

Re: New Jersey's Clean Energy Program: New Construction Program
Docket: QO22050327

July 29, 2022

Dear NJBPU and Clean Energy Program;

I am a resident of Franklin Township, Somerset NJ. When I try to use the NJCEP website, it isn't that straight forward. I do hope that NJBPU NJCEP builds a more straight forward website that enables residents and builders to assess what incentives are available for existing homes/buildings and what incentives for new buildings.

The proposed changes don't make it more it more readily understandable. Perhaps the package and custom options just become tiers of incentives based on how many CEP areas are selected. There should also be a minimum. In other words, builders should not be allowed to build inefficient homes/buildings that waste water and energy at every level of the home/building.

I listened to the July 22 meeting, which was helpful. I very much appreciate the presentation and dialogue opened up as we embark down a pathway towards removing carbon from the energy infrastructure.

I had a few subject areas that I wanted to present and suggest for the updates, which are below.

Water

There is another area in buildings that hasn't been raised, but has numerous implications around buildings. That is water: water consumption, grey water, septic waste and precipitation runoff. As we have seen over the past three recent years, dry spells are increasing in intensity and occurrence; and precipitation is less frequent and predictable, but increasing in intensity when it does occur. I believe we need to integrate components of rainwater collection, greywater reuse in addition to the existing water conservation methods in buildings. When the precipitation is several inches in a short period of time, the water runoff impacts the building and also the areas where the rain drains to. As intensity increases, this will result in more flooding and unplanned erosion. Whereas, if instead building codes started offering incentives for precipitation collection, it reduces the potential for flooding and erosion. Many buildings consume water for external factors such as watering plants, grass or even cleaning off driveways. This is true for businesses and homes. For new construction, if there could be incentives based on how much percentage of outdoor water use is provisioned by precipitation collection (whether aquifer or buried water containers); it would not only reduce impacts of flooding and erosion, but also reduce water consumption of the building. For corporate buildings, this can be millions of gallons of water reduction.

If all homes were presented incentives to have precipitation collection for outdoor water uses, it would have a substantial impact on water consumption around New Jersey. Grey water is another area, but these two methods of water collection/reuse would need to have incentives that warrant the costs necessary for installing the precipitation collection and grey water separation from septic. Of course, grey water would have to have the restriction of no chemicals and only allowable detergents are natural biodegradable detergents.

Energy

Another area that I would like to encourage NJBPU NJCEP to consider for new construction and existing building conversion to carbon free fuels is around a full energy microgrid components.

Energy Natural Gas

First and foremost, NJBPU NJCEP needs to remove gas connection as an incentive connection for new construction. Natural gas needs to be removed from new construction permits overall by 2024. New Jersey needs to be phasing out all existing natural gas connections by 2030.

Put simply, natural gas supply chain for New Jersey is highly toxic and releases substantial amounts of methane, carbon dioxide and carcinogenic pollutants (benzine, toluene, formaldehyde and many more) at every facility from the hydraulic fracturing wells, to the processing plants, through the hundreds of compressor stations along the thousands of miles of natural gas pipelines and through the utility distribution pipelines. Worst part about the natural gas supply chain is that none of the agencies measure the emissions from all of the facilities. EPA and NJDEP skip many facilities. For the facilities that they do register, the facility owner provides low estimates for emissions once a year that doesn't include venting emissions. I can point to facilities missing from the GHG inventory in New Jersey as well as facilities in New Jersey that provide annual estimate emission updates that are technically impossible for the equipment used at the compressor station facilities. **What does this mean? It means the carbon dioxide, methane and carcinogenic pollutants emissions are not be measured from the usage of natural gas in New Jersey.**

Natural gas is 95% methane. At every facility, methane is emitted through leaks (fugitives), venting and combustion. The outdated technology used at natural gas facilities actually emits unburned methane in the smokestacks. Sad part is that the methane emissions is in the millions of tons every year just with the local supply chain from the Marcellus shale area to New Jersey. Adding new construction that includes connections to natural gas only exacerbates this. Methane has a much higher warming potential than carbon dioxide that initially starts at 120 times carbon dioxide and decreases over time. You may know of the GWP 25, which even the EPA acknowledges is out of date and doesn't account for the short term. This is because the GWP 25 is based on the IPCC fourth assessment, which took place in 2007 and the Global Warming Potential and was based on methane warming potency 100 years *after* the emissions took place. Suffice it to say, NJBPU NJCEP should be looking over the next 20 years in terms of methane emissions impact resulting from the supply chain providing natural gas to New Jersey buildings.

