

September 16, 2019

**Dear EMP Committee,**

With the recent administrative order and bill, New Jersey now has a 30 year timeframe for completely converting its energy infrastructure and consumption.

- **May 23, 2018 Executive Order 28** – requiring NJBPU draft an Energy Master Plan that “shall provide a comprehensive blueprint for the total conversion of the State’s energy production profile to 100% clean energy sources on or before January1, 2050”
- **July 23, 2019 Signed bill S3207** - Establishes new timeframes for implementation of, and revises, certain requirements in "Global Warming Response Act." It also specifies 18 months from signature of bill for NJDEP to “adopt, pursuant to the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.), rules and regulations establishing a greenhouse gas emissions monitoring and reporting program to monitor and report Statewide greenhouse gas emissions.”

This is a tall task to achieve. When reviewing what stage we are at with regards to the community, agencies and partner utility and energy companies, it would be the initial stage where collaboration doesn’t yet exist and interfaces tend to be ‘storming’ in nature (taken from the collaboration attribution stages 1. Storming, 2. Forming, 3. Norming, 4. Performing). The plan hasn’t taken shape except for broad-brush long-term goals, despite leaving out significant parts necessary for meeting Executive Order 28 100% conversion. This also happens to be the stage where time is lost due to many interpretations, definitions and funding influenced positions differences that are attempted to be sorted out. This also happens to be the most urgent time period for rapidly doing the quick obvious wins and to start the project moving forward.

Quick actions that will reap initial definitive building blocks (that support 2050 objective) for supporting the long-term transformation and conversion:

- a. Immediately withdraw all approved stationary air permits that are for natural gas pipeline expansion and natural gas fired power plants where it has been at least 1 year since the permit approval and construction has not begun. This will cause permit holders to reapply under 2018 tighter threshold rules for what stationary sources must include monitoring of emissions.
- b. Urge Governor Murphy to create an Energy Master Plan Transformation Program (EMPTP) dedicated organization reporting to Governor Murphy that focuses on Program Management of the 30-year project. This will not only ensure the project is continued, it also builds in continuity over the years as well act as a central point measuring and reporting on progress of the conversion on a monthly basis. The EMPTP will work with NJBPU and other agencies to create the multiple project management tracks necessary to tackle this conversion from the many different perspectives and continue to identify milestones, critical path priorities and support collaboration across agencies, partners and community. A simple high-level listing should include the following sampling of tracks:
  1. Energy Master Plan Transformation Program Management
  2. Emerging Renewable Energy and hydrogen technologies
  3. Grid redesign and planning
  4. LMI and community-based programs
  5. Energy emissions measurement, monitoring and consumption
  6. Audit Oversight and Efficiency
  7. School engagement (NJ K-12 and NJ colleges and universities) for enabling conversion

In going through the questions identified in the Draft EMP identified in Section VI – Request for Feedback (Draft EMP page 97 through page 97), it is clear that New Jersey is at an initiation point and that there are more questions than answers for the path forward on the conversion of grid infrastructure, home efficiency, distribution of energy to households beyond electricity and many other areas. In that spirit the answer suggestions for each question below

focus on setting up the structure for how NJ can quickly come up to speed and utilize the community in achieving this. The comments focus on several themes:

1. Utilize New Jersey K through 12 schools and colleges/universities to participate and enable objective research and piloting as well as a focal point for selecting leaders to be members in the program tracks listed above.
2. 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 goals for 1MM hydrogen cars and 1,000 hydrogen gas stations by 2030. UK and France are building hydrogen trains, buses along with other countries. Smart grid development is now focused on hydrogen as a [local gathering fuel from renewable sources and locally distributed](#). The rules are changing as countries and states recognize that natural gas and oil play no role in the 2050 energy target. It is time that New Jersey recognizes this. The Draft EMP mentions hydrogen 4 times as an afterthought and focuses on renewables and electrification – this is incomplete and not practical considering to electrify every inch of New Jersey. The EMP also does not detail elimination of natural gas even though natural gas is a fossil fuel and not considered renewable sourced. Using hydrogen and renewable, NJ can mitigate excessive electrification requirements that otherwise would be needed and be a mechanism for weening off of natural gas.
3. The Energy Master Plan needs to be a master plan managed by a program team (EMPTP) that is independent of all agencies reporting to Governor Murphy and managing the project tracks that NJBPU, NJDEP, NJDOT and NJEDA identify as critical paths forward in parallel. It can utilize program management methodology and segment areas to specific tracks as mentioned above so that there is continued focus and continuity in the evolving plans and goals. EMPTP also will aggregate and report monthly metrics in performance, progress, emissions, LMI enablement, financial and resourcing requirements.

#### Observations:

1. Measurement was not asked in the questions below, nor is it currently provided on a monthly basis for emissions, performance or progress. Without measurement, there isn't any visibility and little capability to manage priorities, adjust timeframes, set milestones, manage critical paths nor actively manage investment and engagement of communities and schools. **Monthly Measurements are critical** and must be a cornerstone of this 30-year project. Measurement reporting needs to start now on a monthly basis. Monthly updates that include what each agency accomplished pertaining to EMP, greenhouse gas emission estimates (should become actual measures and be a part of the project timeline), budget management (spend, revenue from fees, etc), issues management, transportation measurements, transportation emissions estimates, sourcing and consumption measures, and many more that give a high level view into the progress.
2. While 30 years seems like a long period, the first 2 years are the most critical in creating a stable platform and management program for successfully launching and sustaining this 30-year investment project for the health and well-being of New Jersey residents. There is a reason why this program is critical and there are many other benefits that will result from this program over the next 30 years. If managed well, it can completely revitalize NJ businesses, skill trades, education and innovation as well as reconnect residents with communities, schools, businesses and government. A bit idealistic, but that is possible given a well-managed Program Management team.
3. New Jersey environment is rapidly changing, especially since 1970. There has been anecdotal evidence that suggests previous environmental change predictions were wrong and the timeline is much shorter with increased consequence to residents. As a part of the NJ EMP transformation, climate analysis and projections need to be continually revised so that the energy infrastructure and buildings are designed to sustain in a continuing changing environment.

