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Written Testimony to the Climate Action Council
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To:

Doreen Harris, Co-Chair, Climate Action Council

Basil Seggos, Co-Chair, Climate Action Council

From:

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To the Council,

Thank you for the opportunity to provide written testimony concerning the Draft Scoping Plan for the Climate Leadership and Community Protection Act (CLCPA). In this testimony, I would like to address two issues: first, the costs and benefits of the CLCPA, and second, the growing risk to resource reliability on the New York electrical grid.

I: Costs and Benefits

The Scoping Plan fails to be forthright concerning the relative costs and benefits to New Yorkers of the Climate Leadership and Protection Act. Employing the Integration Analysis's estimate of $280-340 billion in costs and $420-430 billion in benefits, the Scoping Plan declares that "The cost of inaction exceeds the cost of action by more than $80 billion."[i] Similarly, Co-chair Harris was recently quoted as saying, "The good news is that the benefits from jobs, health, greenhouse gas perspectives and beyond, far surpass the costs."[ii]

But what is obfuscated in this message is that *all* the costs fall on New Yorkers, while they receive only a *portion* of the benefits. Avoided economic costs due to reduced greenhouse gas emissions estimated at $260 billion are *global* benefits, although the plan fails to specify this important detail. This becomes clear only to those who are aware that the $260 billion estimate is based on the Department of Environmental Conservation's social cost of carbon, which in accordance with the CLCPA is explicitly a global benefit.[iii] This is not clearly specified in the Scoping Plan, leaving the unwary reader with the mistaken impression that the benefit to New York outweighs the cost to New York.

Nor does the Integration Analysis prepared by Energy+Environmental Economics make any attempt to disaggregate that $260 billion global benefit to discern what share accrues to the people who will be paying for it. But New York contributes approximately four-tenths of one percent of global greenhouse gas emissions. If we assume the state receives roughly the same share of the benefit, New York's share of that benefit is only $1.4 billion. If we generously

multiply that by 10 (assuming for the state what is likely a highly disproportionate share of the benefit), the benefit to New York would be $10.4 billion. If we subtract the $260 billion from the claimed $420 to $430 billion in benefits, then add back in that assumed benefit of $10.4 billion, we get a total net benefit to New York of $170.4-180.4 billion.

Against a cost of $280 - $340 billion, this means there is no net benefit to New Yorkers, but a net loss of $100-170 billion. Simply put, by the state's own analysis the cost to New York outweighs the benefit to New York.

If New Yorkers want to pay that much to benefit people in other countries, or as the price of leadership, that is their right. But it is unethical to keep up a pretense that the net direct benefit to New York is positive or to ask New Yorkers to commit to this plan without knowing they are paying as much for the benefit of others as for themselves.

Additionally, it is certain that the costs are understated because the CLCPA and the Climate Action Council's Integration Analysis understate the amount of renewables necessary to replace firm resources. Because of the lower capacity factor of renewables due to their variability (see part III), the amount of installed renewable capacity necessary to replace firm capacity ranges from a minimum of 2X to many times as much.

That is, 1 MW of installed renewable capacity is not, and cannot be, equal to 1 MW of firm capacity. At a capacity factor of 45%, for example, 2 megawatts of an installed variable energy source would be necessary to replace 1 megawatt of a firm capacity source with a capacity factor of 90%. The cost of that replacement source would necessarily, then, be double what it superficially appears to be.

In addition, due to the variability of the weather, reliance on renewables relies on vast amounts of storage to endure what the Council itself in this plan notes could be extended periods of low wind and sun for weeks or longer. Neither the CLCPA's mandated 3,000 MW of battery storage nor Governor Hochul's proposed 6,000 MW of battery storage begins to address this necessity. The cost of storage alone, whatever combination of battery or pumped hydropower, could add hundreds of billions of dollars to the cost of this plan.

