

August 12, 2023

Hon. Michelle L. Phillips
Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350
Submitted electronically

Re: Case 15-E-0302-Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard.

ABOUT THE AUTHOR

Richard Ellenbogen an active party in the case , a resident of the State of New York, the CEO of Allied Converters, and welcomes the opportunity to provide comments as requested by the Commission in the above referenced proceeding, issued in the May 18, 2023 “Order Initiating Process Regarding Zero Target”.

I am a Former Bell Labs Engineer that has done work on the Utility System with NYSERDA and Con Ed. I also decarbonized my factory starting in 1999 and those measurements resulted in the Public Service Commissions Case 08-E-0751 to reduce power line losses. I was an invited speaker to a PSC Utility Conference in 2008 for that case on Line Loss Reduction that was initiated by Steven Keller based upon my work at the factory and a paper written at the request of Con Ed after a factory visit¹. I was the Keynote Speaker at the 2023 Business Council of NY Renewable Energy Conference² and an invited speaker at the Dutchess County Chamber of Commerce meeting on Energy. I was an early adopter of renewable technologies going back to the 1990's and decarbonized both my home and my business two decades ago. Between 2006 and mid 2023, the business recycled or repurposed 100% of its waste and sent nothing to a landfill. Over the past 20 years, the factory has generated between 60% and 85% of its electrical energy onsite with a carbon footprint approximately 30% lower than the Con Ed System, even prior to the closing of Indian Point.

I have major concerns about the state's energy policy and how it is being implemented and have done a mathematical analysis of the state's energy profile. When it was presented to NYSERDA four years ago, they said that the numbers were correct. It was also presented to Chairman Rhodes of the PSC and no one at that meeting challenged the numbers. It was recently presented to several Cornell Engineering Professors and members of their energy center. The only comment from the group was that I was understating the problems with NY State’s Energy Policy. “If the CLCPA is enacted as written and all of the goals are achieved, we can expect hundreds of hours of rolling blackouts annually.”

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1. **Distributed Generation, Customer Premise Loads & the Utility Network A Case Study**
<http://www.powerfactorcorrectionllc.com/Distributed%20Generation.pdf>
 2. **2023 Business Council of NY State Renewable Energy Conference**
<https://savenyenergy.com/business-council-of-ny-states-renewable-energy-conference/>

I have lived live in an “electric” house since 2004 with a solar array and a geo-thermal heating system with 100% radiant heat using 95–100-degree water with a COP between 5.5 – 6.0, far more efficient than what most places will build under NY State guidelines, and I have driven an EV for six years. As all of the parameters in both the house and factory are measured three times per minute, I see firsthand what implementing the CLCPA will do to the load every day. The house was written up in the NY Times in November, 2008 under “Going Green: Still Challenging Turf”³ and the factory was written up in the Wall Street Journal under, “Westchester Plastics Maker Embraced Renewable Energy Decades Before The Gas Moratorium”.⁴ Additionally, I defeated Con Ed in a tariff hearing in 2008-2009 to allow additional interconnection of renewables and the factory became the first building in NY State with multiple sources of high efficiency grid connected generation.⁵

It is through this lens that I have developed an understanding of the shortcomings of renewables after 20 years of living with them. They are a great way to reduce the reliance on fossil fuels but attempting to run the entire system on them is going to be an unmitigated disaster which will be documented in the following pages.

INTRODUCTION

Prior to addressing the 14 questions in the Public Service Commission request, we first need to address the basis of the plan that is making the request necessary.

While I am in favor of the decarbonization goals of the CLCPA, the way that the policy is structured cannot possibly work and it is going to cost the state hundreds of billions of dollars, while not reducing atmospheric carbon, and worse, it precludes methods of reducing carbon emissions that actually will work much more rapidly within the way that the utility system is structured. These issues supercede the 14 questions because without first ascertaining the feasibility of the plan, the answers to the 14 questions are irrelevant. I became involved with analyzing the state’s energy policy after the gas bans were initiated in Westchester County where I live. I was listening to the rationale of the arguments and became aware that the arguments against using gas were devoid of any mathematical analysis. I have no financial interests in the fossil fuel industry and understand that methane emissions are an issue, however the solutions being adopted by NY State are actually going to make things worse. Potential issues that I presented to NYSERDA and the PSC four years ago have turned into newspaper headlines in the present day,⁶ It wasn’t clairvoyance. It was arithmetic and analyzing what had been done elsewhere and the end results.

3. **Going Green: Still Challenging Turf** NY Times November 14, 2008,
<https://www.nytimes.com/2008/11/16/realestate/16wczo.html>

4. **Westchester Plastics Maker Embraced Renewable Energy Decades Before Gas Moratorium** Wall Street Journal October 27, 2019, <https://www.wsj.com/articles/westchester-plastics-maker-embraced-renewable-energy-decades-before-gas-moratorium-11572174001>

5. **NY State Public Service Commission Case 08-E-1426** Allied Converters, Inc. – Petition For a Declaratory Ruling on the Administration of Solar Net Metering Provisions at Locations Where Multiple (Hybrid) Energy Efficient Generation Technologies Are Installed.

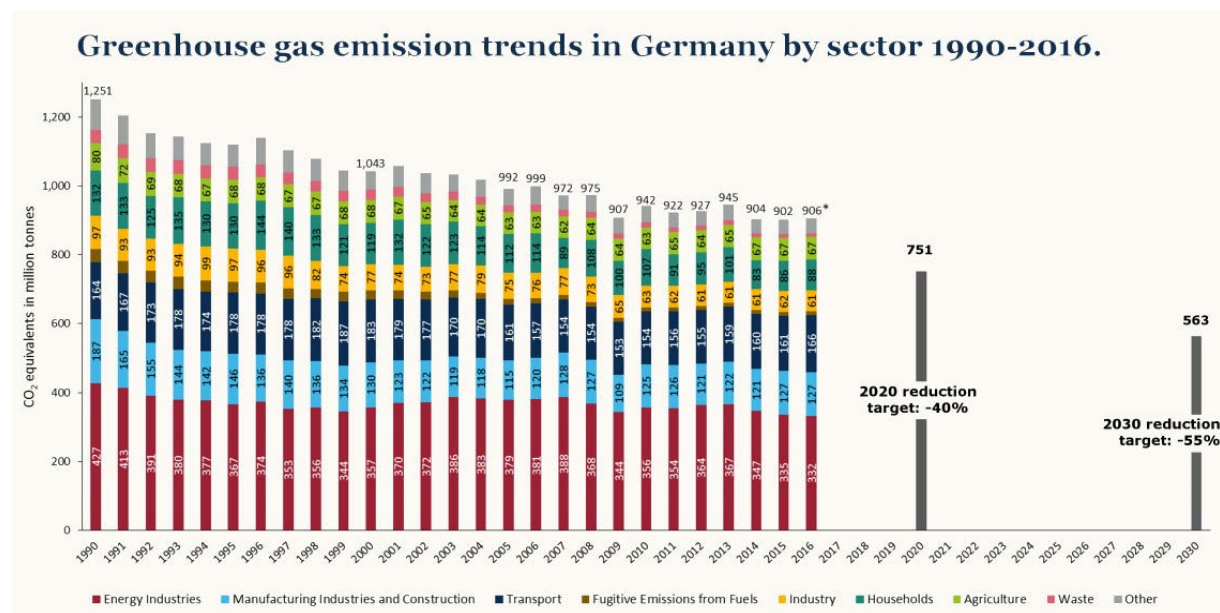
6 **As New York Lags on Climate Goals, Some Dirty Plants May Stay Open Past Deadline** NY Focus June 14, 2023
<https://nysfocus.com/2023/06/14/new-york-air-pollution-climate-peaker-plant>

