Nuclear New York

Independent Advocates for Reliable Carbon-Free Energy
A project of Community Studies of New York, Inc, a 501(c)3 non-profit organization
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November 16, 2020

United States of America Federal Energy Regulatory Authority (FERC)

Californians for Green Nuclear Power, Inc
Complainant

v.

The North American Electric Reliability Corporation, the Western Electricity Coordinating Council, the California Independent Systems Operator, the California Public Utilities Commission, the California State Water Resources Control Board, & the California State Lands Commission
Respondents

(Docket No. EL21-13-000)

Comments of Nuclear New York

Pursuant to the Federal Energy Regulatory Commission's ("FERC" or "Commission") rules and the Notice of Complaint issued on October 26, 2020 in this docket, Nuclear New York ("NNY")[1] respectfully submits these comments in support of the Complaint filed by the Californians for Green Nuclear Power, Inc. ("CGNP").

Given the increasingly evident impacts of anthropogenic global warming,[2] we support California's commitment to reach statewide carbon neutrality and 100% carbon-free electricity generation.[3] Lacking a system-based comprehensive federal climate policy to cut greenhouse-gas (GHG) emissions, various actors have instated fragmented measures such as subsidies and specific technological mandates, resulting in politically preferential energy policies. The larger goal of cost-effective decarbonization has fallen by the wayside due to confused political, intellectual, and fiscal support that primarily targets solar and wind power.

Real-world evidence and scientific inquiry have made clear that nuclear energy is an essential complement to variable renewable sources of energy for reliable, cost-effective deep decarbonization of modern economies. Nuclear power's energy density results in the lowest ecological footprint, especially compared to low-density, land-intensive, and non-dispatchable renewable sources like wind and solar.

In order to meet California's climate goals with reliable, cost-effective carbon-free energy sources, NNY requests that California regulators and Pacific Gas and Electric Co. ("PG&E") reconsider the 2016 decision[4] to prematurely shutter Diablo Canyon Power Plant Units 1 and 2 in November 2024 and August 2025,

[1] Nuclear New York is a project of Community Studies of New York, Inc, a 501(c)3 non-profit organization. We are an independent and non-partisan advocacy organization devoted to supporting evidence-based energy and climate policies.

[2] Intergovernmental Panel on Climate Change, Sixth Assessment Report. https://www.ipcc.ch/assessment-report/ar6/

[3] Executive order B-55-18 and Senate Bill 100 of 2018.

[4] CPUC Decision D.18-01-022

respectively, as described in the petition by CGNP.[5] These reactors, California's last remaining nuclear power plants, provide 10% of the state's electricity. Moreover, as discussed below, they perform an essential function in maintaining a cost-effective reliable electricity grid, which is part of FERC's mandate.

A 2020 study of all U.S. nuclear power plant openings between 1970 and 1995 found that nuclear plant openings resulted in a corresponding reduction in monthly coal-fired generation. The same study found that forced nuclear plant outages between 1999 and 2014 resulted in a corresponding increase in monthly coal-fired generation.[6] Today, in most parts of the U.S., due to the economics of fracked gas, no other source of electricity is competitive unless the market incorporates negative externalities of air pollution, ecological impacts, or climate change. Thus, when nuclear plants are closed, fracked gas plants take their place. In downstate New York, the premature closure of Indian Point nuclear power plant (2,080 MW) over 2020 and 2021 is expanding fossil fuel generation, making New York's electricity grid more fossil-fuel dependent and climate polluting than at any point since 2002.[7] New York Independent Systems Operator (NYISO) reports demonstrate the fossil expansion is occurring with massive fracked fossil fuel plants CPV Valley (678 MW) and Cricket Valley Energy (1,100 MW), both built explicitly to serve the market in the absence of Indian Point. Furthermore, the repowering of old fossil plants in the Metro New York City region, such as Danskammer (535 MW), Astoria NRG (437 MW), and Gowanus Generating (590 MW) is ongoing. Since New York's electricity demand has not grown, the development and redevelopment of this fossil infrastructure is due to the premature closure of Indian Point.