By not taking into account the overcapacity necessary to replace firm resources with variable renewable resources, the Council's Integration Analysis radically underestimates the amount of variable renewable energy sources that will be required for a green transition, and therefore the cost.

Finally, on the matter of cost, despite requests from some members of the Council, the CAC has declined to estimate how the costs will be apportioned among the citizens of New York. Of particular interest is what the effect will be on energy prices. High energy costs are a burden on poor and elderly citizens, but the Council has chosen to ignore that element of a just transition in the Scoping Plan. Shockingly, the answer seems to be that we'll only get around to figuring out that cost after we've committed New Yorkers to bearing it.

II. The Risk to Grid Reliability

The CLCPA and the Scoping Plan create an unacceptable risk to the reliability of the electrical grid. As the New York Independent System Operator (NYISO) has previously informed the Department of Environmental Conservation "Emitting generation is retiring faster than new resources are being developed."[iv] We have also seen non-emitting generation retired without being replaced by other non-emitting resources with the closure of the Indian Point Energy Center. And two new sources of natural gas power generation that would be cleaner than those currently existing were denied permits in 2021.[v1vi]

In addition, two of the state's remaining nuclear reactor units are licenses only through 2029, with another licensed through 2034, and the last one through 2046. Given the significant level of opposition to nuclear power – despite it being a reliable and non-emitting source – nobody can say with certainty whether any of them will be relicensed. Three of them may be closed before the 2040 deadline for achieving zero-emissions electricity, and all may be closed prior to the 2050 goal of achieving a net-zero emissions economy.

While fossil-fuel generation, and possibly nuclear generation, is likely to be taken off-line, demand for energy is anticipated to increase by up to 80%.[vii] This will come from the planned increases in the number of electric vehicles and electrification of home heating and cooking.

The problem is evident. NYISO predicts that by 2040 – when the CLCPA calls for 100% zero-emission electricity production – the state will be in need of as much as 30 gigawatts of installed firm capacity, a gap of as many as 30 or more major power facilities, equal to a gap of 10% of the state's electricity demand.[viii]

To make their CLCPA-compliant scenarios work, NYISO had to make a heroic assumption about dispatchable emissions-free resources (DFERs) that "are not commercially available at this time."[ix] They did not presume either to guess what those might be or to assume they would be either technologically or economically feasible at utility scale by 2040.

The Climate Action Council itself recognizes this problem. The Draft Scoping Plan, relying on a study by the New York State Energy Research and Development Agency, notes "a remaining need for 15 – 25 GW of electricity generation in 2040 to meet demand and maintain reliability."[x] Whether just 15 or more than 30 GW of generation capacity is missing, this is unacceptable. As NYISO has shown, reliability margins will already become dangerously tight in New York City by 2030.[xi]

As a group of 21 scholars wrote,

> "Many . . . studies of deep decarbonization of electric power illustrate that much can be done with wind and solar power but that it is extremely difficult to

[1] New York State Department of Environmental Conservation. 2021. "Statement from DEC Commissioner Basil Seggos on Denial of the Title V Permit for Astoria Gas Turbine Power, LLC." October 27. https://www.dec.ny.gov/press/124070.html.

> achieve complete decarbonization of the energy system, even when using every current technology and tool available, including energy efficiency and wind, hydroelectric, and solar energy as well as carbon capture and storage, bioenergy, and nuclear energy.[xii]

The Scoping Plan seems to rest on the hope that green hydrogen or renewable natural gas "possibly" will be ready for utility-scale deployment within the next eighteen years. But nobody can say that they will be. If the state closes existing firm but emitting resources, fails to approve new more-efficient firm but emitting ones, and firm non-emitting resources do not become available by 2040, New York may back itself into a severe power-generation resource shortage.

This outcome is disturbingly likely. As the Scoping Plan itself states, "there are . . . many weeks in the year – especially during the winter – in which the contributions from renewables and existing clean firm resources are not sufficient to meet demand."[xiii] The Council appears to recognize the risk it is creating, but to ignore it.