I very much appreciate your consideration and hope you will take these suggestions seriously, especially including hydrogen as an underlying energy factor for the grid, transportation and energy distribution to homes as well as pursue engagement, research and competitions with New Jersey schools. The schools are the short term and long-term awareness mechanisms.

The following are the questions with suggestion answers from the Draft EMP:

## Strategy 1: Reduce Energy Consumption and Emissions from the Transportation Sector

### 1) In considering the policy mechanisms suggested in Strategy 1, how should the state seek to implement the policies to reduce transportation-related emissions? What policy mechanisms have we missed?

- a **Implementing Hydrogen fuel into transportation sector including:**
  - i **Set target for 1,000 hydrogen gas stations and 1,000,000 hydrogen fuel cell vehicles by 2030**  
([California](#) and [China](#) have both already set this target of 1,000,000 hydrogen fuel cell vehicles and 1,000 hydrogen stations by 2030)
  - ii **Set target of 60% hydrogen sourcing for each hydrogen gas station to be local renewable sourced.**  
Since Hydrogen can be generated anywhere and emerging technologies are enabling more efficient hydrogen generation, it is critical to limit and break free of outdated fossil fuel brute force energy infrastructure model (production, transmission and distribution) and focus more on local sourcing and distribution.
  - iii **Sponsoring hydrogen to be available for hydrogen trucks by 2020.**  
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.](#)
  - iv **Urgency to include Hydrogen in EMP with quick turnaround targets for NJ to quickly adjust direction to be in line with the rest of the world and leverage emerging renewable energy associated with Hydrogen development.**
    - 1 [California](#) already has 7,450 hydrogen fuel cell vehicles on the road as of June 2019.
    - 2 UK and EU are implementing hydrogen trains and cars; Australia, China and Japan investing in rebuilding transportation towards a hydrogen fueled transportation.
- b **Instituting aggressive incentives for NJ residents to purchase hydrogen fuel cell vehicles.**  
NJ needs to jolt the introduction of hydrogen by implementing the following rebates that are capped to first 3,000 per year for incentive to residents, first 2,000 per year for entities and first 3,000 per year for low income:
  - i **\$30,000 (\$40,000 for low income) rebate in 2020,**
  - ii **Reduce to \$15,000 (\$20,000 for low income) rebate in 2025**
  - iii **Reduce to \$3,000 (\$7,000 for low income) rebate in 2030**
- c **Implement Fee based transportation incentives for Rail, truck and bus conversions to Hydrogen**
  - i **2025 Epass surtax fee for non-hydrogen fuel cell vehicles**  
\$.50 flat fee for cars, \$2.00 for trucks and busses (motorcycles initially excluded)
  - ii **2030 Epass surtax fee increase for non-hydrogen vehicles**  
\$3.00 flat fee for cars, \$10.00 flat fee for trucks and buses
  - iii **2030 NJ Transit surtax \$1MM per current diesel engine per year not converted to hydrogen**
- d **Policies in Transportation should begin to tax fossil fuel vehicles and trucks starting 2025**
  - i Phase in vehicle registration and renewal fee for fossil fuel vehicles include a surtax that increases each year.

- ii Phase out NJDEP permits associated with transportation that include non-hydrogen fossil fuel-based transportation
  - 1 NJDEP assigns 2-year Permit requests review Team starting 2020 to create detailed plan for implementing progressively increasing permit fees and increasing permitting regulations that lower emissions allowances as well as types of allowed chemical emissions. Review Team to provide policy revisions and continued oversight for achieving 0 based fossil fuel transportation infrastructure and high levies for non-compliant fossil fuel vehicles from other states by 2050.
  - 2 **NJDEP adds policies that limits all permits associated with fossil fuel transportation to 1,000 per year starting 2030.**
  - 3 **NJDEP no longer allows transportation permits that include fossil fuel distribution and or transportation by 2050.**

**2) The state seeks to “lead by example” in the electrification of its fleet. What case studies, cities, states, etc. should New Jersey look to and learn from as it rolls out clean light-duty vehicles and buses?**

- a **NJ needs to lead by example by catching up to countries and California that have already discovered that hydrogen-based vehicles are far more effective for attaining a 100% fossil free 2050 transportation.** Mass Electrification is a legacy from a fossil fuel-based era of 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).

- b Target renewable energy 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](#), solar [molecular hydrogen generation](#) it becomes very real for local renewable sourced energy.
- c Use UK and Europe hydrogen train as a basis for converting NJ intermediate haul transportation to hydrogen-based fuel cell engines.
- d Transition sourcing for electrical from fossil fuel electricity generation to local renewable hydrogen sourcing, which will enable electricity distribution.
- e Ramp up education of NJBPU, NJDOT and NJDEP on emerging policies and implementations in **California, UK, Germany, France, Japan and Australia to learn latest policies and investments**
- f 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.

