SIERRA CLUB

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Via Electronic Mail (emp.comments@bpu.nj.gov)

Grace Strom Power, Chair
Energy Master Plan Committee
State of New Jersey, Board of Public Utilities
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Re: Comments on Integrated Energy Plan

Dear Ms. Strom Power:

On behalf of the Sierra Club and its over 20,000 New Jersey members, we submit the following comments on the Integrated Energy Plan as presented by the Rocky Mountain Institute on 11/1/19. Comments focus on how the modeling results should influence the Final Energy Master Plan and commentary regarding the modeling assumptions.

I. Key Analysis Findings that Must be Translated into Final EMP Policies

A. Analysis confirms no new gas infrastructure should be approved or built in New Jersey

The analysis of the "least cost" pathway shows that our use of fracked gas for electricity and space heating must decline immediately, and continue to decline through 2050. This means that if we build the eight proposed gas pipelines and six proposed gas-fired power plants currently in the planning stages, we'll have a huge excess of gas infrastructure. This would make it harder to meet our emission reduction mandates and put communities and property owners across New Jersey at risk.

It would also represent a double cost to energy consumers, as we ramp up investment in clean energy but fail to ramp down unnecessary spending on fossil fuels (represented by the "avoided costs" in the graph on slide 20). Any new gas pipeline or power plant is destined to become a stranded asset in the near term if we make the decarbonization progress that we need to make. Based on this finding, it is critical that the final Energy Master Plan include policies that prevent the construction of new gas-fired power plants and pipelines.

The least cost scenario puts New Jersey on a path to eliminate fossil gas usage in the power sector by 2050, and reduce overall pipeline gas consumption by approximately 80% in the same timeframe. The analysis indicates that additional firm generating capacity may be needed by 2040 (slide 25). We outline below why this could be a product of conservative assumptions and an incomplete accounting for systemwide costs and benefits, and that the need for firm capacity could be much lower. But even if a future increase is necessary, the analysts conclude that decisions about whether to add this infrastructure can be delayed until 2035. This finding is entirely consistent with a moratorium on new gas projects, and is a compelling reason for the EMP to prevent new gas power plants currently in development from being be permitted.

B. Analysis confirms that EMP should adopt a schedule to phase out existing coal-fired power plants

In all scenarios presented in the IEP, coal generation is gone by 2025. The two remaining coal plants in New Jersey are Logan (242 MW) and Chambers Cogen (285 MW). Both have relatively high expenses of around $50/MWh, leading to low capacity factors (for coal plants) of around 30%. Both are parties to power purchase agreements (PPAs) through 2024. The PPAs are costing ratepayers more than the market rate for wholesale electricity, and at one point Atlantic City Electric was required to "make a good faith effort to re-initiate discussions with [Logan, Chambers, and another plant] ... regarding possible renegotiation of the [PPAs] and mitigation of the costs incurred thereunder."[1] At 2800 lbs/MWh and 3400 lbs/MWh respectively, Logan and Chambers have among the highest rates of CO_2 emissions per unit of energy of any power plants in the state. Therefore, the Final EMP should include a policy that New Jersey will be a coal-free state after these power purchase agreements have expired. This could be realized by setting strict carbon emissions rates in the next round of air pollution permitting, which the DEP already has the authority to do.

II. Questions and Concerns about Modeling Assumptions

[1] Quoted from Stipulation No. 8 of the Order on Provisional Rates, dated May 29, 2013, BPU Docket No. ER13030186

A. The scientific imperative is to reduce greenhouse gas emissions by 45% by 2030, and to eliminate them by 2050.

The target of 80% emissions reductions by 2050 (as required by the Global Warming Response Act) is outdated. The Intergovernmental Panel on Climate Change (IPCC), which is the global authority on climate science, said in its 2018 Special Report that we must actually reach net-zero emissions by 2050, and also make near-term reductions of 45% by 2030.[2] The IEP did not attempt to hit these more ambitious but necessary targets. According to the presentation, the least cost scenario only achieves an emission reduction of approximately 30% by 2030,[3] but at this point the speed with which we reduce emissions is perhaps more important than the final target toward which we work. The failure of the modeling assumptions to conform to the current scientific understanding of the level of required action does not mean the results aren't useful, it simply means that for New Jersey to do its fair share to address the climate crisis, the policies in the final EMP must achieve deeper and earlier carbon reductions than those indicated by the modeled least cost scenario.

