

TO: New Jersey Board of Public Utilities – Energy Master Plan
44 South Clinton Avenue, 3rd Floor, Suite 314, Post Office Box 350
Trenton, NJ 08625-0350

September 16, 2019
Sent via Electronic Mail to
emp.comments@bpu.nj.gov

FROM: Dr. Barbara Cuthbert
260 Bunker Hill Road
Princeton, NJ 08540-8514

RE: Comments on the 2019 State Energy Master Plan

Dear Energy Master Plan Committee Members:

I am a citizen of New Jersey concerned about the impact of climate change on the health, safety and economy of people, wildlife and the environment of our state. I applaud all current and recent efforts toward addressing this, but I wish to emphasize that it is time to prioritize ACTING that follows a concrete, measurable and transparent plan which allows for flexible adaptation as new technologies become available and cost-effective – not just passing laws or regulations that may or may not be enforced – so that we actually meet the goals set forth in Governor Murphy’s Executive Order 28 and mandates in the Clean Energy Act, PL 2018, c.17 (5/23/18).

Some of my general comments are:

- The impacts of climate change are happening with increased frequency and intensity, and the next version of the Energy Master Plan needs to be much stronger and more specific in terms of measurable goals, annual milestones, interim benchmarks, independent oversight, consequences for not meeting short-term goals, and allowances for adjustments as technologies and innovations improve and become more cost effective. Realistic external and internal analyses that culminate in specific, measurable and attainable actions that will truly be monitored must include ratepayers who, over the long-term, need to support actions to protect people and the environment from climate change’s impacts.
- Planning also needs to be truthful and transparent about industry-led lobbying and deflection campaigns that do not do enough to reduce our man-made climate changing impacts. New Jersey should not continue to relinquish its economic, environmental and educational strengths to corporations and politicians whose profits and benefits are at the expense of the health of our people, environment, wildlife and our economy. Masking solutions in complexity and bureaucracy without providing real and enforceable actions and targets will just continue to erode the health, quality of life, economics and livelihoods of people in New Jersey who overwhelmingly want clean air and water. The Energy Master Plan must consider the effects of air and water pollution, along with other impacts from climate change that are driven by increased greenhouse gases from use of fossil fuels, on poverty, racial injustice, violence, and economic inequality that harm our state.
- The goals for clean energy in New Jersey are attainable if the implementation plans are realistic ones that take into consideration practical, economic, environmental and social factors in a manner that is not just another plan that may or may not be implemented and monitored. Planning needs to include stakeholders involved with energy efficiency, forest and wetland management, electric service, transportation, education and energy sources to be effective, and the goal of only using clean, renewable energy by 2050 should be the focus of all discussions and studies. This is a tall order that will require transformation at every level of our society, and it can easily be derailed if the short-term electoral cycles of politicians are paramount to a real solution to the threats that we are facing by inadequate action, and it could be derailed by the narratives, ideologies and economic interests that underpin views about needing to consider the health, safety and viability of ALL people in New Jersey in this Plan.

- The Energy Master Plan should set interim emissions targets for every five years between 2023 and 2050 by sector - electricity generation, transportation, residential and commercial sectors - to provide a pathway to achieve Global Warming Response Act goals by 2050 (statewide reduction of emissions by 80% from 2006 levels). The EMP should develop a comprehensive blueprint to achieve these interim targets and require bi annual monitoring and reporting. These monitoring and reporting components are crucial to achieve our near-term goals and inform long term projecting. We need to ensure that we are consistently taking steps that move us closer to achieving our GWRA goals and RPS goals.
- To reduce uncertainty in the energy market and utility bill costs, the state should determine pathways to reach 2050 goals utilizing state-of-the-art modeling and analysis of the regional grid out to 2050. This was recently done in other states such as Minnesota and Hawaii, to identify the mix of clean energy resources needed over time to achieve a reliable grid, deep de-carbonization and low-cost pathways. The EMP should provide a cost-effective pathway to achieve 100% renewable energy while capitalizing on the tremendous opportunities to generate good local jobs and spur economic development in New Jersey through renewable energy projects and investments in energy efficiency, hydrogen energy and electrification.
- Oversight needs to be developed by all stakeholders to ensure cooperation between those making technological advances, those implementing the technologies, those replacing fossil fuel infrastructure with renewable and clean energy sources, and those with enforcement authority who actually provide independent monitoring, support and, if necessary, penalties. To be effective, actions must include economic incentives to increase use of clean and renewable energy sources while also disincentivizing fossil fuel use and infrastructure building. Given the influence of money in decision-making, and acknowledging that New Jersey is already reckoning with impacts of climate change to our coastal regions, farmers, wildlife, waters, air and health, it is vital that there be an agency or commission dedicated to independent, data-driven and scientifically-valid action and oversight to ensure that policies and plans are enacted and implemented.

Other commenters, with knowledge and experience in the multitude of fields that are important to consider in this endeavor, have or will submit comments to the BPU about the Draft Master Energy Plan. Though I do not have such knowledge or experience, I am aware of the issues and provide my comments here. Some of these have been borrowed from comments that are already submitted and posted. I trust that the Committee will seriously consider all comments.

As Arthur Keostler wrote in *The Sleepwalkers*, “Every creative act involves a new innocence of perception, liberated from the cataract of accepted belief.”