- g **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.
- h **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.

**3) Over what timeline should the state seek to rollover its light-duty (passenger) fleet to EV? Over what timeline should the state rollover its bus fleet? Please also consider incremental milestones.**

- a **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) are 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 a vehicle that takes 3 to 5 minutes to refuel (similar to gasoline vehicles), that have 300 to 500 mile range (similar to gasoline) and have less dependency on battery degradation.**

To gain a full picture, I would encourage NJBPU, NJDEP and NJDOT to commission research competitions in 2020 and 2021 with NJ high schools and colleges to evaluate battery versus electric longevity, where all schools that participate receive a \$5,000 grant and the first place school earns \$15,000, the second place \$10,000 and the third place \$5,000.

NJ should plan on replacing fleet to hybrid (BEV,HEV) or HEV vehicles by 2025 and should utilize schools to help with the selection as competitions in 2023. NJ should seek to rollover 50% light-duty fleets to HEV (Hydrogen Vehicles) by 2030.

As a part of all NJ catching up to other states and countries that lead in clean energy, NJ should consider ways to utilize NJ high schools and colleges for assisting in analysis, ideas and long-term considerations.

- b **NJ should target completely converting 100% light-duty fleets to HEV (Hydrogen Vehicles) by 2045.**

**4) How can the state work with the private sector to increase publicly-accessible EV charging infrastructure?**

- a **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 a 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.**

**Corporate incentives 2020 – 2022: 50% of actual installation cost issued as rebate by NJBPU. Must include requirements that renewable energy is captured in the form of hydrogen and then provided as hydrogen and electric refueling at site.**

**Municipality incentives 2020 – 2022: 70% of actual installation cost issued as rebate by NJBPU. Must include requirements that renewable energy is captured in the form of hydrogen and then provided as hydrogen and electric refueling at site.**

**2023 through 2025 – rebates drop to 25% and 40% for companies and municipalities respectively, sunsetting at the end of 2025.**

- b **Providing grants to startup companies specializing in hydrogen generation, storage and fuel cell electric sourcing for existing gas stations.**
- c **Providing grant competitions for NJ universities and high schools to participate in capturing and innovating emerging technologies to enable Smart Microgrid Infrastructure using Hydrogen.**
- d **Incentives to gas stations that are early adopters (prior 2025) and for all stations that are 60% sourced locally.**
- e **Fees for gas stations that have not adopted hydrogen by 2030.**
- f **Fees for gas stations that have not adopted 60% locally sourced hydrogen by 2040.**
- g **Incentives for residents that install hydrogen sourcing and fueling:**
  - i **60% rebate for residents until 2025**
  - ii **20% rebate for residents until 2030**

**5) How can the state work with the private sector to advance the technology for medium - and heavy-duty vehicles and incentivize private sector adoption of alternative fuel vehicles?**

- a **Provide research grants for new innovations enabling conversion of existing medium and heavy-duty vehicle conversion to hydrogen. Grants to be issued to any NJ high school, college or university employed to work on behalf of private sector investment.**
- b **Incentives to private sector that employ NJ college or university to develop hydrogen transformation of medium - and heavy-duty vehicles.**
- c **Start of noncompliance Fees on private entity sector that own and operate fleets that have not converted registered fleet to hydrogen by 2050.**

**6) What policy mechanisms should the state develop to reduce greenhouse gas emissions at its ports?**

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

**Strategy 2: Accelerate Deployment of Renewable Energy and Distributed Energy Resources**

**7) New Jersey is currently targeting the installation of 3,500 MW of offshore wind generation by 2030, but there is likely room for much more growth. Can New Jersey achieve more? Why or why not, and if so, how much is feasible? What concerns and barriers must we address in developing this resource?**

- a **The 3,500 MW of offshore wind generation by 2030 is preceded by legacy massive scale implementations of renewable generation without the consideration of maximum efficiency, nor how that energy is captured as a fuel. If it is electricity, then it must include batteries and transmission lines. If it is hydrogen, it must include tanks and transmission methods (pipelines or transport). For the initial start, this is a one off, it can't dictate the future implementations since it is brute force renewable energy capture.**

- b Wind farm logic has been focused on the legacy approach of Large expansive inefficient massive wind turbines farms that are not optimized to generate and transmit energy efficiently. The reality is, most massive energy capture methods tend to be highly inefficient and harmful to people and environment by the byproducts of emissions and massive infrastructure requirements necessary to support single sourced massive scale farms. NJBPU, NJDEP and NJDOT need to reinvent agency expertise that captures latest research as well as sponsor competitions in NJ high schools and colleges in developing New Jersey's energy future. The first place to start is by viewing [Dr. John Dabiri's](https://www.youtube.com/watch?v=56xW2535obY) presentation on Next generation wind farms: <https://www.youtube.com/watch?v=56xW2535obY>.
- c NJBPU to issue competitions to NJ high schools and colleges for developing modular scalable hydrogen generation solutions that apply specific to NJ landscape and landmarks using all facets of renewable energy. As a competition, it should include grants for schools (\$5,000) that register with verifiable commitment and also awards for first (\$30,000), second (\$20,000) and third (\$10,000) prize. This type of competition should be offered every year until 2030, where the program needs to be updated and revised to reflect current state at 2030.
- d Micro wind generation is a recent new trend enabling aggregative deployment starting at 500 watts and



easily scaling upwards in capacity. Micro wind generation can be implemented at many homes and businesses where wind is captured at the top of the building. Micro wind generation and solar become an integral part of the redesigned NJ energy infrastructure enabling scalable grid infrastructure.