ISSUES

The CLCPA, despite its name, is not leadership. It is following a plan that has failed in Germany over the course of 33 years. Just recently, on 8/7/23, it was announced that Germany is a net importer of electricity despite 33 years of installing renewable generation, while France that has chosen a mix of 70% nuclear energy and 10% hydro is a net exporter while having 10% to 15% of its nuclear output curtailed because of maintenance⁷. At the opposite end of the spectrum Germany is a net electricity importer despite importing massive amounts of natural gas to generate electricity. They recently signed an agreement with Qatar to import 30 million metric tons of LNG over the next 15 years⁸.

Had Germany's Renewable Installation plan worked, they would not have had these issues. Figure 1, below, copied from e360.yale.edu shows that Germany has not come close to achieving its carbon reduction goals despite 33 years of trying and expensing hundreds of billions of dollars. Since 2016, they have fallen farther behind and had to restart coal generating plants in 2020, even prior to the war in Ukraine.⁹

Figure 1 Carbon Crossroads: Can Germany Revive Its Stalled Energy Transition? ¹⁰



7 France Is Europe's Top Power Exporter as Germany Turns Importer

<https://www.bloomberg.com/news/articles/2023-08-07/france-is-europe-s-top-power-exporter-as-germany-turns-importer#xi4y7vzkg>

8 German minister satisfied with 15-year Qatar LNG deal Reuters November 29,2022

<https://www.reuters.com/business/energy/german-econ-minister-satisfied-with-15-year-lng-deal-with-qatar-2022-11-29/>

9 Coal Keeps Germany's Lights On Wall Street Journal March 9, 2023 <https://www.wsj.com/articles/germany-coal-energy-electricity-renewables-4700b442>

10 Carbon Crossroads: Can Germany Revive Its Stalled Energy Transition? Yale 360 December 13, 2018

<https://e360.yale.edu/features/carbon-crossroads-can-germany-revive-its-stalled-energy-transition>

The issues with the plan are as follows:

1 – Lack of energy to Support the Plan

2 – Expense will far exceed other, better solutions

Shortage of Materials required to complete the plan

Shortage of Necessary Labor

Inadequate financial resources to complete the plan

3 – It will Raise Atmospheric Carbon Levels Far Above What Could Be Achieved

4 – It can't be completed in the planned time frame

5- Major Issues with the Logic and Analysis contained within the CLCPA

1 – Lack of energy to Support the Plan

My analysis and research done independently at Cornell indicate that even if all of the renewables specified in the CLCPA are installed, the state will still be 100,000 GWh short of what is needed and there will be hundreds of hours of rolling blackouts annually.

However, to make matters worse, the CLCPA will not achieve the installations that are in the plan. When I presented to NYSERDA in 2019, they acknowledged that my numbers were correct but said that they would install renewables faster than I was calculating, except I was using their values. Four years later, in 2023, the state is falling behind even that installation rate because of interconnection issues due to trying to overlay distributed renewables on a system that was designed for large centralized power plants, NIMBY issues, high costs, labor shortages, commodity shortages, and the Jones Act, among other issues. These are not temporary problems. Further, when it was proposed in 2011, the CHPE Power Cable was originally designed to be a summer peaker offset. Now, with NY State's building electrification plan, the winter loads will far exceed the summer loads. Studies from the Montreal Economic Institute have indicated that within a decade, Quebec will need all of its energy to support their own electric grid during extremely cold weather leaving the CHPE curtailed when heat pumps in NY City would need the energy the most.¹¹

On Figure 2, below, column A shows NY State's fossil fuel energy load in 2019 expressed in GWh. Column B shows what can be achieved if everything is converted to renewable technologies such as heat pumps or Electric Vehicles. Keep in mind that this does not include generation that is already supplied by Hydropower, nuclear, or pre-existing renewables which amounts to approximately 65,000 GWh. Including that energy, the total load would be reduced from 850,000 GWh to 440,000 GWh of energy usage, so the reduction is a worthwhile pursuit, however NY State's execution is not going to achieve that.

Column D shows the projected 2035 renewable generation installations in 2019 when I originally did the analysis. It is about 70% of the 2022 electric utility fossil fuel load that must be reached by 2030. As previously mentioned, four years after I originally presented to NYSERDA,

renewable installations are falling well behind the 2019 installation rate with solar projects being canceled because of high costs and interconnection issues. Projects that aren't being canceled are being delayed because of labor shortages, financing issues, and interconnection issues. Offshore wind is presently having major delays in the installation rates with inflation, high interest rates, and the Jones Act all impacting the process. A recent article from the Boston Globe, **'Made in America' is sinking offshore wind**, defines the Jones Act issue.¹²

The Jones Act is a little-known provision in the much larger Merchant Marine Act of 1920 and was intended to boost the shipbuilding industry in the wake of World War I. The Jones Act requires that all goods transported between American ports must be carried on ships that are built, owned, and crewed by US citizens. Presently, of the 48 Jack Ships in the world that are used to install offshore wind, 16 are in Europe and 32 are in China/Southeast Asia. The first Jones Act compliant Jack Ship in the United States will not go into service until 2024 and it will be owned by Dominion Energy and after installing 1.1GW of offshore Wind for NY State and 704 MW of Offshore Wind for Connecticut and Rhode Island, it will be obligated to install offshore wind in Virginia prior to being used elsewhere. The keel for the Charybdis was laid in 2020¹³, so these take over three years to build. No one should expect a rapid influx of additional ships and NY State will still be about 8 Gigawatts short of its 9 Gigawatt goal for 2035 and what will be needed to achieve a 70% clean grid by 2030. Further, on page 64 (page 71 of the pdf) of the Initial Report on the New York Power Grid Study¹⁴ prepared by the NYSDPS, NYSERDA, and the Brattle Group, . It states the following in italics,

Should these challenges limit interconnections in New York City below the 5-6 GW amounts studied—either routed through the harbor or brought into New York City through the Long Island Sound—more than 3-4 GW of OSW generation may need to be interconnected to the onshore grid on Long Island, leading to substantially higher curtailment and the need for additional onshore transmission from Long Island to the rest of the State to mitigate the risk of these curtailments..