Though the Draft Energy Master Plan is missing details about strategies, benchmarks, implementation and monitoring, I broadly support the goals laid out by the Energy Master Plan Committee which include specifying plans to achieve 100% clean energy by 2050, growing New Jersey’s clean energy economy (jobs and technologies), and ensuring that customers are afforded choice, reliability and affordability in the transition to and attainment of 100% clean energy. **HOWEVER**, I am concerned that the Draft Master Energy Plan seems to (1) define “clean energy” as “100% carbon-neutral electricity generation and maximum electrification of the transportation and building sectors”, (2) allow for a continuing use of natural gas as well as not mentioning the plethora of proposed natural gas projects currently being reviewed for permits by NJ agencies, and (3) ignore the possibility of planning for hydrogen as an energy source.

ISSUE: Definition of CLEAN ENERGY

I am concerned with the EMP's definition of "clean energy".

Having noticed the lack of specifics in the Draft Energy Master Plan and changes from Governor Murphy's terminology about "clean energy" in his Executive Order to "carbon-neutral electricity generation and maximum electrification of the transportation and building sectors" is worrisome and indicates a watered-down commitment to protect all in New Jersey from the impacts of climate change and our man-made contributions to greenhouse gases.

Governor Murphy's Executive Order 28 (5/23/18):

"This 2019 Energy Master Plan (the "2019 Plan") **shall** provide a **comprehensive blueprint** for the **total conversion** of the State's energy production profile to **100% clean energy sources** on or before January 1, 2050, and shall further provide **specific proposals** to be implemented over the next ten (10) years in order to achieve the January 1, 2050 goal." (page 2; emphasis added)

In the Draft Energy Master Plan (DEMP) (6/10/19):

"The EMP defines "100% clean energy by 2050" to mean 100% carbon-neutral electricity generation and maximum electrification of the transportation and building sectors (the sectors that produce the greatest carbon emissions in our state) to meet or exceed the GWRA emissions reductions by 2050." (page 9 – Draft EMP)

Though the Global Warming Response Act of 2007 (GWRA) established targets for the New Jersey Department of Environmental Protection (NJDEP) to meet greenhouse gas reduction targets of 80 percent, economy-wide by 2050 where New Jersey was obligated to reduce its greenhouse gas emissions to 25.7 million metric tons (MMTs) of carbon dioxide equivalent (CO₂e) by 2050 (80x50), apparently there was no mechanism to require state action to meet the targets. This did not happen, as noted in the Updated Global Warming Response Act (S3207). This inexcusable lack of procedures, evident by the inaction for the past 12 years, should not be allowed to happen with the new EMP. We know that this is the time for action to reduce greenhouse gases.

New Jersey has already enacted landmark legislation requiring 50% renewable energy by 2030, and the EMP should put the state on a pathway to achieve 100% renewable energy by 2050. Clean energy should be defined as Class I Renewable Energy, like solar, wind, hydrogen, small or run-of-the-river hydro, fuel cell systems, and geothermal in addition to energy efficiency standards and energy consumption goals and actions. Modeling done in other states has shown that a clean energy portfolio, based on renewables, efficiency and storage, can achieve deep decarbonization while ensuring reliability and lower costs. New Jersey should invest in cost-competitive technologies that provide resilient power, decrease emissions, improve air quality, and result in zero emissions. Energy sources should be easily accessible by all New Jersey residents, thereby allowing consumers to decide how they want to power themselves.

- The goal of 100% carbon neutral energy by 2050 must be replaced with the goal of achieving 100% clean renewable energy by 2050. Carbon neutral includes energy from fossil fuel power plants with ineffective market-based schemes like carbon offsets, pollution credits and other pay to pollute schemes. Carbon neutral also includes garbage incineration, aging and new nuclear power plants, and more fossil fuel power plants with carbon capture and storage, an expensive technology that has never shown any commercial or practical viability. These dirty and dangerous energy sources and pollution trading schemes disproportionately impact low income communities and communities of color and block progress towards achieving the 100% renewable energy economy we urgently need.

- The definition of clean energy must exclude waste incineration. Though energy from so called "waste-to-energy" or "resource recovery" facilities currently qualify for Class II Renewable Energy Credits, burning waste is neither a clean nor renewable way to produce energy. Per unit of energy produced, these facilities are some of the most polluting energy sources, both in terms of greenhouse gases and air toxics like mercury and carbon monoxide.¹ Incinerators endanger the health of New Jersey's most vulnerable communities and are uneconomic energy sources, often bringing financial calamity to municipalities that support them. Waste-to-energy must have no part in New Jersey's clean energy future.

ISSUES: Natural Gas is not a clean energy source, so it should not be a component of the EMP in the near future; and greenhouse gas (GHG) emissions need to be regulated, measured and monitored.

NJ has a hard 2050 date for converting from fossil fuel-based energy infrastructure to clean renewable sourcing and hydrogen/electric infrastructure. It isn't practical or realistic to consider a complete rebuild of grid infrastructure. The grid needs to be gradually converted and adapted to support a smart scalable grid that utilizes local renewable energy sourcing along with conversion to support local hydrogen and electric distribution.

New Jersey must start promoting energy conservation, tapping the enormous resource of energy efficiency, directly reducing dependence on non-renewable fuels, and maximizing the benefits of renewable energy. We should not rely on transitional fuels to cover any emerging energy needs, and a recent study conducted by the Conservation Foundation highlights the fact that we don't need any additional natural gas capacity as we have enough already to manage our future projected demand.

Building codes and conservation requirements need to be revised at the State and local levels that accommodate the rapidly changing energy transmission and local renewable energy abilities associated with the hydrogen and/or electrification economy.