An example is a set of small wind turbines at the edge of a company building capturing the wind off the top of the building built in France:

This deployment was rather primitive and has significant opportunity for improvement. This should be another competition to NJ high schools and colleges to develop more effective implementations of micro renewable (solar, wind, rain, tides, and geothermal) that take into consideration location, availability of renewable energies and integration with the environment.

- i \$100,0000 annual Grants to NJ high schools and colleges that employ research and present annual prototypes of micro scalable renewable energy solutions. From 2020 to 2025.
- ii \$30,000 annual incentives to New Jersey Companies that assist NJ high schools and colleges in developing new micro scalable wind turbine prototypes. From 2020 to 2025.

An additional requirement is for energy transference must utilize hydrogen for storage and either connection to electric grid or hydrogen distribution methods.

## 8) How should New Jersey address the solar and NJ Class I cost cap established in the Clean Energy Act?

- a NJ is rapidly heading to climate crisis. Since 1970 to present, New Jersey average temperature has risen 3°F and continues to rise. The NJ Class I cost cap needs to increase for residents, under utility managed input into a revised smart grid distributed energy strategy. For 2020 through to 2023, NJ needs to increase the cost cap to 20% for residential and business applications. This will spur aggressive renewable buildout in communities across New Jersey. If NJEDA can enable higher funded cap than 20% for a 3 year period, NJ should consider it. NJ needs to push all agencies to drive greater investment into NJ Class I installations in the immediate term to build the momentum required in driving change to the infrastructure and energy

grid towards renewables and attaining a 100% renewable energy sourcing goal.

- b Plan to shift the funding required for increasing the NJ Class I cost cap towards increased fossil fuel sectors in NJ. What we have seen in the past 10 years is that there currently no full scenario cost impact associated with the rapidly increasing climate change in NJ. If the recent trends that of increasing average Temperature (1 degrees Fahrenheit every 14 years since 1970), increasing high average temperature (increased by 2.5 degrees Fahrenheit since 1970) year over year. NJEDA needs to map out fossil fuel ‘tariffs’ (to/from other states) and taxes based on the next 30-year investment (until 2050) required to shift away from fossil fuels 100%. Requires including a first 10 year ramp up where increased investment will be necessary to start the conversion process and stimulate conversion at the residential, municipalities and business locations.
- c This is a critical component for attaining Executive Order 28 requirement of 100% conversion of fossil fuels to renewable energy.

**9) Does the allowance in the current RPS on the use of unbundled Renewable Energy Certificates (RECs) interfere with state efforts to incentivize in-state renewable energy power generation?**

- a RPS requirement currently allows for unbundled Renewable Energy Certificates (RECs) so that electric suppliers can claim to offer energy meeting renewable percentage requirement of RPS by purchasing RECs from suppliers that provide. Also informed that RPS does not account for the environmental footprint to manufacture RECs. In order to increase RPS percentage over next 15 years, then unbundled is required for the short term, but NJEDA needs to calculate full environmental cost as a threshold and cap.
- b NJEDA needs to build long term deficit projections based on unbundled and use this as the cost basis for fossil fuel industry needs to fund for next 20 years (2040). After which point, the burden of cost needs to spread to include renewable with 2050 as the timeline for eliminating fossil fuels and shifting burden to renewable implementations.

**10) Which policy mechanisms do you recommend the state implement to lower the cost of capital for in-state renewable energy power generation?**

The capital costs of renewable energy materials will be initially substantially expensive for NJ in order to start the transition of NJ infrastructure, commercial and residential transition to clean energy (renewables, hydrogen, electricity). Additionally, power generation that switches from monolithic massive plants towards a distributed scalable smart grid locally sourced power generation will incur costs. Even monolithic renewable plants are not realistic and have different but parallel adverse impacts the environment. Several suggestions as policies to consider for spearheading this change:

- a Set policy that mandates a project team (Renewable Energy Sourcing Team) is implemented for overseeing cost containment of renewable energy materials until 2050. Team consists of key personnel from NJBPU, NJDEP, NJDOT and NJEDA as well as selected leaders from municipalities, utilities and universities. Project team acts as oversight and long-term strategy for containing costs for both consumers and NJ state, while ensuring that sourcing and pricing enable targets of 100% conversion from fossil fuel infrastructure to clean energy.
- b Set a policy that creates a renewable energy wholesale hub for NJ residents and companies. Hub directly works with manufacturers and potential grant mechanisms in providing the latest technology and pricing available for NJ residents. Hub would be overseen by the Renewable Energy Sourcing Team. One possibility is that the Hub could be delegated to NJ utility companies, thereby enabling utility managed infrastructure and standardization. Hub would focus on latest technology enablers, sourcing, large order discounts, standard integration requirements, energy measurement reporting standards, knowledge base support and enabling all residents to employ energy efficiency and renewable energy for all New Jersey residents. Hub would include special discounts available subsidies for low income residents.



