



September 19, 2019

**COMMENTS ON BEHALF OF NEW JERSEY PASSIVE HOUSE (NJPH) ON THE DRAFT
2019 NJ ENERGY MASTER PLAN (NJEMP)**

On behalf of New Jersey Passive House, a chapter of the North American Passive House Network, we would like to submit the comments that follow for review and further consideration in the New Jersey Energy Master Plan (NJEMP). We appreciate the opportunity to comment.

Passive House principles are an essential tool for the NJEMP to provide a rapid transition to 100% clean energy and a low-carbon economy. Based on nearly three decades of proven performance globally, our goal is to offer our expertise in performance-based solutions for our built environment. All of the NJPH volunteers contributing to the following comments are industry practitioners with vast experience in the effective design and construction of high-performance and ultra low-energy, net-zero energy ready buildings that have been successfully completed throughout the region and the continental United States.

We look forward to your response and the opportunity for a continued role in crafting the NJEMP for rapid and cost-effective implementation. Thank you for these very important efforts for the citizens of New Jersey and our climate.

Sincerely,

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Introduction:

New Jersey Passive House (NJPH) is a non-profit organization whose mission is to utilize industry experts to increase awareness about Passive House design and construction techniques. By using public outreach and education to influence policy decisions, we intend to cultivate a community of professionals and citizens who will create a resilient, healthy, net zero-energy, and carbon-free economy in New Jersey to fight climate change.

61% of New Jersey's emissions come from the built environment; therefore, it is essential to address buildings if NJ is to meet the goals laid out in the NJEMP. NJPH applauds the State of NJ for the creation of the NJEMP. However, we recommend the development of policies that enact implementation of Passive House (and comparable high-performance, low-energy, and performance-based building methodologies) to support zero-energy ready buildings. This is the essential first step to facilitate the transition to 100% electricity-based clean energy in NJ. An "energy-efficiency first" approach to the built environment not only makes the transition feasible in the near-term, it also makes it more cost-effective based on existing market-ready renewable technologies. In addition, low-carbon buildings that reduce impacts of both operational emissions and the embodied carbon emissions of building materials are likely to be one of the major drivers of new building codes.

As a group of industry practitioners and advocates, NJPH has collaborated with stakeholders throughout our North American professional network to recommend the most effective and impactful solutions based on existing technologies to support the NJEMP. Our goal is to provide expert resources in the building sector by leveraging our interstate and international network to not only ensure NJ's success in achieving its carbon emissions targets, but also to create a new, equitable, post-carbon economy that creates jobs for all citizens while mitigating climate change.

Passive House Definition:

The Passive House Standard is a holistic, performance-based design and building methodology that ensures healthy, energy-efficient, comfortable and affordable buildings. However, Passive Houses are neither passive, nor are they only houses. Developed in Austria nearly 30 years ago, Passive House principles have a track record of proven low-energy performance in every building typology including single family homes, high-rise multi-unit residential buildings, affordable housing, schools, offices, and even car dealerships.

Performance expected by meeting the standard are as follows:

- Passive House buildings allow for space heating and cooling related energy savings of up to 90% compared with typical building stock and over 75% compared to average new builds. Passive Houses use less than 1.5 l of oil or 1.5 m³ of gas to heat one square meter of living space for a year – substantially less than common "low-energy" buildings. Vast energy savings have been demonstrated in warm climates where typical buildings also require active cooling.
- Passive House buildings make efficient use of the sun, internal heat sources and heat recovery, rendering conventional heating systems unnecessary throughout even the

coldest of winters. During warmer months, Passive Houses make use of passive cooling techniques such as strategic shading to keep comfortably cool.

- Passive House buildings are praised for the high level of comfort they offer. Internal surface temperatures vary little from indoor air temperatures, even in the face of extreme outdoor temperatures. Special windows and a building envelope consisting of a highly insulated roof and floor slab as well as highly insulated exterior walls keep the desired warmth in the house – or undesirable heat out. This performance characteristic is especially important in terms of resiliency, public health, and power outages.
- A ventilation system imperceptibly supplies constant fresh air, making for superior air quality without unpleasant drafts. A highly efficient heat recovery unit allows for the heat contained in the exhaust air to be reused.

