Comments to Draft New Jersey 2019 Energy Master Plan
General Comments, Strategy 1- Transportation, and
Strategy 2- Clean Energy/DER

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Sunrise is a movement to stop climate change and Create millions of good jobs in the process.

GENERAL COMMENTS

A. Definition of Clean Energy: "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."

Recommendation Use the traditional definition of 100% clean energy; i.e., energy derived from renewable, zero-emissions sources ("renewables" and hydrogen), as well as energy saved through energy efficiency. Zero emission refers to an engine, motor, process, or other energy source, that emits no waste products that pollute the environment or disrupt the climate.

B. Definition of Distributed Energy Resources: The EMP states "Distributed Energy Resources (DER) are on-site systems, equipment, or processes that are appropriately sized, modular, and decentralized, as compared to larger, centralized power plants, that also include transmission and distribution systems. DER can be either grid-connected or off-grid energy systems located in or near the place where energy is used."[1]

Recommendation: Distributed energy resources (DER), which are defined as distribution-connected distributed generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies.[2] New Jersey should adopt California Public Utility Commission (CPUC) more narrow definition of distributed generation that includes only renewable resources.[3]

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[1] Draft 2019 Energy Master Plan, p. 10-footnote 1

[2] https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Commissioners/Michael_J._Picker/DER%20Action%20Plan%20(5-3-17)%20CLEAN.pdf

[3] https://www.ferc.gov/CalendarFiles/20180215112833-der-report.pdf pp. 7-8.

C. **Least-cost vs. highest net value:** Goal 2.1.3 is "Model scenarios and pathways to achieve 100% clean, carbon-neutral electricity generation by 2050 with consideration for least-cost options."

Recommendation: The Clean Energy Economy and technology opens a vast opportunity for improving our environment, society, and economic growth. It should be treated as an investment in the future. The Rutgers NJ Energy Storage Analysis noted that battery storage applications that do not yet yield positive returns for investors have social benefits to include increasing hosting capacity for decentralized solar photovoltaics (PV) and increasing resilience in combination with solar PV. Electric buses significantly reduce pollution levels and improve student academic performance. Goal 2.1.3 should read "Model scenarios and pathways to achieve 100% clean, carbon-neutral electricity generation by 2050 with consideration for **highest net value** options." This will allow integrative planning to consider environmental, social, and economic costs/benefits to assess alternatives and select the best path forward.

D. **Basic Planning Principles:** In simple terms, a plan consists of three elements: a description of the current position (baseline), a description of future (goal), and the path to reach the goal. Draft NJ 2017 Energy Master Plan's scope encompasses energy demand and greenhouse gas reductions for transportation, residential, commercial, and industrial purposes. The document describes a number of actions planned or being implemented, but neither the baseline nor the goal defined in terms necessary to gage the effectiveness of policy and actions. A common measure allows easy comparison. For instance, Offshore-Wind goal is defined as MW (a measure of capacity) whereas the goal of 100% Clean Energy is measured in MW hours (consumption). How many MW's of solar, wind, and energy storage are needed to meet 2050 MWh demand?

Recommendation: Describe the energy baseline using data the available and acceptable. The U.S. Energy Information Agency publishes an annual Energy Profile describing consumption by source, fuel, electric generation, and prices. [4] The annual BTU baseline data can be converted to GW or MW hrs. and used to project future values or goals based on energy efficiency and economic growth assumptions. This measure allow assessment of planned events such as closure of nuclear plants, the need for Natural gas projects, and the effectiveness of policy to achieve energy master plan objectives. This consumption measure (MWh) facilitates calculation of Green House Gas emissions. Here is a sample of the EIA Data for 2017 by End-use sector and fuel:

[4] https://www.eia.gov/state/?sid=NJ#tabs-5

New Jersey Energy Consumption by End-Use Sector 2017

Source: Energy Information Administration State Energy Data System

Category	Energy Consumption by End-Use Sector New Jersey Energy Consumption Estimates Trillion Btu
Residential	536
Commercial	559.5
Industrial	256.8
Transportation	782.5
Total	2134.8