- c Set policy to create **Audit Oversight and Efficiency Division (AOED)**. With NJ ranking 11th highest in population and 10th highest in state budget spend per resident out of all 50 states, New Jersey needs to aggressively contain costs across all NJ groups and enable a substantial statewide energy transformation. **AOED** will track, monitor and mitigate excess spend across all agencies, but not report into EDA to ensure impartiality.
- d Set policy that as a part of cost containment that NJ limit all grants for new innovations, technology reviews and sample case competitions to high school and college participation. This expands visibility to all NJ towns through students as well as creatively shape a future that isn't fully defined. NJ should set higher priority to small business (less than \$200k) sponsored NJ school submissions.
- e NJ overall guidance on budget impact is to initially ensure that for the next 20 years that renewable energy replacement energy is similar competitive pricing to fossil fuel-based energy, while adding climate change surcharge to fossil fuels to sustain and enable 100% conversion by 2050.

**11) What policy, legislative, or regulatory mechanisms can New Jersey develop to ensure that it can most cost-effectively pursue a 100% carbon neutral power sector?**

- a **Draft 2019 EMP needs to revise 100% carbon neutral to 100% clean renewable energy. This is what Executive Order specified, carbon neutral prevents 100% conversion to clean energy.**
- b **Policies to go into effect starting 2020 for Air quality permits for stationary emissions**
  - i. **NJDEP needs to immediately withdraw all air permits that were approved 1 or more years ago and have not started construction that include estimated methane emissions greater than 15 tons per year. Reapplication for these air permits would fall under the revised 2018 monitoring thresholds that NJDEP implemented and require the companies applying for the permit to implement monitoring of emissions.**
  - ii. **NJDEP needs to implement 2025 Methane emissions cap of 10 tons per year. Cap includes all vehicles, marine vessels, machinery, and building HVAC and electricity sourcing. Includes all emissions of methane (exhaust, fugitive, blowdowns).**
  - iii. **NJDEP needs to implement 2030 CO2 emissions cap of 50 tons per year. Cap includes all aspects of permit application including construction, operation and maintenance. Includes all emissions of CO2 (exhaust, fugitive, blowdowns). Includes all emissions of CO2 (exhaust, fugitive, spills, etc)**
  - iv. **NJDEP needs to implement 2050 Zero emissions policy for methane and CO2 for all stationary air permits.**
- c **New Jersey needs to create an Energy Master Plan Transformation Program division reporting into Governor Murphy that oversees plans, measurements, progress and reporting of New Jersey's transformation from fossil fuel to 100% renewable clean energy.**
  - i. Existing New Jersey Agencies have a mission to support the current process. Each organization is structured to facilitate and enable existing energy infrastructure maintenance and improvement, not complete wholesale conversion of energy infrastructure. Executive Order 28 requires the **2019 EMP "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."**
  - ii. This requires a program management team that is independent from all other New Jersey Agencies and performs overall project management for the 100% conversion of existing energy production to clean energy. This project management is oversight of a 30-year program designed to achieve 100% conversion. It includes providing monthly executive readouts to Governor Murphy that identify current planning, measures, financial status and projections, % of engagement from agencies, actions in progress, risks and issues.

- iii. The Energy Master Plan Transformation Program (EMPTP) would coordinate, collaborate and support New Jersey Agencies changing their policies, procedures and activities to enable meeting 2050 goals.
- iv. Executive Order 28 requires 100% change for how New Jersey does business in energy production. New Jersey Agencies need help replotting strategy and change in order to meet that requirement.
- v. The EMPTP can provide monthly updates to New Jersey residents, foster change in utility and partners and drive awareness and education in the rapid shift towards a hydrogen-based economy which is the basis of a clean energy infrastructure.

### Strategy 3: Maximize Energy Efficiency and Conservation and Reduce Peak Demand

**12) New Jersey is currently targeting annual energy efficiency gains of 2% in the electricity sector and 0.75% in the gas sector. Do you recommend that New Jersey be more aggressive in approaching its energy efficiency goals? Why or why not, how much annually is feasible, and how long of a ramp up period is needed?**

- a **Public engagement and commitment to convert to increased efficiency and conservation is challenging. I see many residences who leave their outdoor Incandescent lights on 24 hours a day or waste energy indoors or in parked cars running and many other aspects of daily life. How to change?**
  - i **Public responds to and learns through incentives. Make large incentives readily available up front (2020 through 2025) with special add-on incentives for low income, and the public will eagerly jump on board.**
  - ii **Education initiatives could be sponsored through schools (grades 1 through 12). Parents tend to learn from their children. Teach the children and offer discounts to the parents, and the public will quickly adapt**
- b **Natural gas conservation is not as realistic as electricity. Natural gas is currently mostly used for heating, stoves and dryers for most residence. For natural gas, it is more about conversion to alternative fuel source than it is about conserving. Sure, NJ can encourage residence to lower thermostat to 60 instead of 72 or hang clothes (which only speaks to residence who have the ability to hang clothes). The emphasis for reduction of natural gas consumption is to offer an alternative energy transmission through existing pipes or enable at home renewable energy generation.**
  - i **Other countries are exploring how to convert existing natural gas pipelines to hydrogen as one way for reducing and eliminating natural gas consumption.**
  - ii **NREL published an analysis on mixing hydrogen into natural gas pipelines. The analysis is flawed since it focuses on the large scale production of hydrogen similar to natural gas instead of recognizing the ability for local hydrogen production that would eliminate the hundreds to thousands of miles of pipeline conversion necessary for gradually introducing a hydrogen blend into the natural gas local distribution to residents.**  
[https://www.energy.gov/sites/prod/files/2014/03/f11/blending\\_h2\\_nat\\_gas\\_pipeline.pdf](https://www.energy.gov/sites/prod/files/2014/03/f11/blending_h2_nat_gas_pipeline.pdf)
  - iii **New Jersey has thousands of miles of natural gas infrastructure that either has to be eliminated or converted to hydrogen. Natural gas is a fossil fuel that emits tons of greenhouse gases, especially methane and CO2. It is not a part of the 100% clean energy plan and has to be phased out by 2050, either through conversion or elimination.**