In order to meet the 2030 targets set by the IPCC, the Final EMP should:

- Set goals for increased solar adoption, particularly in the next five years. The IEP least cost scenario projects solar to add only about 200 MW by 2025 (slide 25), which will make it hard for the industry to ramp up to meet future needs. Doing so may require a near relaxing of the cost cap from the Clean Energy Act of 2018.
- Set goals for ramping up offshore wind development more quickly than the 3500 MW by 2030 that current policy requires. We should be planning to develop the entire potential of the existing federal lease areas, approximately 12.5 GW, by 2030. Since offshore wind is not subject to the cost cap, this faster ramp-up is even more important.
- Begin to phase out electricity generation at existing gas plants, beginning with the least efficient. Even if some dispatchable capacity may be needed in the future for reliability purposes, these plants should be mothballed until they are absolutely necessary.

B. Least Cost versus Highest Net Value

The NJ IEP is consistent with Draft NJ 2019 EMP Goal 2.3.1: "Model scenarios and pathways to achieve 100% clean, carbon-neutral electricity generation by 2050 with consideration for least-cost

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[2] IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

[3] NJ Integrated Energy Plan, Public Webinar, 11/1/19, Slide 17.

options." The Sierra Club considers this the wrong baseline on which to base EMP implementation decisions affecting taxpayers and ratepayers. The IEP considers benefits in the form of "clean air health benefits" and the social cost of carbon (slide 20), but there are many other categories of benefits of a transition to renewable energy that are not being accounted for. Some of these benefits result from the increased economic activity that creates jobs, boosts local tax revenue, and attracts private investment beyond the direct investment in energy projects (economic multipliers), but include many other benefits as well. Our Draft NJ 2019 EMP comments recommend consideration of "highest net value" supported by the following rationale:

> "Furthermore, integration with other statewide goals and policies requires the Final Plan to look beyond the "least-cost" option, as suggested in Goal 2.1.3, and to consider highest net value. The Clean Energy Economy opens a vast opportunity for improving our environment, society, and economic potential. For instance 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 carcinogenic particulate pollution levels and improve student academic performance. By considering "highest net value" options and not just "least cost" options, we would allow integrative planning to consider economic, environmental, and social costs/benefits to assess alternatives and select the best path forward."

Another example of uncounted benefits is illustrated by customer side deployment of energy storage (ES), which provides numerous benefits. ES improves resilience by allowing continued operation during outages. ES with time-of-use (TOU) rates allows facilities to recharge at night and discharge during peak demand periods. ES with Demand Response allows facilities to continue operations rather than to curtail energy use. ES raises property values and productivity of commercial and industrial facilities. Expanding the scope of benefits from clean energy, electrification, and elimination of energy-related pollution could have quite far reaching effects on which technologies and systems end up being the best choice for New Jersey.

C. Definitions of Clean Energy: Renewable vs. Carbon Neutral

The IEP analyst team was instructed to model pathways to electric sector carbon neutrality, rather than 100% renewable energy by 2050. This could allow for incinerators, biomass, carbon sequestration, and offsets, all of which could potentially subject New Jerseyans to a number of external costs that are not captured in the least cost pathway.

1. Indefinite ratepayer support for nuclear energy

Included in the least cost pathway is a continued reliance on our three existing nuclear power plants until at least 2050. While they do not emit carbon dioxide onsite, the mining and enrichment of nuclear fuel is a carbon-intense process, and the plants produce dangerous radioactive waste for which we still do not have a long-term disposal plan. The operating licenses for these plants expire between 2036 and 2046. If each is extended for another 20 years, the plants will each be 80 years old by the end of their license extension. With age comes increased risk, so the EMP must chart a pathway to retire these plants and replace them with renewable energy.

The nuclear plants currently receive a combined $300 million/year ratepayer subsidy, which is expected to continue indefinitely, and would total over $9 billion by 2050 at the current rate. The IEP does not include these subsidies in its least cost calculation, but rather considers them "transfers" from ratepayers to generators, which net out to $0. While this might make sense from the perspective of a model that is making decisions about capital investments, from a utility customer's perspective this subsidy is in fact a cost. We believe that a much higher net benefit would be achieved by redirecting the bulk of the presumed 30-year, $9 billion nuclear subsidy to accelerating deployment of offshore wind.

2. Questions about sustainability of biogas

As fracked gas pipelines and power plants become stranded assets due to decarbonization mandates, the analysis looks to actually increase the amount of dispatchable "firm" capacity from current levels in the later years to 17.5 GW. The least cost scenario selects biofuel and hydrogen burned in conventional turbines to meet reliability needs. This may be problematic as production and use of biofuels is expensive, relies on extensive water usage, and produces pollutants both during production and combustion. There will still be major climate impacts from fugitive methane along its lifecycle whether that methane is fossil or biologically derived. Hydrogen, particularly if it is derived from methane, has similar issues. As noted below and by the analysts, the model results are highly sensitive to uncertain cost projections for developing technology, particularly in the out years, that could well make the reliance on biogas unnecessary.