As clean energy advocate Michael Liebreich has written,

> It may be relatively easy to design a wind and solar-based system that meets power needs for much of the year, but it is orders of magnitude harder to design one that can get through monsoon and rainy seasons, winter weeks with low wind and freezing weather in northern climes, or shocks of an unprecedented scale.[xiv]

The great risk the state is creating is that in an extreme weather event such as a polar vortex electrical demand will surpass supply. This could create at first rolling blackouts in city after city, but then a potential cascade of voltage failure that extends across the state or even through the Eastern Interconnect into a multi-state region. During the August 2003 Northeast power outage, 50 million people in eight states and one province were affected for between a few hours and four days. A cold-weather repeat would be far more damaging and deadly.

The Texas blackouts in February 2021, due to a polar vortex, resulted in hundreds of deaths in weather that was in the teens, with nearly $200 billion in property damage. A multi-day blackout in single-digit or sub-zero temperatures in New York could also result in many hundreds of deaths – mostly the poor and elderly – and also create hundreds of billions in property damages, costs that are not included in the Council's estimates of the cost of the CLCPA.

New York cannot afford such reckless decision-making. Planning must account not just for the best-case scenario where sufficient wind and sunshine serve to provide enough energy to meet demand, perhaps with assistance from batteries during peak demand and morning ramp-up periods. The state must plan for the worst-case scenario as well. This is especially so as electrification shifts the annual peak from summer to winter, making winter blackouts from excessive demand more likely. And cold is more deadly than heat, with cold weather killing more people annually than do heatwaves.

III. Understating the Amount of Installed Variable Power Necessary

Although the above case is based on a (predictable) worst-case scenario, it nevertheless relies on the rosy assumption that the planned wind and solar installations are normally operating at full capacity. This, of course, is not true, and as noted in part I of this comment, that means the replacement of firm power resources cannot simply be conducted as a 1:1 replacement.

The energy capacity factors of various sources as calculated by the U.S. Energy Information Agency are shown in the following image.

Note three simplifications in this graphic concerning wind and solar. First, offshore wind has a higher capacity rate than onshore wind, between 40% and 50%. Second, solar is a national average, taking into account the desert southwest as well as the more cloudy and less favorably angled northern states, and the actual capacity rate for New York is as low as 12%. Finally, the natural gas rate is also an average that includes peaker plants that may run only a few hours a day or less. The potential capacity rate for a base-load or load-following natural gas plant is as high as 90% or more.

Consequently, the planned 9,000 MW of offshore wind will have an effective capacity of, at best, 4,500 MW, whereas 9,000 MW of natural gas or nuclear capacity will have an effective capacity of as high as 8,100 MW. Therefore we would need to multiply the offshore wind installed capacity by 1.8, of up to 16,200 MW, to equal the capacity that the Scoping Plan assumes will be produced by the 9,000 MW of offshore wind.

For onshore wind and solar, the realities become correspondingly worse.

The essential failure here is that the Scoping Plan makes its assumptions based on installed, or nameplate, capacity rather than considering capacity factor. Put another way, it mistakenly focuses on megawatt power potential rather than the actual megawatt hours per year that we can reliably predict a power facility to produce.

Recommendations

We must not limit our options before we have ensured we can meet the state's expected electricity demand. The CLCPA authorizes continued operation and even development of new natural gas facilities if determined to be necessary to meet reliability needs. NYISO's demonstration of declining reliability margins demonstrates that these facilities are still needed and will be for years. Therefore, the final Scoping Plan should contain the following recommendations.