New Jersey Energy Consumption by Fuel Estimates 2017

Category	New Jersey Energy Consumption Estimates Trillion Btu
Coal	16.5
Natural Gas	734.1
Motor Gasoline excl. Ethanol	447.4
Distillate Fuel Oil	158.7
Jet Fuel	163.3
HGL	23.1
Residual Fuel	20.4
Other Petroleum	94.4
Nuclear Electric Power	355.9
Hydroelectric Power	0.1
Biomass	56.1
Other Renewables	26.3
Net Electricity Imports	0
Net Interstate Flow of Electricity	38.5
	2134.8

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?**

Response: "To maximize CO2 reduction and effectively, electrification of the transportation sector early focus should be placed on heavy duty vehicles and charge stations". For every 1,000 EV buses, the global demand for fuel drops by about 500 barrels a day.[5] Similar impact results from removing mid-sized and heavy duty diesel trucks. Range and charging are bigger issues for trucks than cars. (Let industry solve the range problem.) Planning and deployment of charge stations along high traffic routes to service these vehicles must also consider light duty vehicles, emergency evacuation demands, and critical facilities. Electric storage paired with bidirectional chargers to facilitate Vehicle to Grid should be mandated. Focus on buses and heavy duty vehicles will directly benefit EJ communities by reducing pollutants and encourage mass transit.

Children are especially susceptible to the adverse health effects of diesel exhaust pollutants.[6] There is no established safe level of exposure for school age children. An emphasis[7] Priority on replacing school buses provides ensures the wellbeing of children and provides environmental/cost benefits and potential property tax relief.

Federal Policy and commercial market for light duty passenger EVs will be driving demand for the next 5-10 years. Considering the NJ is a "crossroads" state with a high percentage of interstate drivers and transport, investment focus on charge stations versus vehicle incentives is recommended. To capitalize on commerce trends of the future, NJ must create an environment to allow the proliferation of EVs.

Recommendation: In addition to electrifying all rail lines, New Jersey should restore all train service cut since 2006 and improve frequency of service like Metro North with off-peak 20 minute service or better. (The Regional Plan Association actually called for 10 minute Rail service in NJ urban core and 15 or 20 minute frequencies just outside the urban core).

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[5] https://singularityhub.com/2019/04/22/chinas-electric-buses-save-more-diesel-than-all-electric-cars-combined/

[6] https://www.researchgate.net/publication/24422246_School_bus_pollution_and_changes_in_the_air_quality_at_schools_A_case_study

[7] https://uspirg.org/reports/usp/electric-buses-clean-transportation-healthier-neighborhoods-and-cleaner-air pp 8-9

Recommendation: In regards to frequent service on train lines and bus lines. NJ Transit should be tasked with defining and implementing a frequent service public transit network (including non-NJT operators) by July 2020 and begin implementing by July 2021; such that 70% of the state's population is within 1/2 mile of a bus or rail stop with frequent service by 2026.

Recommendation: Establish funding mechanism for the acquisition of electric-powered publicly used vehicles (school buses, transit buses, trucks, vans, and cars) This "electric vehicle transition fund" would provide state loans to municipal, county, state, schools, and privately owned companies providing public transportation services. Loans would be repaid from operating savings.

Recommendation: Beyond electrification of the transit fleet, there are a number of things that can be done to make public transit more attractive and to induce people out of their cars. This fall into two categories:

a. Access and wait –

1. Add shelters with heat and real time info. to all bus and rail stops with at least 200 boardings per day (as a starter)
2. Ensure good bus and train stop access via bike paths, sidewalks, and crosswalks.
3. Ensure good lighting at and near transit stops

b. The trip - Use a number of low-cost strategies to speed the bus trip, especially in peak hours. These include:

1. Reducing stops, where closely spaced
2. Creating bus only lanes in congested traffic areas, especially in peak periods
3. Bus preferential treatment at traffic signals, such as leading greens or extended greens depending on the situation

c. Provide better ways to access public transit info. (One part of our grant from National will address the NJT website in this respect.)

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?

