be adjusted to meet the MA GWSA targets, due to the use of 'present value,'

In addition to this messaging issue, a recently released graph from the MassSave New Construction Program of the average amount of incentives awarded to house by floor area,

modest size homes on average receive ~\$1000, and >9000 sf homes receive over five times that.

So again the state is messaging there is no issue with larger homes with larger energy consumptions receiving more money for being larger contributors to the GHG problem. Further, the incentives given for the largest homes is given to people who could care less about that amount of money, and I see this as a very regressive structure. In terms of climate justice and equity, this seems a remarkable position for a state like MA to take.

I've worked in the MassSave program for nearly 10 years, I can provide supporting documentation upon request.

I worked on over a dozen homes in the National Grid / Eversource Deep Energy Retrofit pilot program, from that and my experience designing, testing and verifying dozens of zero net energy / passive homes, I believe the only cost effective opportunity to realize a low energy building is in the initial design, after which deep energy use reductions become prohibitively expensive.

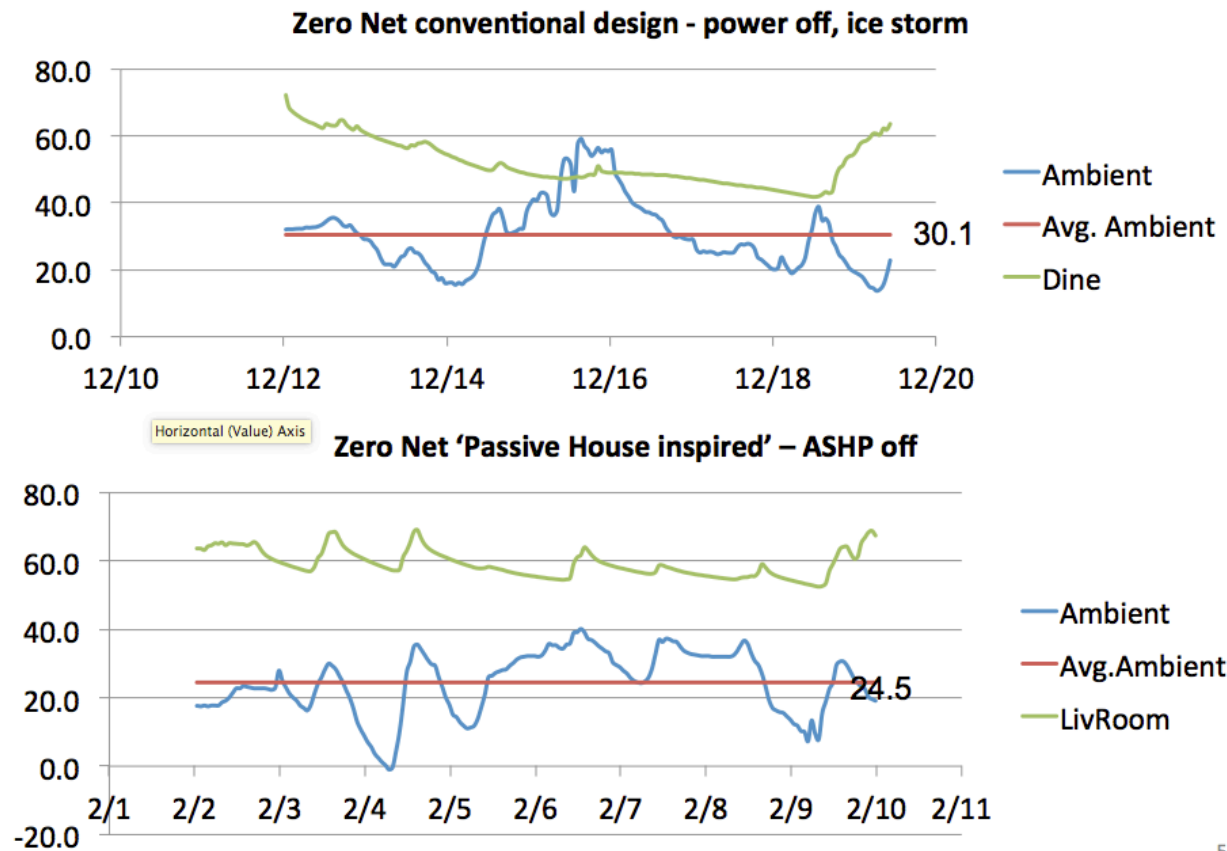
So it is my opinion we need to go much deeper than existing building code, my personal target is >45% energy use reduction below code. Otherwise we build buildings today that will be in use well beyond 2050, and they will be part of the GHG problem, not part of the solution.

As a Certified Passive House Consultant and a HERS Rater, I know first hand of the accuracy of the Passive House design tools (e.g. WUFI Plus, WUFI Passive and PHPP, upon which the WUFI tools are based) and the lack of accuracy that has been traded off for higher precision of the RESNET approved simulation tools such as REM/Rate and Ekotrope, that are used to calculate the HERS index and in the MassSave Program to calculate UDRH savings.

RESNET tools have been designed for precision (i.e. the Rater and the QAD performing QA on the Rater can obtain very similar HERS indexes) and the way this has been achieved makes these tools profoundly unsuitable for Passive House design.

So since incentives are currently based on the RESNET simulation methodology, there is a large performance gap between simulated and realized performance.

I will illustrate one aspect, the space heating performance gap using two homes with HERS indexes that differ by 1, which behave much differently without space heating in winter.



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These are graphs real data showing the performance of each home without a heating system.

The first, a conventional Zero Net Energy home quickly becomes uncomfortably cold, in spite of much warmer outdoor temperatures, where the second, a 'passive house inspired' home maintains a much higher temperature at much colder outdoor temperatures - even down to 0F.

Also the first home was never actually zero net energy - energy bills were low, about \$100-\$200 per year.

The second home produced over 2000 KWHR/yr in excess of consumption - enough to power an electric car for 6000 miles. Both have a HERS index that differs by 1 as certified by ICF International staff, illustrating the RESNET system produces a poor reflection of reality (i.e. accuracy) for very good homes, particularly the very low space heating loads of Passive House.

There are other differences, but I think this serves to illustrate that the RESNET calculation methodology is not appropriate for 'passive house' class homes.

Existing Homes Program

As someone who has worked on over a dozen DER pilot homes, and a number of less aggressive existing home energy reductions, I'd like to offer some thoughts:

Putting a customer in the middle of a project, expecting them to choose and coordinate different contractors, who may or may not be skilled in the areas of energy efficient renovations might be a turn off for many who may not be technically adept, may not want to search out and vet contractors, who do not have expertise in this area and are not inclined to acquire it, who do not have or want to use their time that way, etc. may not be as fruitful as providing 'one stop shopping' with a program like NYSERDA's Home Performance with ENERGY STAR. Nearly 10 years ago I saw TV ads in NY state for HP w/ES companies who were turnkey operations, and it seems to me that would be much more attractive to a much larger group of people.

Thank you for the opportunity to provide comment, feel free to contact me if you have any questions.

Sincerely, Michael B. Duclos