**13) What are the strengths and weaknesses of the utility-run energy efficiency programs, thirdparty supplier-run energy efficiency programs, and state-run programs that NJBPU should consider?**

- a **This question is the challenge where there are no real measures on a monthly basis to determine or data available to rationalize, 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 KPIs that measure program reach, engagement, response and actual participation.**

- b NJBPU needs to implement a monthly report card identifying existing programs, third-party campaigns and public participation for energy efficiency.
- c Weakness – minimal public visibility, no monthly metrics (KPIs) and confusing clean energy website presentation.
- d Strength – NJBPU has instituted incentives for residents to replace appliances and implemented some household efficiency programs. However, it is not very clear and obfuscated with many ‘clauses’ that dissuade the average resident.

---

**14) How can the state ensure equitable access to and benefit from energy efficiency programs for all residents?**

---

- a NJ must employ a method for enabling equitable access for all New Jersey residents. It also has to distinguish between houses, apartments, and low income to poverty residents.
- b For low income to poverty, the incentives need to be provisioned from the municipality at a micro scale that specifically provides reductions in rates, conversions to energy efficiency consumption and conservation efficiencies in the living quarters. For this category, NJ needs to be highly aggressive in incentives (50 percent more) than other categories and oversee municipalities implementing these solutions.
- c For renters (apartments) NJ needs to incentivize both landlord and resident, which needs to focus on both apartment complex conversion to clean energy as well as enabling renters to replace out appliances for fuel conversion as well as upgrade electric devices to energy efficiency. NJ has to provide incentives to landlords and monitor their implementation for converting from fossil fuel based energy to clean renewable sourced energy sources – especially location specific energy sourcing.
- d For NJ home owners, NJ must incentivize residents to reduce household usage of electricity and implement renewable energy sourcing at home (both private and utility managed) that utilizes home renewable energy creation into the grid.
- e The state must have an independent division under Governor Murphy that measures, monitors and validates implementation of NJ funded transformation. There are currently no monthly measures, nor any checks and balances that are available to the public.
- f The state needs to invest into grades 1 through 12 for education and awareness to New Jersey residents. This is in addition to public notifications. The single largest influence to conservation is for a child to ask “why don’t we shut that light off.” New Jersey needs to promote awareness and the most effective place is in the schools.
- g New Jersey can also promote competitions in NJ based high school and colleges for methods of spreading the word to residents, measuring the progress and innovative ways for increased energy conservation.

---

**15) Which states or cities have successfully implemented stronger-than-average building and energy codes? How should New Jersey seek to strengthen its building and energy codes, and over what timeline?**

---

- a New Jersey needs to investigate leading cities, states and countries from around the world in terms of learning about successful building and energy codes. The most successful implementations in the US are not from town or state, but rather from individuals seeking energy independence of their home. Whereas in other countries, there are very successful implementations of energy conservation for homes, apartments and office buildings (Australia, Netherlands, and other EU countries).
- b This research can be provided by NJ based high school and colleges in annual research and design competitions.

- c NJ can strengthen its building and energy codes by utilizing NJ based high schools and colleges on an annual basis and building on the advancements that each competition brings.
- d Building and energy efficiency codes needs to establish a distinct panel focused on utilizing education and research for developing the necessary codes required. This needs to be established by 2024 and must require representatives from selected high schools and colleges as the leaders and members. Each year competitions determines the following year members.
- e Timeline: 2020 - Immediately institute team and selection process for including leading high schools and colleges, 2021 – first year competition completion, 2022 revised building and energy efficiency team (BEET), and continued annual adjustments based on school participation and results. Codes continually revised each year associated with competition results and revisions.
- f Timeline 2030 – Revised building codes and conservation requirements that accommodate the rapidly changing energy transmission and local renewable energy abilities associated with the hydrogen economy.
- g Timeline 2040 – Zero new natural gas or fossil fuel sourced energy associated with new construction in New Jersey. Also focus on high efficiency and reusable waste byproducts, especially in grey water reuse, vegetable composting and minimized trash disposal pickup. While waste disposal is an entirely different area, there have to be some controls and measures instituted NJ wide.

**Strategy 4: Reduce Energy Consumption and Emissions from the Building Sector**

**16) What policy, legislative, or regulatory mechanisms can New Jersey develop to successfully transition the building industry to develop net zero carbon construction? Over what timeline should the building industry seek to make this transition? What incremental goals and milestones should it set?**

- a Zero carbon construction needs to first focus on defining what zero carbon construction is defined. 0 carbon construction means that all components in construction have no carbon impact, not all of which NJ can regulate immediately.
- b Incremental goals and milestones
  - i 2020 – Formation of first annual team (OCT) consisting of representatives from state agencies as well as educational representatives. Team formulates annual competitions, revisions to what zero construction is as well as best identified transition goals from top schools identified.
  - ii 2024 - Governor approved formalization of 0 Carbon Team (OCT) and 0 carbon construction guidelines.
  - iii 2026 – OCT assessment of building industry and latest innovation and emerging technologies to recommend 2028 construction policy initiatives. Renews every 2 years.
  - iv 2040 clear construction pathway towards 0 carbon-based construction.
  - v To be revised by OCT on annual basis.