The Plan needs to aggressively and quickly address the climate change perils we now face so that the lives, jobs, businesses, recreation and environment of New Jersey are protected and enhanced in a healthy manner. The Plan should be one that will be supported by the people and future Governors of New Jersey, and it should not perpetuate myths like natural gas being a bridge fuel. There is no need to incorporate "transitional fuels" into a definition of clean energy because transitional fuels such as coal, natural gas, and petroleum products produce emissions, and must be replaced at some point by clean sources. As John Maynard Keynes said, "The real difficulty in changing the course of any enterprise lies not in developing new ideas but in escaping old ones."

To have 100% clean energy by 2050, the EMP must include steps to address the permitting processes so that new fossil fuel projects are not permitted. If they are, the costs for assets that will likely be stranded or orphaned before 2050 will be borne by ratepayers, and the emissions from these would thwart goals to reduce greenhouse gases to protect our health and address impacts of climate change.

¹ See Comments of the New York State Department of Environmental Conservation Regarding the Verified Petition of Covanta Energy Corporation. August 19, 2011. Access at - <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BDEEA097E-A9A6-4E53-898C-0BC2F4C60CC4%7D>.

The EMP should require all new generation capacity and infrastructure to be renewable and carbon-free. The DEP should promulgate rules that establish carbon pollution limits for all existing fossil-fueled power plants. These limits must be incorporated into renewals of Title V operating permits. The limits should decline over time and reach zero no later than 2050.

NJDEP needs to put a hold on all fossil fuel expansion projects focused on transmission going forward. Oil and natural gas are not a part of the 2050 deadline, and further expansion in transmission is counterproductive as well as prevents New Jersey from meeting the 2050 deadline. However, building more sustainable, safe and efficient communities must address the sources of energy and energy efficiency. Not addressing the fact that approximately 75% of the homes in New Jersey are heated with natural gas and approximately 50% of our electricity is generated by natural gas - which is NOT a clean energy source, considering its extensive methane leakage points - is a failure of the draft EMP that needs to be revisited without including industry's talking points that it is a bridge fuel needed for resiliency and affordability. It is very apparent that the influence of industry money and their lobbyists could hinder a true accomplishment of Governor Murphy's goals. As Winston Churchill said, "An appeaser is one who feeds a crocodile, hoping it will eat him last."

The Draft EMP drastically understates the global warming impact of methane released by the extraction, distribution and burning of natural gas. Over a 20-year period, methane is 86 times more potent than CO₂ as a GHG. Yet the Draft EMP - a plan for policies over the next 30 years - only considers the impact of methane over a 100-year horizon. This drastically obscures its real effect on climate change in the near term by a factor of at least two-thirds and dramatically understates the amount of methane emissions occurring today and the volume of reductions required by 2030 and 2050.

The only questions that I saw pertaining to use of natural gas referenced maximizing energy efficiency and conservation and reducing peak demand with a 0.75% target for annual energy efficiency in the natural gas sector (Strategy 3 - Question 12) and asking - What policy, legislative, or regulatory mechanisms can New Jersey develop to incentivize and accelerate the transition from oil, propane, and natural gas heating systems to reduce energy consumption and emissions from the building sector to electrified heating systems? (Strategy 4 - Question 18).

Steep reductions in climate change impacts from fossil fuel infrastructure and combustion will require actions and plans that actually regulate greenhouse gas emissions and include annual reduction benchmarks and objectives. It is not acceptable to subject state residents to frequent "ozone alert days" by building more infrastructure for natural gas use and combustion and allowing fumes from transportation - on land, in the water and in the air - to add to the health and safety threats that also exist from other facilities like trash incinerators, proposed new natural gas infrastructure, and LNG export terminals. Plans to move away from fossil fuels need to include quick actions that are attainable if there is the political will to do so.

New Jersey can regulate greenhouse gases under the Air Pollution Control Law which can block new power plants and force current power plants to clean up. The DEP has the authority to regulate greenhouse gases and carbon and deny air permitting and Title V permits. The BPU also has the authority to regulate GHG's and deny projects that increase GHG's. However, New Jersey Agencies and Federal agencies do not measure or monitor greenhouse gas emissions from natural gas pipelines and power plants. All data is aggregated using estimates provided by the industry being measured. Currently, New Jersey has no active monthly metrics of greenhouse gases from natural gas fired compressor stations and power plants, yet the state is rapidly expanding to add more of both. Based on compelling scientific evidence of existing and projected adverse impacts due to climate change on the environment, ecosystems, wildlife, human health, and enjoyment of property in the State, this needs to be a key consideration of the Draft EMP. GHGs must be regulated to achieve IPCC's 2030 target and GWRA's 2050 mandate. The Draft EMP only tepidly proposes to "study" this issue. There is nothing more to study here without action. NJDEP must immediately regulate GHGs to meet these targets.

Ideas:

- NJDEP needs to implement a 2030 Methane emissions cap of 20 tons per year. Cap must include all vehicles, marine vessels, machinery, and building HVAC and electricity sourcing, and it must include all emissions of methane (exhaust, fugitive, spills, etc.)
- NJDEP needs to implement a 2040 CO₂ emissions cap of 60 tons per year. Cap must include all vehicles, marine vessels, machinery, and building HVAC and electricity sourcing, and it must include all emissions of methane (exhaust, fugitive, spills, etc.)
- NJDEP needs to implement a 2050 Zero emissions policy for methane and CO₂ at all ports with a 5 year grace period.

ISSUE: Alternatives to natural gas**Barriers that exist that could hinder successful implementation of new net zero carbon construction (Strategy 4 – Question 17) = Allowing for continued build-out of natural gas infrastructure in New Jersey.**

NJ has the opportunity to develop a resilient and independent energy infrastructure that can be traded with adjacent states and is not reliant on through-state transmission infrastructure needed for energy such as now exists for natural gas.