So even if NY State can build the 9 Gigawatts of Offshore Wind, there is going to be difficulty in interconnected it to the system without curtailing the energy output, let alone interconnecting the 20 Gigawatts of Offshore Wind being demanded by some in the state. It is going to require large amounts of transmission infrastructure being built in some of the most densely populated areas in the United States. If Wainscott is any indicator¹⁵, this is going to be a time consuming and expensive process and it is against this backdrop that NY State is trying to execute its plan.

11 **Rising demand stretching Canadian hydropower thin** Associated Press June 9, 2023

<https://journalrecord.com/2023/06/09/rising-demand-stretching-canadian-hydropower-thin/>

12 **'Made in America' is sinking offshore wind** Boston Globe August 7, 2023

<https://www.bostonglobe.com/2023/08/07/opinion/offshore-wind-challenge-jones-act/>

13 **Charybdis** Dominion Energy <https://www.dominionenergy.com/projects-and-facilities/wind-power-facilities-and-projects/charybdis>

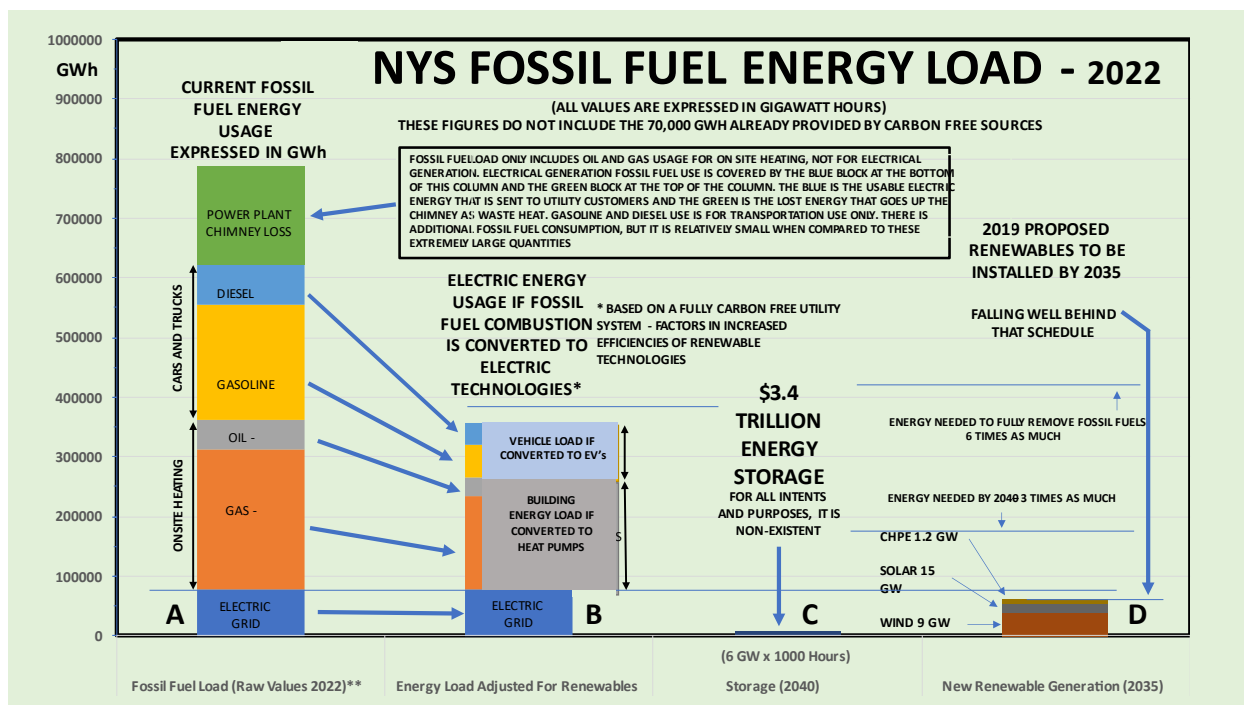
14 **Initial Report on the New York Power Grid Study** NYSDPS, NYSERDA, Brattle Group January 19, 2021

https://dzdeca.a2cdn1.secureserver.net/wp-content/uploads/2022/01/Brattlefiles-20842_initial_report_on_the_new_york_power_grid_study-pp71.pdf

15 **Wainscott Residents Sue to Stop Wind Cable** The Easthampton Star March 17, 2022

<https://www.easthamptonstar.com/villages/2022317/wainscott-residents-sue-to-stop-wind-cable>

Figure 2 NY State Fossil Fuel Energy Load vs. Renewable Installation



2 – Expense will far exceed other, better solutions, Shortage of Materials, Labor and Capital needed to complete the transition

The recently released NYSERDA 6 GW Energy Storage Report¹⁶, on page 94 of the 104 pages documents a need for 1000+ hours of storage or 6000 GWh of storage. Text from page 94 follows in italics.

*Solar output is highest in the summer and lowest in the winter, and wind output is complementary to solar, as shown in Figure 40. **With seasonal storage (1000+ hours)**, the availability of a specific resource during critical weeks – or in between multiple critical weeks in a season matters less; instead, the cheapest form of energy, such as solar in the spring and summer, can be stored and discharged over multiple winter weeks.*

Column C in Figure 2 shows the 6,000 GWh of storage on the same scale of generation and demand. It is almost non-existent relative to the loads and will be totally inadequate to support the system. Far more storage than that will be needed to support a renewable system, however the NYSERDA report also documents a cost of \$560 per KWh. At that price, the 6,000 GWh will cost \$3.4 trillion, or about 16 times NY State's annual budget. Some have been proposing using EV batteries to support the system. Having driven an EV for six years, I am almost never near a charger except when I am charging so there would be no way to feed energy back into the system. Furtehr, how many people will willingly use their car to support the utility when they find out they will rescive 20% less revenue for discharging than they paid for charging and thet the more frequent cycling will shorten the battery life. There are also capacitive batteries now being manufactured.