**17) What barriers exist that could hinder successful implementation of new net zero carbon construction?**

- a There are many barriers for implementation of zero carbon construction. Such as:
  - i. New Jersey Agencies
  - ii. New Jersey utilities
  - iii. New Jersey partners
  - iv. Cheapest cost to consumer purchasing construction.

- b NJ needs to institute policies and rebates that encourage NJ residents to choose least carbon construction and highest efficiency. This requires an initially (10 year) aggressive rebate program that prorates climate costs and efficiencies gained into cost effective solutions that compete with fossil fuel based and conventional design methods for building new homes.

**18) 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 electrified heating systems? Please consider appropriate mechanisms for residential, commercial and industrial buildings. Over what timeline is this achievable? Please also consider incremental milestones for the different fuels and technologies.**

- a Regulatory mechanism: New Jersey needs to cap all future growth and expansion immediately of oil and natural gas infrastructure expansion throughout New Jersey. New Jersey needs to cap all future growth of energy generation using natural gas and oil immediately within New Jersey.
- b Other mechanisms for driving transition from oil and natural gas consumption is 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.
- c Timeline: New Jersey needs to set a 2040 deadline to be off of oil and natural gas and work backwards to 2022 to determine what steps need to be taken in order to make the 2040 timeline. Currently in the Draft EMP, there are no details or vision for how this could be done. This means that the blueprint is for the next 2 years that a strategy is developed and vetted through grant research to NJ high schools and colleges, validated against leading locations in the world in approach and then implemented in a phased approach starting no later than 2024.
- d Incremental milestones:
  - i. 1 million vehicles and 1,000 hydrogen gas stations by 2030 (similar to California and China that both have this goal).
  - ii. All major highway service areas implemented with hydrogen gas stations by 2022 (supports Nikola hydrogen fuel cell truck production nationwide).
  - iii. 60% rebate incentives for residential homes to convert from natural gas/oil to local renewable energy generated hydrogen for heating (and kitchen ovens/stovetops that were natural gas) from 2020 until 2025.
  - iv. Local smart grid generation, storage and distribution of hydrogen conversion from natural gas to begin 2024. Utilities to initiate planning 2020 through 2022 on defining what needs to change in utility infrastructure to support conversion from natural gas and oil to hydrogen and electric distributions.

**Strategy 5: Modernize the Grid and Utility Infrastructure**

**19) How should New Jersey approach the modernization of the current utility model (e.g., decoupling or performance incentives, rate design, smart grid technology, demand response)**

- a 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.

- b Considering hydrogen was mentioned 4 times in the Draft EMP as an afterthought, it is premature to work out decoupling/performance incentives, rate design, grid transformation and demand. The New Jersey Agencies do not yet have the tools or knowledge necessary to consider working with utilities and establishing financing and conversion methods.
- c A small strategic team needs to be formed that includes leaders from New Jersey based colleges focused on smart grid and hydrogen energy economy. This team needs to urgently begin interfacing with California regulators as well as leading countries that are rapidly moving forward with the hydrogen energy economy. There are multiple conferences in California this fall that bring all the experts from around the world to present what works and how in the hydrogen energy economy (such as: <https://www.solarpowerinternational.com/hydrogen/>). New Jersey needs to invest in strategic staff in quickly learning what is being done in other states and countries around the world now.

**20) How should NJBPU consider planning and paying for upgrades to the electricity distribution system, including Distributed Energy Resource (DER) connections; EV charging; and utilities' recuperation of cost?**

- a Financing and conversion planning to smart scalable grid with local hydrogen and electric sourcing and distribution needs to start now.
- b As noted in prior questions, the question needs to include hydrogen. In this question it should be EV charging and hydrogen refueling as well as upgrades in local sourcing and distribution of hydrogen and electricity.
- c NJBPU needs to quickly come up to speed with the latest developments **and implementations** in hydrogen energy-based economy, which is on display all around the world and in California today. It is not the future, it is now. For NJBPU to completely this means it is currently going off of outdated information and skills, rendering NJBPU unable to effectively produce a vision, blueprint or the steps for achieving conversion to 100% renewable clean energy. I recommend NJBPU assign several staff along with investing in NJ based schools for learning and quickly developing a true smart scalable renewable energy grids. Timeline: end of 2020 recommendations, competitions and initiation of models to be evaluated.

**21) What regulations and legislation do other states use for evaluating transmission upgrades that New Jersey should consider modeling?**

- a NJ staff need to do a thorough investigation and research on renewable/hydrogen energy models currently being implemented around the world and take the best practices back in considering how NJ needs to rapidly evolve its energy infrastructure.
- b NJDEP needs to put a hold on all fossil fuel expansion projects focused on transmissions going forward. Oil and natural gas are not a part of the 2050 deadline and further expansion in transmission is counter productive as well as prevents New Jersey from meeting the 2050 deadline.
- c Evaluation and upgrades for existing transmissions needs to start by 2021, but in preparation for converting from fossil fuel to hydrogen electric transmission. 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. That is one of the single largest advantage that hydrogen has, it can be generated in most locations unlike fossil fuels that have to be gathered from deep formations in specific areas in the US. NJ has the opportunity to develop a resilient and independent energy infrastructure that can traded with adjacent states, but not reliant on through state transmissions such as natural gas currently.