We need to have a clear path that identifies:

1. Timeframe for converting all existing buildings away from natural gas
2. Timeframe for when natural gas connection will be prohibited for new construction
3. Immediate removal of natural gas as a home building Clean Energy incentive

Energy Buildings as Microgrids

With the recent growth in companies providing hydrogen electric storage, especially the companies using metal hydrides for storage, there exists a whole new revolution in energy and energy storage. A recent article, <https://www.wbur.org/news/2022/07/28/hydrogen-power-future-massachusetts>, highlights main stream existing green hydrogen generation using electrolysis, but there are several competing companies and university research building electro-photochemical methods at the nano particle level. Sun Hydrogen is a company that already has working pilots and working on ramping up manufacturing for their product. These new hydrogen generation methods improve the efficiencies for generating hydrogen up to 90% while also only utilizing solar energy. With safe noncombustible metal hydride storage and new methods of generation going into production in 2023, it should put hydrogen electric storage

as a critical component for each and every home. Unlike natural gas, coal or oil, hydrogen can be generated anywhere in New Jersey. Hence, can be generated at every home and building.

What does hydrogen electric storage provide? It enables each and every end unit connected to the grid to become a microgrid, a unit that consumes electricity, provides electric generation and has electric storage. In contrast to lithium batteries for electric storage, hydrogen doesn't have the temperature vulnerabilities, is more energy dense (smaller footprint) and easily scalable to megawatt hour storage (again less footprint) without the requirement of rare earth resources that are mined in other countries. I am not suggesting to get rid of lithium, we need batteries and that won't go away. Even in a hydrogen electric storage for a house, it is better to have a 'buffer' battery at the fuel cell to better regulate a 'pure' stable 120/240 volts. A buffer battery is far smaller and does not require the storage capacity for providing electricity to the building over time.

If NJBPU NJCEP provided high rebate incentives for new construction that enables a building to be a microgrid and or an existing building to retrofit to microgrid using renewables and hydrogen electric storage, it will enable the grid as a whole to be more resilient, have a direct reduction on natural gas consumption (since all grids currently use natural gas power plants) and the storage can be used for power outages, peak offloading and enabling the value of renewables extended beyond when there is wind or sun. NJBPU NJCEP could work out a formula so that 50% of the hydrogen electric storage is controlled by the utility and 50% controlled by the building for outages. These are digital solutions that enables this type of segregated control, which enables the utility company to draw energy from storage if require.

Short note about wind turbines. In New Jersey, we are seeing increased fluctuating wind even at 10 feet in the air. There are many 1kilowatt and 2kilowatt wind turbines that are inexpensive, very small and can be mounted to building roof tops or even at the end of a driveway. These small wind turbines are more sensitive to wind and begin generating at 2mph wind. When people mention wind turbines, often it conjures the image of the massive 200m wind turbines on the ocean. But if we started combining small wind turbine incentives for all buildings and homes in New Jersey, it provides another cost-effective method of renewable electricity generation for every home and building as a microgrid entity. I urge NJBPU NJCEP to include rebates and incentives for new construction as well as existing building conversion for small wind turbines. It is a viable source of energy that currently is being overlooked.

Building Construction – 3D building printing

SQ4D (sq4d.com, @sq4dbuilds on twitter) is a company that has been building homes using 3d printing technology. They use less materials than regular construction and only require several staff overseeing the printing. Reduces the overall lumber requirements, cement requirements and there is literally no waste of resources. I have been watching this company and the homes it has been building and posting on twitter over the past year. The way the homes are constructed, they are very insulated and air tight from the outdoors unless a window or door is opened. SQ4D posted a video 7 months ago introducing the first 3D House Printed in the United States - 1900 sq ft house printed in 2 days with 3 workers. Link: www.youtube.com/channel/UCzvUrvlZvHK5pxW6FLMH8uA .

I urge NJBPU NJCEP to consider adding substantial incentives and rebates for new construction built using 3d printing technologies.

I appreciate your consideration of these suggestions.

Sincerely,

Kirk Frost