Summary of New Jersey Passive House Goals within the NJEMP:

- Enable the realization of buildings with a low carbon impact in NJ by increasing awareness of Passive House principles and by defining clear, high-reaching performance standards for efficiency, occupant comfort, and health.
- Reduce peak energy usage on the demand side. This is the most cost-effective and impactful way to reduce the need for power generation from carbon-based fuel sources.
- Define clear and high reaching standards of occupant comfort and health for our New Jersey's building stock.
- Encourage the use of materials with low embodied carbon (low carbon footprint) and environmental impact in new buildings and building retrofits.
- Develop a strong workforce within New Jersey to achieve its carbon emissions goals through workforce training that will positively impact our building stock and the success of the NJEMP.
- Allow for Passive House and low-carbon buildings to be a cost comparable construction solution by developing access to the necessary financial tools and models to accomplish this goal for both retrofits and new buildings.
- Reduce tax-payer burden of energy costs related to government buildings.
- Reduce energy-poverty of low-middle income families related to heating & cooling costs.
- Reduce public health risks associated with extreme temperatures.
- Ensure buildings are integral to any comprehensive energy infrastructure plan. Our built environment is part of our infrastructure and should be considered as an essential building block for all distributed energy resource (DER) planning and resilient infrastructure upgrades. This applies not only to the development of micro-grids, but also charging stations for the transportation sector.

Comments on Specific Sections of the NJEMP:

Section 3.0: Maximize Energy Efficiency And Conservation And Reduce Peak Demand

Section 3 General - Construct the institutions that would build the workforce expertise needed to realize this strategy goals.

3.1.4 Streamline marketing, education, awareness, and program administration.

- Training resources for building construction and operation include:
 - [Passive House Institute](#)
 - Certified Passive House Consultant and Designers
 - EnerPhit Retrofit Certification
 - Certified Passive House Tradesperson
 - Passive House Certifier
 - Building air sealing training
 - Efficient HVAC training
 - Building commissioning and retro-commissioning

- Low-carbon (low embodied energy) materials training resources include:
 - [Woodworks, Wood Products Council](#)
 - Woodworks [Education Sessions](#)
 - Training sessions, Chicago Carpenters Union: [Training Video](#)

- Regional Educational and Innovation Hubs include:
 - Building Innovation Center: [Building Energy Exchange, NYC \(BeEx\)](#)
 - Provides continuing education, training and access to market research and data to New York residents and businesses.

3.3; Strengthen building and energy codes by codifying the Passive House Standard.

3.3.1; Increase New Jersey's overall energy efficiency. The best path to achieving Net Zero buildings is by using Passive House principles as the first and most impactful tool to achieve that goal. In addition, these principles will act as a blueprint for Net Zero projects that will help overcome perceived implementation barriers.

3.3.2; Passive house is a well-established and cost-effective solution to achieve the healthiest, most comfortable, low energy building envelope.

3.3.4; State Funded retrofit programs such as RetrofitNY, SUNY netzero housing, US Department of Energy (USDOE), and Rocky Mountain Institute Realize are programs that have provided the project base to spur on innovation for retrofitting buildings to the Passive House standard. These programs were inspired by the success of the *Energiesprong* model in the Netherlands which provides deep-energy retrofits to the affordable housing sector, thereby enabling net-zero energy housing units.

3.3.5; Current NJ building code is an inadequate air tightness requirement. Code requires air tightness of 3.0 ACH@50, although it is not measured, therefore the requirement is not effective. Air tightness should be lowered to 1.0 ACH@50 and third-party testing should be required (Passive House requirement is <.06 ACH@50).

3.3.6; Establish benchmarking and energy labeling strategy. Building energy usage must be measured to be managed. Approve current legislation in NJ that requires the seller to have a third party energy audit before sale of property. (Similar to Miles Per Gallon or MPG requirements for vehicle sales).

3.3.6 Require energy modeling software (PHPP+ or DOE Model) to assess buildings for Net -Zero Energy feasibility and where the opportunities are for performance improvement of the specific building or home.

3.3.6 HERS/(Passive House) rater should be required to assess after implementation of the energy efficiency upgrade work completed and periodically reviewed to ensure long-term performance metrics are being met.

3.3.7; Appliances: Domestic Hot Water is the next biggest load to heating and cooling in our buildings. This load can be greatly reduced by either mandatory regulation or incentivizing heat pump water heaters. The same holds true for clothing dryers.

