February 18, 2024

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 visit[1]. I was the Keynote Speaker at the 2023 Business Council of NY Renewable Energy Conference[2] 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.

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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 over 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. The requirement in the CLCPA for 25 – 37 Gigawatts of Dispatchable Emission Free Generation (DEFR) by 2040 is problematic at best and is impossible to execute in the stated sixteen year time frame, especially when considering that a single 1.2 GW Power Cable will have taken nearly that long to plan, construct, and get operational (2011 – 2026). I recommend that this DEFR proceeding determine whether there is a dispatchable emissions-free resource that can provide sufficient baseload and, if not, recommend a Plan B.

## INTRODUCTION

Since the original filing was made in August, a lot has changed in the NY State energy landscape. Renewables projects requested $12 billion in infaltionary increases that were declined by the Public Service Commission and that led to the cancellation of numerous projects, including solar, offshore wind, and battery storage. Those resources are now being rebid, likely at a significantly higher price.

The NYISO has indicated that the peaker plants will be operating far longer than planned because of a lack of renewables needed to replace them. CHPE is running into issues with landholders in upstate NY and may have to make eminent domain filings for certain parcels.[6] It will not cripple the project but may delay it.

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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 **CHPE power line project faces eminent domain court battles** https://www.timesunion.com/business/article/chpe-project-faces-eminent-domain-court-battles-18639495.php

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

As mentioned in the earlier filing, the NYSERDA 6 GW Energy Storage Report[7], 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 1, below, 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. Further, 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 that the more frequent cycling will shorten the battery life. There are also capacitive batteries now being manufactured that will have a longer life span and a greatly reduced fire risk, however that are not ready for mass distribution. They also have a much lower energy density which makes them larger. That will work for utility scale storage but not EV's. However, the price is roughly comparable to Lithium-Ion batteries so they will still be prohibitively expensive if used to support the utility system..

The Renewable Generation shown in column D was based upon 2019 projections that are no longer applicable as several Offshore Wind contracts have been canceled and several land based solar and wind projects have been canceled and others are meeting local resistance.

## ADDITIONAL ISSUES

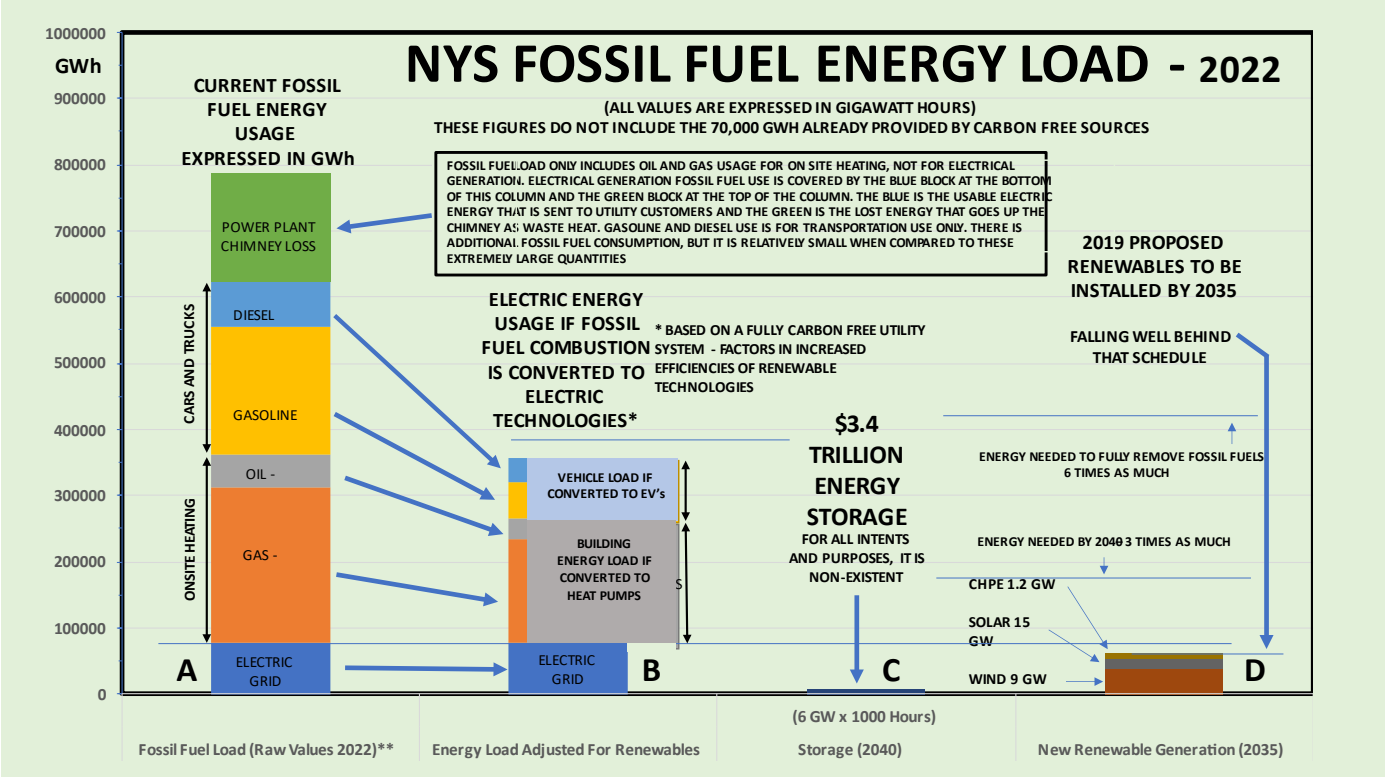
We are reaching a crossroads in New York State whereby the cost of the renewable generation and other mandates included in the CLCPA may make it impossible to live or work here.