16 New York's 6 GW Energy Storage Roadmap NYSERDA December 28,2022
<https://www.nyserdera.ny.gov/-/media/Project/Nyserda/Files/Programs/Energy-Storage/ny-6-gw-energy-storage-roadmap.pdf>

While my home was entirely powered during a five day outage caused by Hurricane Sandy, I have been looking into batteries for my factory because in light of recent events, I have very little faith that NY State will be able to provide sufficient energy to maintain the downstate system. The NYISO has stated the the Downstate System will be under stress starting in 2023 and running to at least 2033. As a result of the NYISO's statement, I have been exploring ways to operate the factory off of the grid for extended periods during power outages. This past week, I received a quote on a capacitive battery pack for my factory. Capacitive batteries have a much lower energy density than Lithium-Ion batteries but for a stationary battery, that is not as much of an issue as it would be on an EV. While the newer technology has a 25-40 year lifespan, far longer than the ten years of Lithium Ion batteries, and it is far less volatile in terms of fire risks, it still was priced at \$583 per KWh. Extrapolated to the 6,000 GWh of storage need documented in the NYSERDA Energy Storage report, that's \$3.5 trillion. That is just for energy storage and does not include any cost of renewable generation or costs for transmission or distribution. Even if they can reduce the cost by 70%, it's still \$1 trillion, over 4.25 times NY State's annual budget for technology that will only store energy. And that takes a very optimistic assumption that they could achieve a 70% cost reduction which is highly unlikely within such a short time frame. You could build 66 Vogtle type AP-1000 nuclear plants for that same \$1 trillion, even after the cost overruns, and generate 535 Terawatt Hours of energy annually that could electrify all of NY State and a large portion of the entire Northeast U.S. How can that storage cost be justified?

The Champlain Hudson Power Express, originally proposed in 2011 and approved by the PSC in 2013 has risen in cost from \$2 billion to \$6 billion, a 235% increase in inflation adjusted dollars. The startup date for the CHPE was originally 2015- 2016 but that is now pushed back to 2026, a delay of ten years. The electrification mandates for new buildings are going to add additional burdens on residents and rate payers, especially poorer homeowners. Based upon recent statements from landlords in NY City, the cost of installation and retrofits will be in the range of \$50,000 to \$77,000 per domicile, not including the rewiring of the utility system to supply sufficient power to the buildings.¹⁷

There is a documented shortage of Electricians and other skilled laborers needed to complete the transition.¹⁸ I have experienced this first hand during the course of running my business. Two years ago, I called BOCES and offered to train their students to be machinists while paying them to learn. The BOCES director was extremely excited by the offer. However, none of the students expressed any interest in doing that kind of work and none even requested an interview. When I asked the director why, he said that they were too preoccupied with their thumbs on their phones and didn't want to get their hands dirty. In discussions with contractors, they are having the identical problem and can't find workers, even minimally qualified ones. Decisions made decades ago to not teach the trades in public schools are negatively impacting the workforce.

Beyond that, when I conducted the Reactive Power project with NYSERDA and Con Ed in 2010, three of the four transformers that were being measured were operating at their capacity on a hot summer day. However, winter loads under the CLCPA plan and NY Heats, along with vehicle charging, will place loads 230% of the present summertime loads that I measured by 2053.

17 Too Much Green to Go Green: Complexes Face Crushing Costs The Real Deal June 5, 2023

<https://therealdeal.com/new-york/2023/06/05/too-much-green-to-go-green-complexes-face-crushing-costs/>

18 The Great Electrician Shortage The New Yorker April 24, 2023

<https://www.newyorker.com/news/dept-of-energy/the-great-electrician-shortage>

This is made apparent on page 19 of the 2023 NYISO Gold Book¹⁹ that shows peak winter loads approaching 59 GW by 2040 and 74 GW by 2053, whereas the current peak summer loads are 32 GW.

As a result, conversion to heat pumps and large local loads will require that the entire system will have to be rewired and almost every transformer in the system will have to be replaced at a time when there is an acute transformer shortage²⁰. Utilities are worried about having a sufficient number of transformers needed to repair the system after a storm, let alone having enough to rewire the entire system and that is not the only issue. While 2050 is 30 years away, the rewiring timeframe for the system will be take longer than that to support those loads.

There are approximately 72,000 miles of roads in NY State that will need to be rewired., of the state's 122,000 total miles. 22,000 miles are more major highways and won't need to be rewired as there are few structures on them. Approximately 20% of the state uses electric heat and could actually have the load on those circuits reduced by switching from radiant electric heat to heat pumps. California is currently rewiring areas of the state that are prone to forest fires. Last year, they rewired 72 miles. By 2027, they expect to be able to rewire a peak of 1200 miles per year²¹. 72,000 miles at 1,200 miles per year yields a 60 year rewiring timeframe. How does that fit in with a 7 year or 17 year timeframe or the 2053 date, 30 years away ?

In the interim, the state has passed an EV mandate for 2035 and most major vehicle manufacturers have committed to ceasing internal combustion vehicle production by 2035 or 2040.²² This is going to greatly increase system load by 2035 and even more so by 2050. Based upon gasoline usage in NY State in 2019 and the relative energy efficiency of 80% efficient EV's versus the 22% efficient internal combustion engines, 100% vehicle saturation would result in a 50,000 GWh increase in annual system load. If diesel trucks are added to that, another 30,000 GWh will be added to the system. Even a 70% saturation of EV's fifteen years after the car companies stop making internal combustion engines will result in almost 60,000 additional GWh on the system in 27 years. Where is that generation going to come from and what distribution system is going to carry it throughout the state?

With the state squandering resources elsewhere on technologies that are far more expensive than what is needed, there will be insufficient labor and resources to build up the necessary vehicle infrastructure that will be needed, with or without state EV mandates.

19 **NYISO 2023 Gold Book** <https://www.nyiso.com/documents/20142/2226333/2023-Gold-Book-Public.pdf/c079fc6b-514f-b28d-60e2-256546600214>

20 **Power companies warn of dangerous transformer shortage The Neighbor August 9, 2023**
https://www.mdjonline.com/neighbor_newspapers/news/national/power-companies-warn-of-dangerous-transformer-shortage/video_2debbacd-b04e-598a-8aee-2930dc41426e.html