Section 4.0: Reduce Energy Consumption and Emissions from the Building Sector

4.1; Start the transition for new construction to be net zero carbon. The Passive House standard has proven itself to be the best tool to achieve a net zero carbon goal for our buildings.

4.1.1; To expand passive house we need to focus our public efforts on incentivizing Passive House in all our public, and private projects. The Pennsylvania Housing Finance Agency (PHFA) prioritizes Passive House in its funding programs for affordable housing in the form of tax credit; and, as such, has created a robust market that has driven Passive House below costs of conventional construction.

4.1.1; In New York, NYSERDA provides funding to train Passive House professionals. It has been shown that in areas where funding for training is available, more people get trained and then there is an increase in Passive House projects.

4.1.2; Currently in NJ, incentives for Passive House are equal to lesser performing technologies and standards (such as EnergyStar). ***The building envelope is the most important and impactful solution to be addressed. Building envelope upgrades and improvements should be incentivized more heavily than renewable energy solutions. Only after demand has been reduced to the lowest possible level through passive measures should we consider onsite renewable subsidies and incentives. The greenest and most cost-effective kilowatt is the one not used.***

Section 6.0: Financing

Section 6.2; Support local, clean power generation and energy efficiency improvement in low- and moderate-income and environmental justice communities.

Section 6.2.; Support community-led development of community solar projects

Section 6.2.2; Incentivize energy efficiency improvements combined with maximum installation of rooftop and community solar by the local workforce resulting community resiliency.

Section 6.2.3; Develop clean energy workforce opportunities and training programs.

Section 6.2.4 Developing the Low/Medium Income workforce expertise around improving their own homes could help bridge barriers and produce energy benefit to the populations who need it the most.

Green Banks should not solely focus on financing renewable energy projects, but also building efficiency projects. Passive House buildings can rely almost entirely on their locally generated energy sources, which could save the state billions of dollars in infrastructure expenditures while also providing communities with self-sustaining resiliency during natural disasters and power outages.

Passive House is focused on energy savings derived mostly from the effectiveness of the building envelope rather than the mechanical equipment. Investing in the envelope, which is a much longer lasting building component, not only takes each invested dollar further, but also allows for a reduction in the capital cost of equipment as buildings loads are reduced. Contrary to equipment, envelope is not usually manufactured by a single entity who backs its sales with financial calculation rather it is the correct assembly of generic low cost components. Green banks and other financing entities would need to build guidelines on how to judge the effectiveness of these assemblies and Passive House provides extensive documentation that can be the blueprint for such guidelines.

While energy efficiency improvements require additional funding to occur, the additional upgrades and savings will provide benefits to all, both on an individual level, as well as societal, at all levels of income. In addition to various incentives offered, there is a need for a New Jersey Green Bank to oversee the funding establishment and the process of administering the funding. This would be best executed by creating a NJ based PACE Program, in accordance with NJ legislation. (Property Assessed Clean Energy)

The NJ Green Bank would be set up as an administrator to the program to assist in the special assessments required to establish the bonding necessary to perform the work. The implementation of such a program will provide numerous opportunities to buildings of all uses and income demographics, by allowing them to use lower rate loans over longer term pay periods. The PACE program would allow for additional cash flow and increased value to these properties. It would also provide flexibility to building owners in allowing the loan to sit ahead of the mortgage, as well as being a transferable part of the property. This would provide an alternative to traditional loans which would then help to provide funding for clean energy projects and upgrades in non-profit, commercial and multi-family buildings. While primarily this has been established to assist commercial building owners, there are residential arms of this program which are being established and will follow at a later date.

In examples set forth by other states, like New York, this could begin as a self-funded program and transition to an open market program, supported by certified capital lenders. The establishment and execution of the funding program would not only benefit the participants by providing the influx of the necessary capital for improvements, but would also provide additional job creation for the residents of New Jersey.

Appendix & Additional Support Material:

- a. Link to NAPHN Policy Case Studies Guide and Resources:
<https://drive.google.com/file/d/1x49Xmey6qaqfG-XDhzvq4TfbdTqhvi0a/view>
<https://naphnetwork.org/resources/>
- b. Link to Massachusetts 3 Year Energy Plan: <http://ma-eeac.org/wordpress/wp-content/uploads/2019-2021-Three-Year-Energy-Efficiency-Plan-April-2018.pdf>
- c. Zero Energy Project:
<https://zeroenergyproject.org>