1. **Benefit Cost Analyses**: The Scoping Plan should contain benefit cost analyses of each sector of the plan with detailed clarification of the costs and benefits to New Yorkers, with separate reference to benefits accruing outside the state.
2. **Build in addition to, not in place of**: The development of new sources of supply of all types must precede the closure of existing sources of supply, regardless of source. Until and unless the state has developed sufficient non-emitting sources, particularly firm sources, to meet demand in the worst-case scenario, existing natural gas plants should be kept online, and new more-efficient gas plants and compression facilities should be permitted.
3. **Maintain present systems**: Construction and upkeep of natural gas pipelines should be permitted to ensure adequate supplies of natural gas. These will also be needed as natural gas is further blended with hydrogen, and potentially as green hydrogen or renewable natural gas replace the current fossil-fuel sourced natural gas.
4. **Be Inclusive**: The Scoping Plan should encourage the state to go beyond the Governor's plan of making it a hub for green hydrogen research and make the state a welcoming place for experimentation with all non-emitting energy sources. This would include creating a welcoming environment for experimentation with natural gas with carbon capture utilization and storage (CCUS) as well as next-generation nuclear power. Overwhelmingly, detailed analyses for achieving net-zero energy policies assume a role for CCUS, and next-generation nuclear power is poised to become a crucial and affordable source of emissions-free electricity within a few decades.
5. **Prioritize New Yorkers' well-being:** Finally, the Scoping Plan should clarify that the safety and well-being of New Yorkers is the paramount concern in making any transition to a decarbonized economy, and that artificial timelines cannot be used as an excuse to create energy poverty or excessive risk of energy shortages that would harm the people of the state.

[i] New York State Climate Action Council. 2021. *Initial Draft Scoping Plan*. P.91.
[ii] Dreux, Lara. 2022. "'A Fundamental Shift': New York's Clean Energy Plans Move Ahead. Feb. 22. *Gotham Gazette*. https://www.gothamgazette.com/state/11133-fundamental-shift-new-york-clean-energy-plans.
[iii] New York State Department of Environmental Conservation. Establishing a Value of Carbon: Guidelines for Use by State Agencies.
[iv] New York Independent System Operator. Feb. 7, 2022. "Written Comments of the New York Independent System Operator on the Proposed Climate Leadership and Community Protection Act and Air Permit Applicants Policy DAR-21." P.2
[v] New York State Department of Environmental Conservation. 2021. "Statement from DEC Commissioner Basil Seggos on Denial of the Title V Permit for the Danskammer Energy Center." October 27. https://www.dec.ny.gov/press/124069.html.

[vi] New York State Department of Environmental Conservation. 2021. "Statement from DEC Commissioner Basil Seggos on Denial of the Title V Permit for the Danskammer Energy Center." October 27. https://www.dec.ny.gov/press/124069.html.

[vii] Climate Action Council. 2021. *Draft Scoping Plan.* P.167.

[viii] New York Independent System Operator. 2021. *Power Trends 2021: New York's Clean Energy Grid of the Future*. Pp.45-46.
[ix] *Power Trends 2021*. P.46.
[x] New York State Climate Action Council. October 2021. Initial Draft Scoping Plan. P.185.
[xi] New York Independent System Operator. December 2, 2021. "2021-2030 Comprehensive Reliability Plan."
[xii] Clack, Christopher T. M., Staffan A. Qvist, Jay Apt, Morgan Braziian, Adam R. Brandt, Ken Caldeira, Steven J. Davis, Victor Diakov, Mark A. Handschy, Paul D. H. Hines, Paulina Jaramillo, Danial M. Kammen, Jane C. S. Long, M. Granger Morgan, Adam Reed, Varun Siveram, James Sweeney, George R. Tynan, David G. Victor, John P. Weyant, and Jay F. Whitacre. 2017. "Evaluation of a Proposal for Reliable Low-cost Grid Power with 100% Wind, Water, and Solar." Proceedings of the National Academy of Sciences v. 114., n.26. 6722-6727.
[xiii] *Draft Scoping Plan*, P.78.
[xiv] Liebreich, Michael. 2022. " The Quest for Resilience – What Could Possibly Go Wrong?" March 1. https://about.bnef.com/blog/the-quest-for-resilience-what-could-possibly-go-wrong/.