Through regulations, New Jersey needs to cap all future growth of energy generation and infrastructure using natural gas and oil immediately within New Jersey.

Other mechanisms for driving transition from oil and natural gas consumption are by introducing legislation and policies that require natural gas distribution pipelines to gradually introduce hydrogen into the natural gas mix at the consumer utility end while also introducing changes that support the hydrogen mix. More research and studies are required regarding feasibility for converting 100% to hydrogen, which is where New Jersey based high schools and colleges can be utilized for performing the research and testing required as grants.

Though a focus on increasing renewables, energy efficiencies, and storage will help New Jersey attain its goals, the Plan also needs to ensure that unneeded fossil fuel infrastructure projects that will impede meeting our targets do not derail progress. The transition away from fossil fuels to clean sources of energy and energy efficiency will likely require a thoughtful diverse portfolio of energy solutions and technologies to achieve the maximum positive impacts on grid reliability, efficiency, resiliency, and environmental and community impacts with consideration of air quality. In addition to reducing the carbon footprint and greenhouse gas (GHG) emissions, is imperative to ensure the greatest benefits to all communities in the State of New Jersey. Planning cannot be constrained by grid operator-imposed reliability constraints that favor fossil fuel build-out at a time when the State is aiming to reduce emissions and address climate change impacts and at a time when we can have reliability with zero carbon and methane emissions.

According to the New York University Institute for Policy Integrity:

“Because DER [Distributed Energy Resources] use often displaces the use of traditional, fossil-fuel-fired generators, the substitution reduces emissions of many air pollutants, including greenhouse gases and local pollutants such as particulate matter, SO₂, and NO_x, which can contribute to climate change, worsen human health, impair ecosystems, harm crops, and make it harder for workers to be productive. Furthermore, DERs can be particularly valuable if they avoid local air pollution imposed on populations that are especially vulnerable to this pollution, such as low-income communities and communities of color.”²

Actions by groups like PSEG to modernize and improve their delivery system’s lines and structures are important for providing reliable and resilient energy, but the continued reliance on natural gas for energy truly does not address greenhouse gas emissions, protect the health and safety of residents of New Jersey, or help New Jersey to meet its goals. However, PSEG and other delivery corporations do not appear to consider the use of clean and efficient power generating systems, such as combined cooling, heating and power (CCHP), waste heat to power (WHP), fuel cell systems, and/or hydrogen energy.

“C[C]HP enhances electric resiliency and reliability in two major ways. First, because CHP systems have the ability to operate independently of the grid, they can provide reliability during a power outage. Second, CHP and WHP systems alleviate burdens on transmission and distribution lines because they depend on localized, on-site electricity generation. In this way, CHP and WHP can help avoid costs associated with investment in and construction of transmission infrastructure. Because of its resiliency and reliability benefits, CHP should be a key element of New Jersey’s broader efforts to modernize its electric grid and make it more reliable.” ... “Ultimately advancing CHP and WHP in New Jersey will enhance the resiliency, competitiveness, availability and security of the state’s energy infrastructure.” (source: Comments to the EMP by Jennifer Kefer, Executive Director of Alliance for Industrial Efficiency - 10/12/18).

New Jersey must recognize the **rapid emergence of the hydrogen energy economy** that is taking off in California as well as many countries around the world. [California](#) and [China](#) recently set 2030 targets for 1,000,000 hydrogen fuel cell vehicles and 1,000 hydrogen gas stations. [California](#) already has 7,450 hydrogen fuel cell vehicles on the road as of June 2019. UK and EU are implementing hydrogen trains, buses and cars; Australia, China and Japan are investing in rebuilding towards hydrogen-fueled transportation. [Nikola](#) is scheduled to start production of hydrogen fuel cell trucks in 2020 that can travel 600+ miles on 1 tank by 2020. [Nikola has more than 14,000 truck orders and plans to start production in 2020.](#)

- Since hydrogen can be generated anywhere and emerging technologies are enabling more efficient hydrogen generation, smart grid development should be focused on hydrogen as a local gathering fuel from renewable sources and locally distributed. There are several research papers discussing methods for conversion to hydrogen and state that it is more practical to implement local based renewable gathered hydrogen than converting thousand-mile pipelines to transport hydrogen. The rules are changing as countries and states recognize that natural gas and oil play no role in the 2050 energy goals. It is time that New Jersey recognizes this. The Draft EMP mentions hydrogen four (4) times as a seeming afterthought and focuses on renewables and electrification. Using hydrogen and renewables, NJ can mitigate excessive electrification requirements that otherwise would be needed.
- The EMP should target local sourcing of hydrogen fuel and local electric distribution infrastructure by 2030. Since hydrogen sourcing is highly flexible in location, it becomes dependent on the renewable sourcing in the area. With recent advances in micro renewable designs including [small scale wind farms](#) and solar [molecular hydrogen generation](#) it becomes very real for local renewable sourced energy.

² Institute for Policy Integrity, New York University School of Law, “How States Can Value Pollution Reductions from Distributed Energy Resources” July 2018, available at: https://policyintegrity.org/files/publications/E_Value_Brief_-_v2.pdf

Community Energy Planning provides the opportunity to communities to consider available land and resources that could be integrated with sustainable renewable energy collection and hydrogen generation. Some communities around the world are integrating renewable energy with agriculture and utilizing the structures to grow crops not otherwise able to grow. NJ needs to provide resources that enable communities to consider and implement local sourced renewable energy hydrogen generation.