**22) What best practices should New Jersey consider and which pitfalls should the state avoid regarding data ownership and privacy as it pertains to Advanced Metering Infrastructure?**

- a This question is a bit backwards considering that municipalities currently enable public access to all residential usage of water and taxes. Meaning the standard of privacy has already been violated by municipalities. However, this should be an example of what NJ should avoid with energy data. Specifically, individual bills, usage and addresses need to be translated to a code that indicates location and utility services that does not reveal unit's owner identity.
- b Best practices:
  - i. Utilities must share all sourcing and consumption data with NJ with exception of residential name and address. When reviewing NJBPU energy data which are aggregated as estimates, and then seeing comments from PSEG that include actual data, it demonstrates that NJ agencies currently do not see data directly from utility companies. This should be provided to NJ agencies as soon as possible.
  - ii. Privacy integrity for all residents that ensure specific address and name are not revealed in data, but instead aggregated to actual area usage.

**Strategy 6: Support Community Energy Planning and Action in Low-and Moderate-Income and Environmental Justice Communities**

**23) How can NJBPU continue to engage with communities to support local energy planning?**

- a Start with the schools.
  - i K – 5: Awareness of energy conservation (simple subject awareness).
  - ii 6 – 8: Student engagement for competitions and to present ideas how homes and towns can further conserve energy as well as renewable energy projects to spread ideas how homes can play an important role in attaining 2050 clean energy.
  - iii 9 – 12: Research contests and real world pilots of new ways for homes and towns implementing renewable energy, hydrogen generation and conversion. Real competition with specific targets for low income housing, inner city projects and municipality locations.
  - iv College: Smart grid development, micro scale wind electric generation, hydrogen distribution and local hydrogen sourcing for smart utility distribution competitions. Should include research grants and awards for top ideas presented. Energy.gov has these types of competitions every year.
- b For residents, the best way to engage residents is through rebates and incentives. Let the students educate the parents and enable the bottom line to influence parent decisions. In order to attain 2050 deadline, the next 10 years need to have extensive rebates (60% rebates and above for appliance conversion, lightbulb conversion, insulation improvements and smart outlets that turn off adapters when devices are not connected), especially for the low-income residents.

---

**24) How can New Jersey ensure that LMI households and environmental justice communities benefit from the goals and policies established in the Energy Master Plan?**

---

- a By participating in rebates for home energy efficiency appliances, LED light bulbs etc, LMI households will lower their electrical bills.
- b NJ needs to also leverage municipalities that regulate the LMI housing so that its energy sourcing becomes opportunities for converting to renewable energy collection of hydrogen and distribution of hydrogen and electricity. LMI tenants benefit as energy supply costs decrease since sourcing is renewable energy.
- c The draft EMP doesn't have a clear strategy, but this is an opportunity to revise the EMP so that it has a specific track targeting LMI energy conversion.

---

**25) What best practices utilized in other states or municipalities should New Jersey consider to support Community Energy Planning?**

---

- a Best practices:
  - i. Recognize that hydrogen energy economy is the path forward at this time that fully enables clean renewable energy without greenhouse gas emissions.
  - ii. 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.
- b. Community Energy Planning is another area where competitions and grants can be offered vial local high schools and colleges. This conversion needs every facet available for generating the interest and motivation in changing from existing energy infrastructure to a 100% renewable clean energy.

**Strategy 7: Expand the Clean Energy Innovation Economy**

---

**26) What industry sectors or job occupations are expected to see growth? Which industry sectors and job occupations are expected to need job training support to ensure an appropriate workforce is available to meet the needs of a growing economy?**

---

- a Construction  
Labor will be required across the entire energy landscape in New Jersey for the next 30 years. This area needs electricians, plumbers, designers, etc and can open up increased trade skill training for students that choose this path.
- b Grid engineering and design  
The grids need to change rapidly. The goal is to identify methods that don't require wholesale change outs of infrastructure, but instead, reuse and adaption of existing infrastructure.
- c Energy economics, think tanks and policy  
From homes, to buildings, to municipalities, to counties to state; Master plans at every level need to adapt to incorporate energy efficiency and conversion to hydrogen based economy. Revisions to policies, engagement, permitting and sponsorship for conversion are some of the topic areas that need to be updated.
- d Dismantling and reuse of powerplants  
Not only requires jobs, but also presents opportunities for municipalities and NJ state. Boston's 'Big Dig'



project converted highway areas into parklands and walkways.

<https://www.bostonmagazine.com/news/2013/09/24/mayor-tom-menino-big-dig-photos/>

- e Urban redevelopment
- f Building efficiency and passive/active energy integration
- g Emerging renewable energy technologies and hydrogen generation technologies (such as nanotechnology hydrogen generation that currently is in the pilot stage and micro wind generation farms instead of massive inefficient wind farms).
- h Measurement, Automation and Robotics

**27) What industry sectors or job occupations are expected to stagnate as we get closer to 2050 and beyond, and what retraining tools and strategies can the state use to support transferable skills to new industries?**

- a Power Plant jobs
- b May impact pipeline staff of existing natural gas pipelines, but that will be very minimal. Pipeline companies such as Transcontinental has very few full-time staff to manage mainlines A and C through New Jersey.

**28) What are best practices, financial tools, and financial infrastructure that New Jersey should consider in supporting the clean energy economy, attracting private investment, and enabling clean energy opportunities to become more affordable for all?**

- a This is an area that needs to be further explored through school engagement, research of what other leading energy locations are doing and building an initial blueprint for New Jersey that is updated every year from 2020 through to 2030. After 2030, the blueprint should be firmer in plan that continually evolves as newer emerging renewable energy and transmission capabilities are available.
- b 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.