Response: The World Resources Institute issued three reports based on evaluation of experiences with Electric bus adoption:

i. https://www.wri.org/publication/how-enable-electric-bus-adoption-cities-worldwide
ii. https://www.wri.org/publication/barriers-adopting-electric-buses
iii. https://www.wri.org/publication/transit-buses-tool

Response: "Air Quality Strategies and Technologies: A Rapid Review of the International Evidence" May 2019 provides a summary of actions focusing on transportation. https://www.researchgate.net/publication/333099345_Air_Quality_Strategies_and_Technologies_A_Rapid_Review_of_the_International_Evidence

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.

Response: It took eight years for Shenzhen, China to become the first city to electrify 100 percent of its public buses—16,359, to be exact.[8] NJ should be able to rollover its light-duty and bus fleet in five years.

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

Response: Provide tax incentives to combine PV solar, behind the grid Electric Storage, and bi-directional chargers to industry and commercial users. As suggested by the Electric Storage Analysis, electric storage with solar maximizes grid utility provides business revenue opportunity for arbitrage and demand response. Adding bi-directional chargers enables employees and public an opportunity to capitalize on this opportunity. This would also encourage private EV sales. Combine this with low interest loans if appropriate.

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?

Response: Suggest review of "Working Paper: Financing Low- and Zero- emission Freight Transportation Technologies in California A review of Funding Sources and Stacking Opportunities" August 2018.[9] This is a report issued by the Goldman School of Public Policy. The report provides a roadmap to California programs designed to boost markets for electric trucks, freight equipment and supporting infrastructure.

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

[8] https://electrek.co/2017/12/28/shenzhen-electrifies-entire-public-transit-fleet-electric-buses/
[9] https://gspp.berkeley.edu/assets/uploads/page/Funding_Programs_Summary_final_August_29.pdf

Response: Suggest you review Port of Oakland Maritime Air Quality Improvement Plan[10]. "Air Quality Strategies and Technologies: A Rapid Review of the International Evidence" May 2019 provides a summary of other actions focusing on transportation.[11] The strategies and technologies described can also be applied to ships, equipment, and vehicles unique to the port.

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?

Response: The offshore wind resource potential based on analysis of wind speed interval of 7 mph or greater within 50 nm of shore is 99,675 MW.[12] "U.S. DOE estimates that the existing and proposed federal lease areas located off the coast of New Jersey could support up to 12.5 GW of offshore wind energy, using a very conservative power density ratio. Using a more accepted power density ratio could double the amount of offshore wind that could be supported in these lease areas."[13] In terms of potential capacity, there is no barrier; instead, NJ has an opportunity to become energy independent.

A recent article in Forbes reported "According to a recent study released by Global Industry Analysis, offshore wind capacity is forecast to grow by over 80 gigawatts (GW) through 2024, achieving an impressive Compound Annual Growth Rate (CAGR) of more than 25% in that period." The article also noted that "According to projections from the International Renewable Energy Agency (IRENA), global growth in offshore wind energy will continue to accelerate, with total installed capacity rising from 19.2 GW in 2017 to 520 GW in 2050." "The United States – one of the world's most prominent wind energy producers – has around 2 GW of offshore wind but could achieve over 20 GW by 2030 under favorable market and regulatory conditions. America's offshore wind potential is estimated to be greater than 22,000 GW (or 22 Terawatts), double the country's current electricity consumption."[14] The projected rapid growth of offshore wind indicates that may of the supply and logistic issues appear to have

[10] https://www.portofoakland.com/community/environmental-stewardship/maritime-air-quality-improvement-plan/
[11] Sustainability 2019, 11(10), 2757; https://doi.org/10.3390/su11102757
[12] https://windexchange.energy.gov/files/pdfs/offshore/offshore_wind_potential_table.pdf
[13] Draft NJ 2019 EMP, p. 51
[14] https://www.forbes.com/sites/arielcohen/2019/03/26/as-global-energy-demands-grows-so-does-appetite-for-offshore-wind/#f10510165e7c

been resolved. In terms of market availability, there is no barrier; instead, NJ has an opportunity to benefit from anticipated lower costs and improved products.