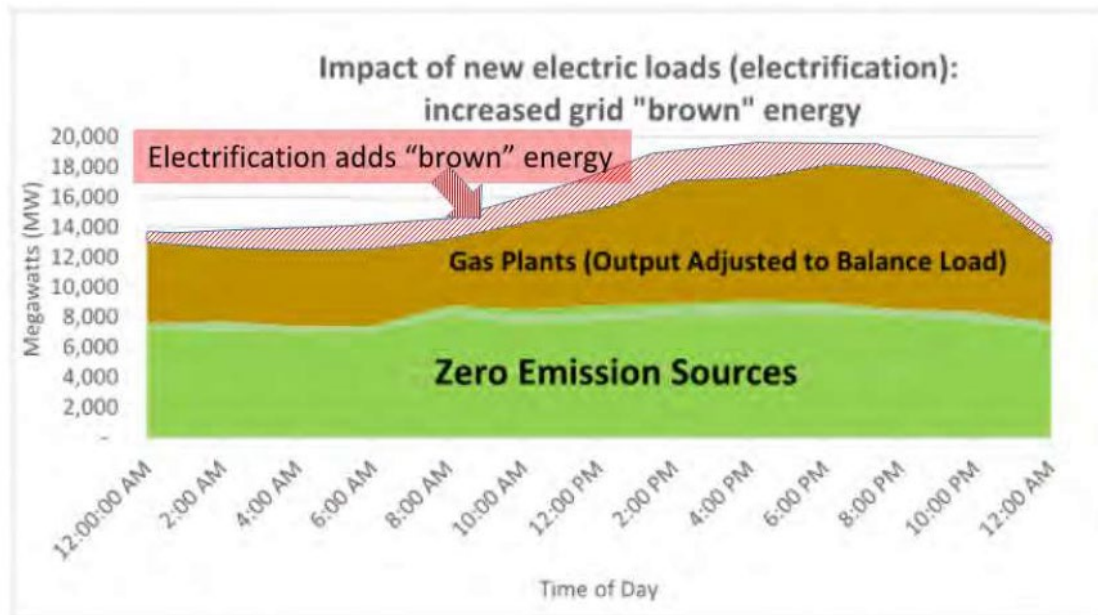
21 **PG&E on track to bury 10,000 miles of underground power lines in high-fire risk areas**
<https://www.kcra.com/article/pge-track-bury-10000-miles-underground-power-lines-high-fire-risk-areas/44645248>

22 **Here are the main electric vehicle goals set by automakers and major markets Protocol October 14, 2022**
<https://www.protocol.com/climate/electric-vehicle-automaker-goals>

3 – It will Raise Atmospheric Carbon Levels Far Above What Can Be Achieved

Additionally, mandates resulting from the CLCPA are going to increase carbon . Because of a renewable energy/carbon free energy shortage that will last several decades, as seen in Figure 2, contrary to the claims of its proponents, all additional loads will be supported by fossil fuel generation, even during the shoulder months as shown below in Figure 3.

Figure 3 Impact of New Loads (Electrification) Increases Fossil Fuel Generation ²³



With NY State's aversion to upgrading its generating plant fleet, heat pumps in most cases will be forced to operate from 35% efficient fossil fuel generation for the foreseeable future. If line losses are figured in, the delivered electrical energy efficiency to the heat pumps will be 28%. Even if an air source heat pump is operating at 300% efficiency on a 40 degree day, the net 84% efficiency is lower than that of an 85% - 95% onsite gas combustion system. On a colder day, where the heat pumps are operating at 200% efficiency, the fossil fuel generating plants will combust 30% more fuel than the onsite heating. On a very cold day, the holistic efficiency of the heat pumps will be 28% and the fossil fuel generating plants will combust 70% more fuel than the onsite combustion. That does not include emissions from refrigerants from all of the additional heat pumps that will be operating. Refrigerants can have a GHG rating 600 – 3000 times greater than CO₂ and studies that have been done have shown that split chilling systems can have a 50% leakage rate. ^{24 a,b}

23 Innovative Thermal Strategies: Electrification's Best Friend Steve Beyers, Koenraad Beckers, Jefferson Tester August 31, 2022 National Renewable Energy Lab <https://www.osti.gov/biblio/1983893>

24a Air Conditioning has Climate Problem. New Technology Could Help Washington Post September 22, 2022 <https://www.washingtonpost.com/climate-environment/2022/09/10/air-conditioner-ac-unit-climate-change/>

24b There's an Invisible Climate Threat Seeping From Grocery Store Freezers.... Washington Post February 15, 2021 <https://www.washingtonpost.com/climate-environment/2021/02/15/these-gases-your-grocery-freezer-are-fueling-climate-change-biden-wants-fix-that/>

The Micron facility in Clay, NY is another example of how the CLCPA is going to raise carbon emissions. A recent analysis has indicated that the facility will need 16 TWh annually by 2043.²⁵ As a comparison, the recently closed 2 GW Indian Point Nuclear plant generated 16.3 TWh in its last full year of operation with a capacity factor of 0.93. While NYPA has said that they will support the Micron facility with 140 MW of Hydropower, in reality that much hydropower is not available in NY State, as clearly seen in Figure 3. All additional loads in NY State are supported by fossil fuel combustion so whoever is presently using that 140 MW will be switched to fossil fuels. As there will not be sufficient generation in NY State to support the Micron plant and the state's Eastern neighbors have their own energy issues, the energy for the Micron facility will be imported from long distances, probably Pennsylvania or Ohio which are primarily fossil fuel generation states, including coal generation. Only a 3% line loss on 16 TWh of energy results in approximately 500 GWh of lost energy annually on the power lines supporting the Micron Facility. To put that into perspective, Cornell University's total energy usage in a year is 200 GWh, so the lost energy in one year transmitting power to the Micron Facility could operate Cornell University for 2-1/2 years. A far better solution would be to put a 2 GW Combined Cycle or Nuclear plant on the Micron site which would eliminate all of that line loss and also make the thermal energy available to the facility to help them reduce costs. Micron would be green in reality instead of papering over the issue with carbon credits and energy allocations that look "green" but aren't. All of this is being done to try and comply with an energy policy that is hamstringing the state in its climate efforts but instead, it will actually result in much higher carbon emissions related to the facility than could otherwise be achieved.

Every state that is trying this plan is having the same issue, whether it is California, Massachusetts, New Jersey, or New York. They are not able to install enough renewable generation to generate enough energy to shut down their fossil fuel plants as planned. As a result, the states are running dirty fossil fuel plants far longer than expected. In June, it was NY State and the NYISO, "*As New York Lags on Climate Goals, Some Dirty Plants May Stay Open Past Deadline*"^{26a} Just this past week it was California, "*Closure of 3 SoCal power plants, including one in Long Beach, likely to be postponed*"^{26b}

Figure 4, below, shows the difference in pollutant emissions between older, existing fossil fuel plants and the newer, combined cycle plants²⁷. NY State clinging to the illusion that it is going to be able to offset the massive load that is about to arrive with renewable generation and batteries is

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- 25 **Micron's Unmatched Environmental Impact at Clay Chip Fabs Doubles in Latest Estimates** Syracuse.com August 1, 2023 <https://www.syracuse.com/business/2023/08/microns-unmatched-environmental-impact-at-clay-chip-fabs-doubles-in-latest-estimates.html>
- 26a **As New York Lags on Climate Goals, Some Dirty Plants May Stay Open Past Deadline** NY Focus June 14, 2023 <https://nysfocus.com/2023/06/14/new-york-air-pollution-climate-peaker-plant>
- 26b **Closure of 3 SoCal power plants, including one in Long Beach, likely to be postponed** Long Beach Post August 10, 2023 <https://lbpost.com/news/aes-alamitos-power-plant-closure-2026/>
- 27 **Survey of National Grid Generation Formerly Owned By LILCO** Raul R. Rodriguez June 25, 2015 <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwixi-6jvtiAAxUsg4kEHdXfAjoQFnoECBYQAQ&url=https%3A%2F%2Fwww3.epa.gov%2Fregion1%2Fnpdes%2Fschillerstation%2Fpdfs%2FAR-323.pdf&usg=AOvVaw2BtKc6qDvPtyipSWQFIyQf&opi=89978449>

going to leave the older, dirtier fossil fuel generation plants running decades longer than they would otherwise have to. In the graph in Figure 4 and the Tables in Figure 5, the Caithness Plant is combined cycle while the other three generating plants are steam plants. All of the steam generating plants are still operating eight years later despite this paragraph in the document from 2015 analyzing them.