The EMP should consider utility-scale procurements in New Jersey with non-combustion, efficient, load-following resources such as **fuel cell systems**.

Bloom Energy has installed multiple projects as part of the Con Edison Brooklyn Queens Demand Management Demand Response Program.³ The program ultimately avoided nearly \$1 billion in ratepayer costs through the use of targeted DER installations. The Program projects included one using solar, storage, and fuel cell technologies together at a low-income housing development, to optimize the efficiency, reliability, and affordability of the project. Current New Jersey regulation that prohibits multiple clean energy technologies from being used behind one customer meter should be updated to allow for these multi-technology projects that create broad benefit for local communities.

Solar:

The BPU Must Begin Designing the Next Solar Incentive Program Immediately

To maintain progress toward the state's long-term clean energy objectives, it is critical that the BPU have a new program ready to accept projects upon the closure of the current SREC program. One of the biggest reasons for New Jersey's thriving solar market has been due to its generous SREC program and customer friendly net-metering policies. As the BPU considers a replacement program for the current SREC program, it is important that New Jersey continue to offer strong incentives to ensure continued deployment of clean energy. Without this, clean energy investments are likely to dry up.

The Board Should Revisit Class 1 REC Eligibility for Solar Projects

The newly passed 50 percent (by 2030 Renewable Portfolio Standard ("RPS")) significantly increases the demand for renewable energy in New Jersey, mostly within Class I market. This statutory goal is an important milestone on the way to reaching the 100 percent clean energy goal of the 2019 EMP.

The Board's current exclusion of regional solar power from Class I eliminates one of the fastest growing and least expensive resources in the PJM power market. There are now 20,000 MW of solar power in the PJM queue outside NJ. Excluding these solar projects, which have become the least-cost resource in several states in PJM is contrary to the goals of the recently passed Clean Energy Law and the long-term goal of the EMP.

The Board Should Adopt the Community Solar Pilot Program Without Delay

In addition to these important near-term measures, establishing a community solar pilot program, currently being developed by the Board, will also help set the state on the right path toward meeting the 2030 statutory goal and the long-term EMP objective. A robust community solar pilot program will allow this market segment to grow, bring a considerable amount of clean energy onto the grid, provide access to the benefits that solar provides to constituencies who current do not have it, and provide an important test-bed for policy makers as they consider expanding these programs. The Board should adopt the community solar pilot program without delay.

³ Brooklyn Queens Demand Management Demand Response Program available at: <https://www.coned.com/en/business-partners/business-opportunities/brooklyn-queens-demand-management-demand-response-program>

Things to consider about Electrification: Mass Electrification is a legacy from a fossil fuel-based era with a brute force energy infrastructure model (production, transmission and distribution), where energy must be harvested in silo regions via vast large farms of production remotely located, transported over millions of miles of pipelines throughout the US, and distributed to each local area with additional pipelines and then converted to electricity and retransmitted over regional areas in mass electrical grid arrays characterizing legacy Mass Grid Style electrification. This is outdated technology and very inefficient, especially considering that electrification often retraces the same area as production and transportation. The loss in production, transportation and distribution of fossil fuels along with the substantial losses in electricity distribution amount to at least 30% of net energy gathered (this is a very conservative estimate).

New Jersey needs to convert to a smart scalable energy grid architecture that utilizes distributed multi-form renewable energy sourcing with energy distribution in a scalable grid design that utilizes electricity and hydrogen for energy and hydrogen for storage and capacitance between grid interconnects. This architecture would eliminate the duplications of mass scale fossil fuel (millions of miles) and mass scale electrification (millions of miles) as well as the losses associated with the infrastructure required. It would substantially reduce costs in the long run for maintenance and risks associated with deterioration-induced mass scale energy grid catastrophes (something impossible to mitigate due to the expanse of pipeline and cabling infrastructure).

ISSUES: Plans absolutely need to address the harms to people in Environmental Justice communities that have occurred for decades.

They pay a disproportionate amount on energy costs and from impacts of pollution from power plants, incinerators, hazardous waste sites and other toxins in their neighborhoods. The EMP should develop policies to guarantee pollution reductions in environmental justice communities in the near-term. Technologies that increase local air pollution in disproportionately impacted communities, or any community, should be explicitly excluded from programs. All combustion-based technologies have emissions of criteria pollutants, such as NO_x, SO₂, and PM. Though many of these combustion-based technologies deploy post-combustion clean-up technologies such as selective catalytic reduction (SCR) to reduce nitrogen oxide emissions, these technologies must be maintained to be effective and can emit ammonia which is a PM precursor leading to an additional air quality burden - often in disproportionately impacted communities. Using money from RGGI for these communities is not enough. Here, too, there must be measurable goals, annual milestones, interim benchmarks, independent oversight, consequences for not meeting short-term goals, and allowances for adjustments as technologies and innovations improve and become cost effective that are specific to these communities.

Additionally, Environmental Justice communities need financial support to make structural repairs to their homes and other buildings before they could qualify for weatherization programs to reduce energy usage. Energy efficiency and weatherization are some of the most cost-effective ways to reduce greenhouse gasses and air pollution. For every dollar invested by a homeowner they save \$4 and for every dollar invested by a business they save \$16. These important standards could save consumers \$11 billion dollars and prevent 25 million metric tons of climate pollution. Energy efficiency also reduces peak power needs and therefore saves people money because peak power can cost double or triple normal power.