The support labor and infrastructure developed to support the Orsted award of 1100MW in June 2019 with all turbines up and spinning by 2024 lays a foundation to accelerate deployment of offshore wind. NJ plan to solicit an additional 1200MW in 2020 and 2022 ignores the learning curve principle that a person's performance improves as one gains experience. Instead of leveling off, the schedule should ramp up. NJ must maximize this advantage to dominate the offshore wind niche and become a net energy exporter.

Recommendation: The offshore wind goal for 2030 should be 9.6 GW or greater to replace fossil fuel and nuclear generated electricity. An alternative goal for 2030 is 12 GW or greater to utilize all the available capacity offered by the Federal lease. NJ would then be a net exporter of electric power. The suggested solicitation schedule for the additional 8.5 GW is: Solicit 2,100 megawatt OREC 2020 with Commercial Operation Date (COD) 2024. Solicit 2,400 megawatt OREC 2020 with Commercial Operation Date (COD) 2028. Solicit 4,000 megawatt OREC 2020 with Commercial Operation Date (COD) 2030.

Recommendation: If offshore wind is to be successful, electric storage capability is a necessary prerequisite. Wither it is behind or in front of the meter, wind generated electrical power needs storage to maintain a balanced grid and reliability standards. The Electric Storage Analysis focuses on opportunities within the State of New Jersey. Suggest that, especially for grid storage, consideration of out of State solutions be considered also. **Think out of the box and seek energy storage solutions that have ancillary benefits.** For example, Lake Hopatcong, Greenwood Lake, Round Valley, Spruce Run, and other venues could be used for pumped hydro electrical storage. They could be grid scale such as Yards Creak or micro hydro scale. Either way, revenues and operation could be used to maintain safe nutrient levels. Screens protecting water intake pipes can function to capture and remove excess vegetation. Another suggestion is to integrate "power walls" in stadiums, arenas, and similar venues. These systems can be integrated into micro grids to improve resiliency and emergency power for critical service providers.

8) How should New Jersey address the solar and NJ Class I cost cap established in the Clean Energy Act? No response.

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? No response.

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

Response: Adopting New York States "Value Stacking" is suggested to provide investors a clear understanding of the value of solar and lower risk. The net result would be lower cost of capital.[15]

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?

Response:

1. Impose a "Ban on Fossil Fuel Projects" until the legislature, BPU and DEP develop rules and procedures and any laws needed to reg-ulate GHG's in New Jersey, and adopt specific annual plans to reduce GHG's consistent with Executive Order 28, the State's commitments in the Global Warming Response Act and the US Climate Alliance.[16]
2. NJ Pension Funds divest from fossil fuel companies and "dirty banks.[17]
3. Incentivize Energy Storage for industrial and commercial users. Incentive program should encourage pairing with PV Solar and bidirectional EV charge stations. (Rutgers NJ Energy Storage describes benefits ranging from peak load reductions, demand response, and other benefits. Energy storage enables businesses to turn off grid connection during peak electricity demand periods and continue operation.) Massachusetts Energy Storage Study[18] estimates 600 MW of advanced energy storage captures $800 million in system benefits.
4. Micro grid development remains a customization design process which leads to delays and expenses throughout the permitting, construction, and testing processes... Recommend that NJ focus on planning rather than execution until industry standardizes products and PJM finalizes rules for micro grids. Be an early adapter instead of a developer.
5. NJ's Town Center Distributed Energy Resource Microgrid Program focuses on resiliency. Future DER Microgrid initiatives need to also address reliability improvement and efficiency. National Conference of State Legislator's "State Efforts to Protect the Electric Grid" April 2016[19] provides a summary of what other states have proposed.

[15] https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources
[16] http://empowernewjersey.com/the-moratorium/
[17] https://www.ran.org/wp-content/uploads/2018/06/Banking_on_Climate_v4pg.pdf
[18] https://www.mass.gov/service-details/energy-storage-study
[19] http://www.ncsl.org/Portals/1/Documents/energy/ENERGY_SECURITY_REPORT_FINAL_April2016.pdf