Brick & Thernstrom evaluated the system consequences in California of high variable renewable penetration vs. balanced portfolios that included nuclear energy.[8] Their first finding is that due to low capacity factors and intermittency dynamics, a electricity system with 80% variable renewable generation ('80 RPS') would require twice the megawatts of generation capacity vs. a balanced system that includes nuclear. Furthermore, as the U.S. National Climate Assessment has highlighted, even with technological advancements through to 2030, solar photovoltaic and wind resources require 15 times and 30 times the footprint of nuclear, respectively.[9] Given the difficulty in permitting and building any energy infrastructure, committing to the largest, most land-intensive energy system is bound to get tied up in lawsuits.

The second finding by Brick & Thernstrom is that high variable renewable generation systems are materially costlier. Californians already pay some of the highest electricity rates in the country, exacerbating poverty.[10]

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[5] PG&E Letter DCL-18-015 to U.S. Nuclear Regulatory Commission, "Request to Withdraw the Diablo Canyon Power Plant License Renewal Application." Dated March 7, 2018 (ML18066A937).

[6] David B. Adler, Akshaya Jha, Edson Severnini, Considering the nuclear option: Hidden benefits and social costs of nuclear power in the U.S. since 1970, *Resource and Energy Economics*, Volume 59. 2020. https://doi.org/10.1016/j.reseneeco.2019.101127

[7] http://www.nuclearny.org/indian-point/

[8] Stephen Brick, Samuel Thernstrom, Renewables and decarbonization: Studies of California, Wisconsin and Germany, *The Electricity Journal*, Volume 29, Issue 3. 2016, https://doi.org/10.1016/j.tej.2016.03.001

[9] U.S. National Climate Assessment. Section 2: Energy, Water, Land. 2014. https://nca2014.globalchange.gov/report/sectors/energy-water-and-land#intro-section-2

[10] Robert Bryce, The High Cost of California Electricity Is Increasing Poverty, FREOPP. 2020. https://freopp.org/the-high-cost-of-california-electricity-is-increasing-poverty-d7bc4021b705

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California, 80 RPS would make electricity cost 51% higher. Claims of 'grid parity' of variable renewables do not consider the cost of operating a reliable electric system, which rise exponentially at higher levels of variable penetration. The cost to reduce emissions under 80 RPS is $393/ton vs. $150/ton in a balanced system – or 2.6 times higher. This will adversely impact low- and middle-income families, thereby undermining "just transition" goals of California's energy policy.

Thirdly, balanced electricity grids can achieve higher decarbonization vs. renewable-dominated grids. The level CO_2 emissions reduction under 80 RPS would be 70% vs. 87% in a grid with nuclear plus 25% wind and solar. In order to provide electricity at times when variable renewable sources do not, 80 RPS requires almost as much (73%) installed fracked gas generating capacity as in a scenario without any climate mandates (served solely with fracked gas). Thus, balanced grids are more effective *and* cost-effective at cutting emissions.

Lastly, the study points out the complexities of developing storage to ensure high variable renewable grids:

> "Wind and solar output exhibit seasonal episodes of both sustained oversupply and undersupply that overwhelm any conceivable storage strategy. Battery storage technologies may have a role in managing shorter-term imbalances but are unlikely to solve the very large seasonal swings in generation output under high-penetration [variable generation] scenarios."

To balance seasonal energy needs, 80 RPS in California would require 8 million megawatt-hours of storage. At a $500/kWh battery storage cost, this would require $30 billion. Thus, storage would increase system costs by a factor of 16. If storage costs were to drop to $100/kWh as some proponents argue is imminent, those costs would still amount to over three times the cost of electricity infrastructure. Such expenditure would be extraordinary, would have material economic repercussions, and are unlikely to be politically viable.

Finally, it is important to recognize that the above analysis only considers an 80 RPS scenario, not one in which electricity generation is 100% carbon free. In the absence of nuclear power to effectively provide firm deliverable generation when variable sources are unavailable, all the above adverse effects grow exponentially, rendering the popularized scenario of "100% renewables" a pipe dream.

All of humanity's previous energy transitions have seen an increase in the use of both new and existing technologies, largely driven by a switch to denser, higher quality energy sources.[11] However, most scientists agree that, given inadequate efforts to date, avoiding the worst impacts of climate change and sustaining a livable planet for the future, will require that we soon attain negative greenhouse gas emissions on a global scale. Without nuclear power, that is essentially impossible. Rather than pursue short-term "feel good" policies that will fail, California must switch to systems-level thinking to ensure an effective and just transition.

Respectfully submitted,

Nuclear New York

[11] Smil, V. (2010). Energy Transitions: History, Requirements, Prospects