As discussed herein, the majority of this former LILCO generation should be retired as soon as their generating capacity can be replaced. In addition to substantial concerns regarding their reliability, these generating units are grossly inefficient by today's standards and are environmentally unfriendly, both in terms of air emissions and water usage. These units need to be replaced by new, modern, highly efficient clean gas-fired combined cycle generation. Replacement of the old, former LILCO generating units with new combined cycle generation would improve significantly Long Island's economy and environment, as well as greatly improve the reliability of Long Island's electric grid.

There was an effort to retool the E.F. Barrett plant in 2017 as a combined cycle plant, however it was declined in favor of future renewable generation. Now, six years later, it is still polluting the air and releasing large amounts of hot cooling water into the local bodies of water. It is also using at least twice as much fuel as the combined cycle plant would. How is this sound energy policy and how does leaving these polluting plants operating promote *Climate Justice* ?

The E.F. Barrett Plant has been operating continuously for the past several weeks supporting the increased cooling load from the recent heat wave. As can be seen in Figure 6, wind speeds are at their lowest off the coast of Long Island during the summer months. As a result, Offshore Wind Farms are going to have difficulty replacing that fossil fuel generation during the cooling season. Europe has a similar problem over the summer with the North Sea Wind Farms during heat waves.

Figure 4 Comparison of Air Emissions From Long Island Power Plants

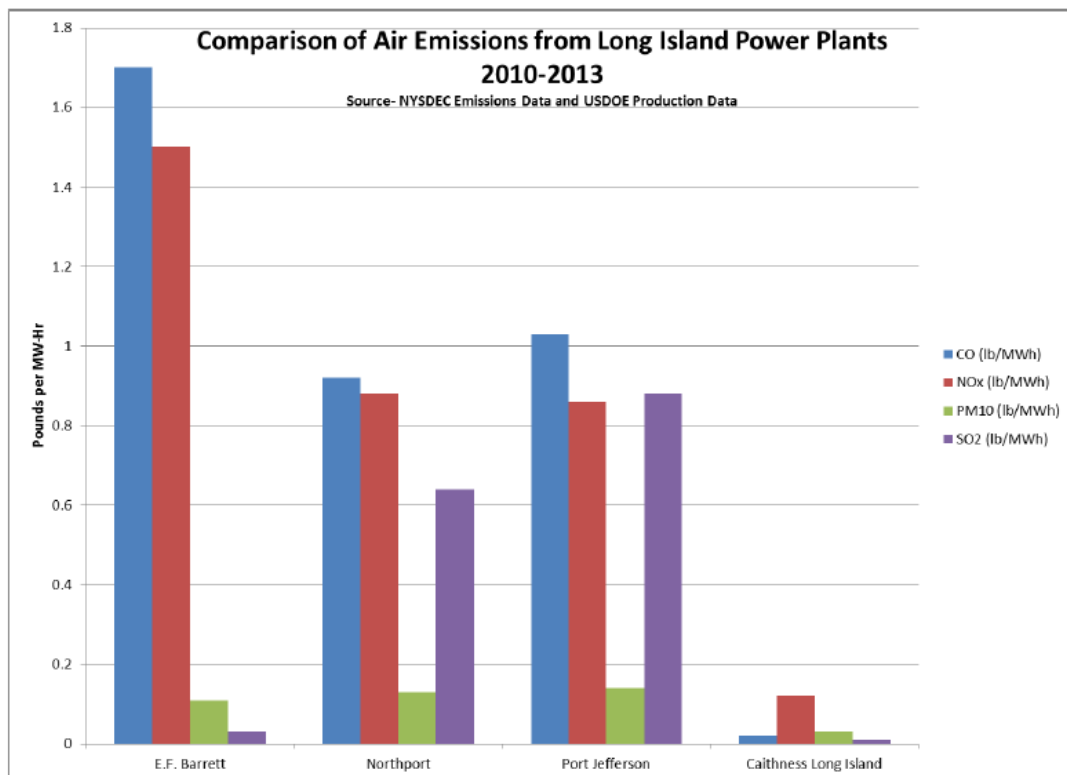


Figure 5 Data for the Chart In Figure 4

Facility	CO (lb/MWh)	NOx (lb/MWh)	PM10 (lb/MWh)	SO2 (lb/MWh)
E.F. Barrett	1.7	1.5	0.11	0.03
Northport	0.92	0.88	0.13	0.64
Port Jefferson	1.03	0.86	0.14	0.88

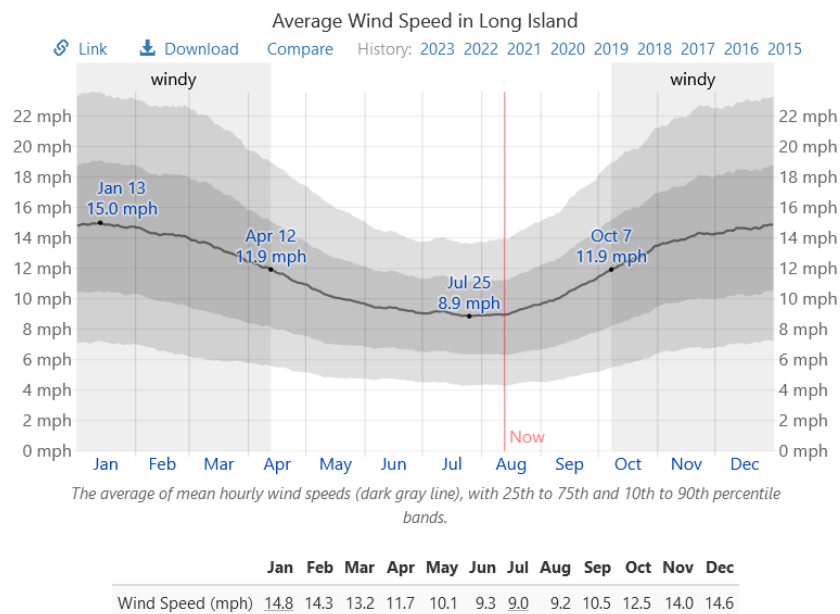
(CO=Carbon Monoxide, NOx=Nitrogen Oxides, PM10=Particulate Matter, SO2=Sulfur Dioxide, , lb/MWh= pounds per megawatt-hour)