Furthermore, the EMP should set energy goals for efficiency delivered to low-income customers. States have taken a variety of approaches to goal setting for low-income programs, including portfolio requirements, spending requirements, and portfolio savings carve-outs for low-income programs, similar to what's been done in Illinois or Maine. To monitor this, the stakeholder group needs to ensure that programs are well-designed to

meet the needs of low-moderate income customers. This ensures that the outlined programs are monitored and evaluated to do as planned with the input of relevant stakeholders.

Workforce Development: As we ramp up investment in clean energy infrastructure, we need to ensure that the good local employment opportunities are accessible to everyone, especially if major investments are happening near low-moderate income, and environmental justice communities. Workforce development programs are essential to build a reliable, productive, competitive and qualified labor force, and the EMP should consider ways through public and private investment and collaboration with organized labor to design programs which ensure historically underrepresented communities are involved in transforming the infrastructure of our state, similarly to what has been done in Illinois with their Future Energy Jobs Act.

ISSUE: Reducing Energy Consumption

New Jersey needs to be building smarter and greener if we want to reduce our energy consumption. If the BPU wants to reduce our energy consumption, it needs to reform utility ratemaking so that company revenues are not dependent on the volume of energy sales. Then, utilities' financial incentives could be compatible with policy goal of saving energy. BPU must also adopt an Energy Efficiency Resource Standard (EERS), as mandated by recent legislation that establishes annual enforceable benchmarks above 2% weather impacts of reduction in energy use with clear performance incentives and penalties for failing to meet the benchmarks.

A utility's energy efficiency program portfolio should pursue emerging technologies, providing technical support to upgrade building and appliance efficiency standards, delivering education and workforce training for installation and municipal building code enforcement, exploring pilot programs, working with key partners like local governments, and offering competitive solicitations for innovative technologies and programs through grants to high schools, colleges and universities in NJ.

The BPU should commission a study to determine (1) the level of achievable, cost-effective efficiency beyond the 2% minimum, including savings from robust appliance standards and building codes (recognizing that new appliance standards would require legislation) and (2) the maximum timeframe for achieving that level of savings (within 5 years). The board should also consider setting mWh and therm savings requirements for each 5-6 year planning period and require utility programs to align accordingly.

BPU should provide a certification program for New Jersey residential homes. Our buildings, schools, homes, and neighborhoods should be at the platinum level for LEED certification. BPU must also mandate all buildings, their appliances, lighting, and equipment to be Energy Star Certified at the Zero Energy Ready Home Tier 3 level. New Jersey should also have an International Green Construction Code (IgCC) for new and retrofitting existing commercial buildings. These green certifications will help reduce energy usage and carbon footprints.

We should be incorporating green roofs to help insulate buildings and save energy. Green buildings provide cost savings through efficient energy usage for heating and cooling of the buildings. These roofs also help with flooding by controlling stormwater. In our cities especially during the summer time, "heat island" effect causes temperatures to spike making temperatures outside unhealthy for people and requiring more energy to cool buildings. Having green and blue roofs would help limit this effect and keep cities cooler, as well as saving money on heating and air conditioning.

ISSUE: Energy Efficiency (EE)

In pursuing aggressive energy efficiency targets, a major market barrier exists: Utilities are not incentivized to improve EE because it can go against their bottom line.

Decoupling turns traditional rate market on its head by breaking the link between energy sales and revenue. It presents a win-win opportunity for both parties. Decoupling keeps revenue steady, reduces financial risk and capital costs for the utility and keeps customer's energy costs in check, with considerable benefits for low-income households because money they aren't spending on energy is money directly back in their pockets without the need for public financial assistance to help pay for electricity. Some low-income households are spending nearly 20% of their income on utility bills.

EMP needs to encourage decoupling to break the conventional link between revenue and sales. EMP needs to guide the BPU to set a goal for energy efficiency delivered to low-income customers, and BPU should consider forming a stakeholder advisory board similar to those in Massachusetts and Rhode Island.

NJBPU has instituted incentives for residents to replace appliances, and they have implemented some household efficiency programs. However, it is not very clear and obfuscated with many 'clauses' that dissuade the average resident. Additionally, there are no real measures or data about this on a monthly basis and, instead, it is based on perception and individual associated experience. Without the published metrics on a monthly basis, without all of the details between NJBPU and third-party programs, stakeholders are unable to ascertain effectiveness of program. NJBPU needs to provide monthly metrics (KPIs) that measure program reach, engagement, response and actual participation for energy efficiency.

Furthermore, the State should recognize that simply meeting an efficiency threshold does not signify that a DER is clean or good for consumers. Projects receiving state incentives should value broader impacts beyond electrical efficiency that include, for example, reasonably high capacity factors and product utilization (both heat and power), resiliency, grid benefits, and air quality and environmental benefits. A crosscutting protocol for evaluating projects would be appropriate, as recommended by the National Renewable Energy Laboratory to: "...examine the energy impacts at the source of the energy supply (beyond the customer boundary) or the environmental impacts (e.g., greenhouse gas emissions or criteria air pollutant emissions) resulting from CHP systems. Similarly, although CHP systems are a valuable component of the electricity system, it is also beyond the scope of this protocol to provide a means for calculating net electricity system efficiencies or examining the system-wide benefits such as improved reliability or resiliency that CHP may provide to the grid. Because environmental and system-wide electricity impacts can result from a wide variety of energy measures and not only CHP systems, it is appropriate to treat these impacts through a crosscutting protocol."⁴

⁴ National Renewable Energy Laboratory, Chapter 23: *Combined Heat and Power Evaluation Protocol, The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Section 1.2, Topics Not Covered by This Proposal*, at 2. Available at: www.nrel.gov/publications

ISSUE: Clean and reliable transportation needs to be an essential component of the EMP practices to reduce air pollution, especially in environmental justice communities since, in New Jersey, transportation is the largest greenhouse gas emitting sector. The transportation sector is responsible for nearly 50 percent of New Jersey's total greenhouse gas (GHG) emissions.