D. Increasing uncertainty about costs and technological development in later years

1. The farther in the future we go, the less certain we are about what technology option is the "least cost"

The study authors note that the further we go out in time, the harder it is to predict costs. Historically, the US Energy Information Agency, the source of the fossil fuel cost projections, has tended to underestimate future costs because it does not account for volatility due to things like instability in oil-producing countries. On the flip side, most projections have tended to underestimate the potential for emerging technologies like solar and car batteries to rapidly decrease in cost. The fact that the least cost scenario selects preservation of nuclear beyond 2050 and biogas burned in conventional turbines over higher levels of solar, wind, and storage is based on today's projections of technology costs in 20 to 30 years, which are highly uncertain.

Even now, storage costs are declining faster than experts believed they would. Indiana, Minnesota, California, Colorado, Rhode Island,[4] and other states are rejecting natural gas power plants in favor price advantages of renewables plus storage. In 2018, a total of 311 MW and 777 MWh were installed in the US, up from near zero in 2012, and one analyst projects total MWh deployed will grow nearly 14 times in the next five years alone.[5]

Lower energy storage costs completely change the economics of renewable energy. ES deployment lowers energy peaks which lower user rates. ES deployment accelerates installation of PV solar and modulates power for offshore wind variations. Commercial centers offering charging stations coupled with ES modulates power usage improving grid reliability and encourages adoption of electric vehicles. Substitution of ES with renewable sources for fossil fueled CHP units would accelerate CO_2 and air pollution reduction. This conversion of these facilities would be especially beneficial if located in the vicinity of EJ communities.

2. Consideration of other renewable energy resources, emerging technologies, and systemwide non-energy changes

The analysis does not appear to integrate emerging technologies and opportunities for power generation. For example, there is no discussion of tidal power, low-impact hydropower, or pumped-hydro storage, all of which could present opportunities in New Jersey.

From a transportation perspective, broader technological and societal changes may fundamentally alter demand for travel, and by extension, for electricity. Transportation-sector carbon limits could promote denser development and greater transit investment, lowering VMT and the amount of electricity needed to power personal vehicles. Self-driving vehicles and drones for delivery of small packages, could completely transform the way we move freight in unexpected ways, and therefore the types and usage patterns of delivery vehicles.

E. Carbon sequestration by forests

Slide 7 of the IEP presentation shows that forests in NJ sequester approximately 8 MMT of CO_2 per year in 2019. It is unclear to us whether or how this sequestration factors into the establishment

[4] https://ieefa.org/shifting-markets-renewables-put-the-kibosh-on-a-1000mw-rhode-island-gas-plant/
[5] https://www.powermag.com/top-5-energy-storage-trends-of-the-year/?pagenum=1

of carbon reduction targets, but it appears to be subtracted from energy-related emissions. Neither the IEP nor Draft EMP provide interim or 2050 forecasts for forest sequestration. Rather, it appears from the charts that the current rate of forest sequestration is assumed to remain unchanged in the future, and that it is factored into the calculation of long-term carbon reduction goals.

Sierra Club supports efforts at reforestation and proforestration,[6] and the preservation of coastal habitats not only for their potential to sequester carbon, but also for the wide range of ecosystem services healthy forests provide, including resiliency, water purification, stormwater/flood management, and erosion control, sustaining biodiversity, and enhancing conditions for agricultural production. However, we are concerned that in the absence of policies in the EMP to encourage these efforts, let alone laws to ensure them, we run the risk of overestimating the future potential of forest sequestration. We need a concerted effort to analyze the potential for sustaining and increasing carbon sequestration from forests, and a clearer understanding of the necessary policies and costs associated with achieving sequestration goals. Until then, we believe it is risky to rely on forest sequestration when setting decarbonization goals, as there is potential for increased land clearing and forest fires to reduce the capacity of our carbon sinks.

III. Conclusion

We appreciate the opportunity to comment on the Integrated Energy Plan, and we commend the Murphy Administration and the BPU for finally moving us in the right direction to address the climate crisis. But because we have waited so long to take ambitious action, we must go further in our reductions than the decade-old Global Warming Response Act mandates, and we must ramp up clean energy sooner.

The analysis represented by the IEP is robust and impressive. The critiques and questions we raise about the uncertainties in the out years are unavoidable in any long term analysis. Our point is that the science tells us we need to eliminate carbon pollution economy-wide by 2050, and uncertainty about costs in twenty to thirty years should not prevent the EMP from adopting that goal. While it remains to be seen what the most cost-effective clean energy technologies will be that ultimately squeeze the last 20% of carbon pollution from our economy, this study makes abundantly clear the course the EMP must chart over the next 10 to 20 years, and that is to halt fossil buildout and ramp up clean energy as quickly as possible.

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[6] Proforestation is a term for growing existing forests intact to their ecological potential, usually with little active management. See: https://www.frontiersin.org/articles/10.3389/ffgc.2019.00027/full

Respectfully Submitted,

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