In sharp contrast, the approximately 350 MW Caithness Long Island plant, which went into commercial operation in 2009, has much lower emissions as shown in the table below:

Table 4A: Average Air Emissions of Caithness Long Island 2010-2013

Facility	CO (lb/MWh)	NOx (lb/MWh)	PM10 (lb/MWh)	SO2 (lb/MWh)
Caithness Long Island	0.02	0.12	0.03	0.01

Figure 6 Long Island Wind Speeds by Month²⁸



28 Climate and Average Weather Year Round in Long Island New York Weatherspark
<https://weatherspark.com/y/150351/Average-Weather-in-Long-Island-New-York-United-States-Year-Round>

4 – The State’s Energy Plan can’t be completed in the planned time frame

Short of adding sufficient nuclear generation to the system, there is no good answer to any of the 14 questions in the proceeding. 7 years and 17 years is too short of a time period. Based upon what I have been reading, even the SMR's (Small Modular Reactors) might not be able to be installed by 2040 and they are already manufacturing those. They certainly would not be ready by 2030. The Vogtle Units 3 & 4 (1 MW AP-1000 nuclear reactors) will have been under construction for ten years when the second one goes on-line in 2024. If a similar project was started in NY State tomorrow, it might be ready by 2033, assuming no NIMBY resistance or lawsuits which is highly unlikely.

Plus, the entire thought process documented in the case is defective. NY State wants to operate some of the generation 3% of the year? That doesn't work in the real world. Most generating technologies don't lend themselves well to being dormant 97% of the time. Additionally, based upon the math, the 3% is extremely low. It would be far more cost effective to build more nuclear generation and fewer renewables. That would remove the intermittency issue and the storage cost issue that will be detailed later.

As I said during the BCNY Presentation, the rollout of fiber optics shows the fallacy of the entire NY State process in trying to implement the energy transition thinking that new technologies will be available. For those that are interested, a link to the BCNY presentation is at Footnote 2.

The fiber optic rollout was a utility scale project and a much simpler one than what NY State is trying to achieve with its energy transition. There was no NIMBY resistance to running fiber cable on existing poles that already had wires on them. No one was complaining about killing fish, destroying views, ruining farmland, contaminating rivers, and I could go on for paragraphs.

The principle of transmitting information using pulses of light through glass fibers was discovered in 1952. Corning had been making glass for over 120 years and it still took 18 years to perfect the process and make the glass fiber commercially viable by the 1970's.

The phone companies had tremendous financial incentives to switch to glass fiber because of the much lower costs of glass versus copper and the much higher information bandwidth of the glass fibers. That compares to renewable energy installations that have historically raised costs everywhere they have been installed. Germany's utility rates are twice those of France, next door.

In 1977, GTE sent the first live traffic through a pilot fiber optic system in Long Beach, California. To date, the energy technologies being discussed by NY State have no mass manufacturing capability (except for the batteries) and building large scale manufacturing takes years. Even with large scale manufacturing already in place and huge economic advantages, fiber optic networks did not get installed at a large scale until the early 1990's, forty years after it was discovered, and many areas still don't have fiber installed almost 70 years later. Using the best case scenario, it will be five to six decades before a new technology will be able to assist with implementing NY State's energy plan, far longer than the 17 years between now and 2040.

I think about where the state is now regarding the energy transition, compared with where they were four years ago when John Ravitz of the Business Council of Westchester asked me to write the PowerPoint presentation. The state has pushed a lot of paper but there hasn't been nearly as much progress on installing systems or solving technical challenges, including the interconnection of the 9 GW of Atlantic Offshore Wind. To the contrary, every day yields another headline of canceled battery installations, canceled renewable projects because of transmission line costs making the projects non-profitable, and offshore wind being impacted by inflationary pressures, interest rates, and the Jones Act precluding the use of needed ships.

The state may get some boutique technologies installed at a small scale by 2030 but nothing of the magnitude that is needed to support the system. It has been a major issue to even figure out how to get the renewables installed and interconnected in a timely fashion. All of the Offshore Wind Contracts are being renegotiated and will impose an enormous burden on the NY State ratepayers.

The PSC is trying to put a good face on an untenable situation and in the interim, they are about to encounter the previously documented enormous costs chasing a pipe dream while technologies that could reduce carbon quickly and much less expensively have been taken off of the table because they don't meet standards of ideological purity.

Why is the PSC trying to figure out how to do something in seven years or seventeen years that Germany hasn't figured out in 33 years despite hundreds of billions of dollars of capital outlay. Beyond the technical hurdles, how is the state going to pay for it? They want to be 70% renewable by 2030. Not only will the state not be able to install sufficient renewable generation by 2030 to offset 70% of the current system load, the load is going to increase because of the building mandates and EV purchases, and there also are going to be major grid stability issues.

5- Major Issues with the Logic and Analysis contained within the CLCPA

If you do a deep dive into appendix G of the CLCPA, which documents the energy portfolio that will be needed, it is based upon fantasy. It uses a solar Capacity Factor (CF) of 22% in a state that has a solar capacity factor of 13% when the arrays are new.