The key state agencies involved in preparing the draft EMP appear to be the Board of Public Utilities (BPU) and the Department of Environmental Protection (DEP). For the VMT section, input should also be solicited from (and guidance issued to) the Department of Transportation (DOT), the Department of Community Affairs (DCA), and the Economic Development Authority (EDA), at a minimum. These agencies make many decisions that influence what gets built where and the transportation network relative to these developments. In general, these key agencies should be asked to review all of their programs with the goal of identifying how their decisions affect land development patterns and travel behavior and how they can be aligned to encourage development that reduces the need to travel by private automobile.

Some ideas, suggested by others, are:

- The State should do everything in its power to prevent CAFÉ Standards from being dismantled.
- Electric and/or Hydrogen-powered Vehicles and Charging Infrastructure Investment is key to realizing NJ's Global Warming Response Act goals.
- Address three primary barriers: Affordability, Range Anxiety and Infrastructure, and Education
- Electrification and/or hydrogen-powered public transportation, specifically within Environmental Justice communities should be prioritized, with a focus on electric and/or hydrogen-powered school buses and clean ports.
- Transit-oriented development and smart urban planning should be emphasized.
- Work with companies such as **Nikola**, which received \$2 Billion in presales as well as recently [\\$480MM investment](#) for their hydrogen truck production starting 2020 and **Hypersolar**, who has patents in US, China & Australia for hydrogen generation at the molecular level.

Some goals should be:

- Establish a statewide target for reduction in vehicle-miles traveled (VMT).
- Establish statewide targets for increasing transit ridership and for the percent of trips that are taken by transit.
- Develop land-use strategies designed to reduce VMT, and align state rules, regulations and infrastructure investments in accordance with these strategies.
- Offer incentives and assistance to local governments to create plans and zoning regulations that discourage spread-out, car-dependent sprawl and that instead foster development that offers travel options beyond the use of private vehicles.
- Design places where as much attention is given to alternative modes of transportation, including biking, walking, and public transit, as is given to automobiles.

New Jersey needs 330,000 EV's on the road to meet its California ZEV program goals by 2025, so any personal vehicle policies considered should evaluate whether it moves the state closer to accomplishing these goals and not build additional barriers or encourage the purchase of high emissions vehicles. Policies similar to those in France, Sweden, and Norway, which impose higher fees or sales taxes on higher emission vehicles to give rebates to cleaner vehicles, should be considered. Cities across Europe and China restrict the use of high-polluting vehicles and give preferential access to electric vehicles, and more Mayors are working to ensure major portions of their cities are accessible only to zero-emission vehicles. Additionally, as noted earlier, there is tremendous opportunity in aiming to create an infrastructure to support hydrogen-fueled vehicles.

Regarding the charging ports/infrastructure, the EMP should evaluate mechanisms that encourage private investment in charging infrastructure that encourages customer choice and equipment choice and doesn't pick winners to ultimately build the most dynamic EV/Hydrogen charging infrastructure market possible. Public and private investment should work collaboratively.

According to a report by ChargeVC, through a reduced cost of fueling and maintenance, putting two EVs into the garage of an average New Jersey household creates more than \$1900 per year of additional disposable income through 2035. This results in a net savings of over \$8.4B through 2035.

EMP should provide guidelines and supply chain recommendations to transition New Jersey to a 100% clean, electric and/or hydrogen bus fleet as soon as possible. While at face value, electric and hydrogen-powered buses are still more expensive than conventional buses, incorporating life cycle assessments that detail mechanical and operational costs, electric buses are much cheaper due to the reduce mechanical and fueling needs/repairs/improvements.

Electric and/or hydrogen school buses should be encouraged and supply chain recommendations should be made that prioritizes and provides grants to school districts, especially districts within environmental justice communities, and urban low-moderate income communities. Furthermore, the EMP should recommend actions to take to electrify and/or use hydrogen to power our ports. More specifically, these actions should look at how the Port Authority, DEP, EDA, and DOT can collaborate to address emissions reductions from heavy duty vehicles and port machinery. Directly transforming our heavy vehicle and public transportation methods will lead to immediate air pollution emissions reductions in environmental justice communities and communities of color.

Furthermore, NJ needs to consider hydrogen fuel cell vehicles for the light duty passenger fleet or, at the very least, hybrid electric/hydrogen vehicles. Battery Electric Vehicles (BEV) were a stopgap 'bridge' vehicle solution while hydrogen was in its infancy. With the rapidly evolving and implementation of hydrogen vehicle (HEV) solutions occurring today, it makes more sense to invest into vehicles that take 3 to 5 minutes to refuel (similar to gasoline vehicles), that have a 300 to 500 mile range (similar to gasoline) and have less dependency on battery degradation.

The only way NJ can lead by example is by radically shifting towards the Hydrogen Economy.

If gas stations are modified to sell hydrogen, then they can also easily sell electricity through deployment of fuel cells. If an existing gasoline station is only outfitted to sell electricity using massive batteries or increasing electricity demand into the grid, it is not readily converted to hydrogen. Invest in the more stable and clean energy first – Hydrogen, it enables electrical generation.

Electrical charging is always going to be 100 to 1,000 times longer than refueling hydrogen.

Hydrogen refueling is 3 to 5 minutes with no degradation of tank lifetime, whereas a battery recharge degrades significantly over time. Batteries have limited lifespan; gas tanks are pretty much unlimited lifespan.

Some other ideas:

- Implement Fee based transportation incentives for rail, truck and bus conversions to hydrogen and/or electricity while implementing taxes or surcharges for fossil fuel-powered transportation vehicles.
- Provide incentives and rebates to people, corporations, gas station owners and municipalities to quickly provide access to electric and/or hydrogen vehicles and charging stations.
- Provide grants to startup companies specializing in hydrogen generation, storage and fuel cell electric sourcing for existing gas stations.

- Providing grant competitions for NJ universities and high schools to participate in capturing and innovating emerging technologies to enable Smart Microgrid Infrastructure using Hydrogen.
- Provide incentives to gas stations that are early adopters (prior 2025) and for all stations that are 60% sourced locally.
- For 5 years (2020 – 2025) implement incentives for companies and municipalities to provide local sourcing hydrogen and hydrogen/electric dispensing stations. For companies, refueling/charging can either be an employee perk or discounted to employees. For municipalities, refueling electric/hydrogen needs to be a discounted price based on actual total cost of ownership over 30 years. For corporations, rebates can be provided that cover a percentage of actual installation that provides renewable energy that is captured in the form of hydrogen and then provided as hydrogen and electric refueling at site.
- Levy fees for gas stations that have not adopted hydrogen by 2030 and that have not adopted 60% locally sourced hydrogen by 2040.
- Levy noncompliance fees on private entity sectors that own and operate fleets that have not converted registered fleet to hydrogen by 2050.
- Provide Incentives (rebates) for residents who install hydrogen sourcing and fueling.
- Provide research grants for new innovations enabling conversion of existing medium- and heavy-duty vehicle conversion to hydrogen. Grants could be issued to any NJ high school, college or university employed to work on behalf of private sector investment.
- Provide incentives for the private sector to partner with NJ colleges or universities to develop hydrogen transformation of medium - and heavy-duty vehicles.

ISSUES: Costs

Funding the Energy Master Plan must be a component of the Plan, and consideration of revenue sources such as a Millionaires' Tax, carbon tax, and partnerships with private entities dedicated to reducing carbon dioxide, methane and black carbon in our atmosphere should be detailed in the plan in a realistic fashion. Considering costs, the EMP needs to evaluate stronger energy efficiency standards and encourage utilities to meet these more stringent levels to realize the good local employment opportunities created in the energy efficiency sector.

The private sector owns much of the critical infrastructure in New Jersey with the associated need for resiliency to maintain essential services such as banking, communications, hospitals, data centers, and food and water resources. The state should employ policies that facilitate the adoption and use of clean power technologies such as fuel cells and hydrogen energy by the private sector, by state facilities, and by utilities that can own such assets and avert otherwise costly upgrades to their transmission and distribution systems.

The only way to keep investments and corporate involvement proactively focused on conversion is by encouraging engagement through New Jersey high school and college grants and investments for projects in New Jersey. If the schools become the idea and investment hubs, it will have a higher degree of success for meeting 2050 deadline and clouding the direction from investor financial gain. Financing and conversion planning to a smart scalable grid, with local hydrogen and electric sourcing and distribution, needs to start now.

The Energy Master Plan needs to include feasible and reliable actions, benchmarks and oversight to minimize the costs of replacing and retrofitting as well as repowering our electric generation and transmission systems. This seems like no easy feat, but it is one that is urgently needed.

Electrification can be less expensive over the long term when approached via hydrogen sourcing and storage which eliminates excessive miles of electrification cabling. Since Hydrogen can be locally generated, it reduces the requirement for added massive electrical power distribution from legacy massive fossil-fuel power stations.

Costs and impacts on ratepayers already exist in terms of health impacts that affect work productivity and fish/crop yields. Since New Jersey is a de-regulated state, there is no risk to ratepayers from stranded assets such as gas generation plants. The state can reduce the risk of losses to investors by providing clear and consistent signals to developers of fossil fuel assets. One type of stranded asset that ratepayers will be at risk is natural gas pipelines. It is expected that by 2030 there could be a significant reduction in gas consumption in New Jersey as well as in New York, which could affect the utilization rate of several interstate pipelines and distribution pipelines. Assuming that the costs to maintain these lines does not change, those costs will be spread over a shrinking pool of customers, creating much higher charges for consumers of natural gas. To protect New Jersey customers, it is absolutely essential to project future gas consumption and refrain from building additional infrastructure that will become underutilized as demand for gas shifts and to ensure that our investments are in-line with the GWRA goals. We should not be putting ratepayers on the hook for costs from unwise infrastructure investments.

Coastal resilience plans, increased use of and supports for use of electric vehicles, adding wind and solar power, mandating energy efficiencies, funding efforts to reduce energy consumption, etc. will only be successful if there is support from the government and buy-in from businesses and communities. Yes, the plan must consider costs, but this should be a challenge met by innovation and inspired vision rather than ending in a compromise where fossil fuel infrastructure and combustion continues to put the health and safety of those in New Jersey in danger. It is not acceptable to pit people's livelihoods against dealing with climate change since we can certainly have prosperity and good jobs while protecting our health, safety and the environment. Capitalizing on opportunities for energy from wind, solar, hydrogen, geothermal and energy storage can both create jobs in New Jersey and meet the goals of clean energy. Using resources in our schools, colleges and universities via grants and other incentives could generate innovative, cost-effective and realistic ideas as well as increase the conversation throughout the state about the need for addressing climate change impacts in meaningful and personal ways. As Henry Ford said, "Obstacles are those frightening things you see when you take your eyes off your goal."