Figure 7 Energy Chart From Appendix G of the CLCPA

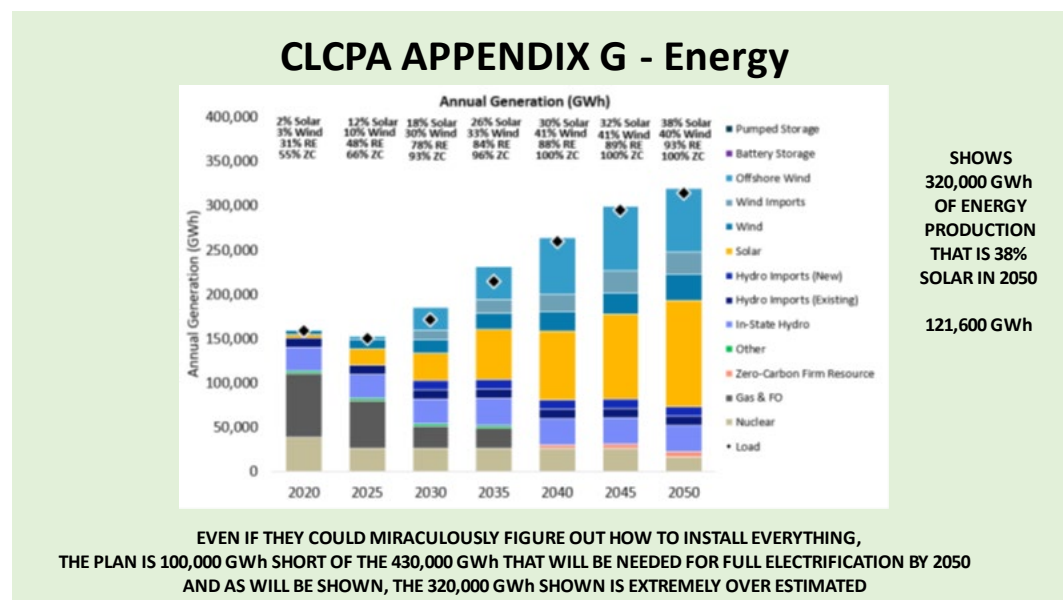
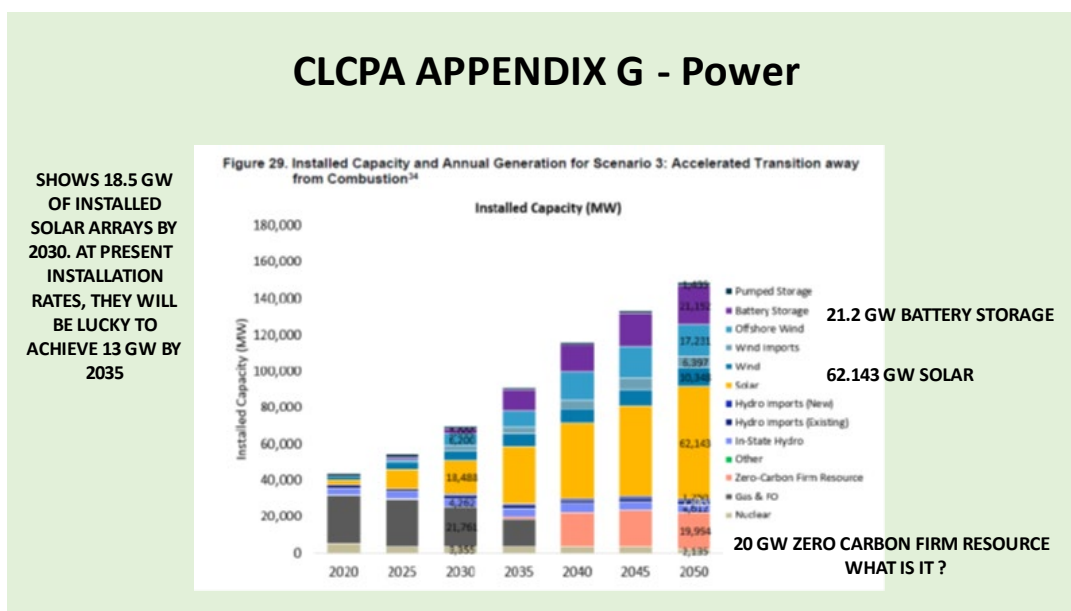


Figure 7, above, is copied from Appendix G of the CLCPA. In 2050, it shows 320,000 GWh of Energy Generation that is 38% Solar equaling 121,600 GWh. Figure 8, below, is also copied from Appendix G of the CLCPA and shows 62.145 GW of installed Solar in 2050. Doing the math,

$$62.143 \text{ GW} \times 365 \text{ DAYS} \times 24 \text{ HOURS} \times 0.2235 \text{ CF} = 121,600 \text{ GWh}$$

It would require a Solar Capacity factor of 0.2235 to reconcile the two charts. However, the Solar Capacity factor in NY State is 13%, not 22.35% resulting in the CLCPA's calculated solar output being overestimated by 72% or 51,000 GWh. Using the correct solar capacity factor results in only 70,768 GWh of solar output in 2050, 51,000 GWh less. Additionally, based upon the earlier presented calculations, the system will need 440,000 GWh of generation, 120,000 GWh more than the 2050 figure in Appendix G and 170,000 GWh if the overstated 51,000 GWh is subtracted. This explains the comment by the Cornell Professor that we can expect hundreds of hours of rolling blackouts every year if the CLCPA is executed as planned.

Figure 8 Power Chart From Appendix G of the CLCPA



Also appearing in appendix G is the following statement:

Reducing GHG in line with Climate Act limits avoids economic impacts of damages caused by climate change equaling approximately \$240 to \$255 billion.

NY States total GHG emissions are 350 million metric tons (MT), 190 MT in state and 160 MT out of state, primarily related to fossil fuel extraction. The first obvious issue with this is that NY State has no control over energy extraction out of state so those will be there whether NY State uses fossil fuels or not. However, a much larger issue is that the worldwide INCREASE of GHG in 2021 and 2022 totaled 2.5 billion metric tons, 40% of that from increased coal combustion, approximately 1 billion metric tons. The 2.5 billion MT is seven times NY State's total. Keep in mind that was just the increase in emissions and not the total global emissions. NY State could eliminate 100% of both its in state and out of state emissions and would gain no economic benefit from damages caused by climate change. The solar capacity factor issue and the economic issue above are two of many issues that appear in the CLCPA document, but they are the simplest to explain. Put simply, had I done the quality of work that appears in the CLCPA when I was

it. While that will greatly reduce atmospheric CO₂, it will greatly increase energy use. That energy has to be accounted for. Where is it going to come from?

Regarding “Green Hydrogen”, hydrogen electrolysis should not qualify. There is going to be an enormous shortage of electrical energy to support the utility system, even if all of the renewables are magically installed. A recent study done in Australia²⁹ found that if all of their current proposals to produce green hydrogen were implemented, the total energy required would exceed all of Australia’s generating capacity. The math will be no different in NY State. A better solution would be to generate hydrogen by investing in a thermo-chemical process using the waste heat of the nuclear plants to power the reaction.

CONCLUSION

While the prior analysis is rather harsh, it is based upon facts, math, and physics, not opinions or wishful thinking. All someone has to do is read the newspaper to understand that there is a major problem with this policy. Throwing more money at the problem is not going to fix it. The concept is flawed. The issues don’t require an understanding of calculus. They just require an open mind and a knowledge of arithmetic. People can’t only say, “Follow the science” when it tells them what they want to hear. Any engineer knows that science, math, and reality can screw up the best plans.

Einstein defined “Insanity” as repeating the same thing over and over again and expecting different results. Why is NY State repeating Germany’s failed renewable experiment that hasn’t worked in 33 years and expecting it to work in seven years or seventeen years. The results in NY State are going to be just as bad as they have been in Germany. However, time is now an issue and significant GHG reductions need to be achieved quickly. The CLCPA will not be any more successful than Germany has been in their efforts.

NY State has to wake up from its ideological stupor or the results will be a non-functional utility system plagued by energy failures and stability issues that will result in deaths, and a mass exodus of people and businesses that will destroy the tax base and with it, the state economy.

29 Australia Goes All In on Green Hydrogen Peter Fairley IEEE Spectrum December 25, 2022
<https://spectrum.ieee.org/green-hydrogen>