The New Jersey nuclear plants announced this past week that they no longer need state subsidies because of the Inflation Reduction Act (IRA) subsidies that are now available to them. This raises the question, what does nuclear generation cost relative to the renewables that NY State is having enormous difficulty getting installed? Is there a viable carbon free Plan B?

The link below is from a paper from September, 2022, published by the Cato Institute, regarding the costs of different generating options and the effect of the IRA on the cost of nuclear generation.

https://www.cato.org/blog/subsidies-nuclear-power-inflation-reduction-act

**Figure 1 NY State Fossil Fuel Energy Load vs. Renewable Installation**




If you look at Table 2 below, from the paper, in the lower left hand column (Baseline), you will see that the **UNSUBSIDIZED HIGH CONSTRUCTION** cost for nuclear generation is 14.4 cents per KWh. The expected bids for Offshore wind are expected to come in substantially higher than that and the earlier bids were nearly that large. The recently canceled wind bids in NY State varied from $107 per MWh to $118 per MWh[8], despite Wind generation in the United States being heavily subsidized. Table 1A, on page 6, shows the recently canceled wind bids and their costs. The requested increase had an average cost of $167/MWh. These are going to be rebid at a higher price and many will not be available for over 6 years, at a minimum, if they are ever built. Also note that the total capacity listed is 5 GW short of NY State's ultimate goals. I referred to the High-Cost nuclear construction scenario because that is approximately what the recently built Vogtle reactors costs correlate with. This is a worst-case comparison of nuclear generation compared to the renewable generation.

A recent blog post presented by Parker Gallant Energy Perspectives and highlighted in a recent post by Roger Caiazza of The Pragmatic Environmentalist, analyzed the costs of various generation types in

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8 NY regulators reject efforts to raise offshore wind contract prices. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/ny-regulators-reject-efforts-to-raise-offshore-wind-contract-prices-77845165

9 USDOE - Advancing the Growth of the U.S. Wind Industry: Federal Incentives, Funding, and Partnership Opportunities https://r.search.yahoo.com/_ylt=AwrherAvp9Jl1o4StA4PxQt.;_ylu=Y29sbwNiZjEEcG9zAzQEdnRpZAMEc2VjA3Ny/RV=2/RE=1708332976/RO=10/RU=https%3a%2f%2fwww.energy.gov%2fsites%2fdefault%2ffiles%2f2021-04%2fus-wind-industry-federal-incentives-funding-partnership-opportunities-fact-sheet.pdf/RK=2/RS=iteORXns4dcY4vilyjyfT1DGglc-

10 Dispelling the Cult Claim—"Wind and Solar are Lower Cost Generation than Natural Gas" **https://parkergallantenergyperspectivesblog.wordpress.com/2024/02/06/dispelling-the-cult-claim-wind-and-solar-are-lower-cost-generation-than-natural-gas/**

Ontario, Canada.[10] The results are shown in Table 1, below. In Ontario, Nuclear Generation is approximately 30% less expensive than wind and 40% less than solar despite the claims that wind and solar are less expensive. Combined cycle gas generation is slightly less than nuclear in Canada.

That shows that unsubsidized nuclear is less expensive than OSW and doesn't kill any birds or people, despite the claims of the fear mongers. OSW and solar could cost NY State ratepayers 30% more than nuclear generation, **not including the costs of the required batteries and the more extensive transmission lines needed for those technologies** due to their low capacity factor. If batteries are added in to support the intermittent renewables, the costs will be higher still. As shown in the earlier analysis of battery costs based upon the NYSERDA Energy Storage Report, the required batteries will cost more than the nuclear generation, independent of the costs of the renewable generation.

Again, I have developed an understanding of the shortcomings of renewables after over 20 years of living with them. In my experience, I believe that they are a great way to reduce the reliance on fossil fuels but expectations that they can completely replace fossil fuels are misplaced. A primary concern is cost and maintaining public support for the process. Public support will evaporate quickly with the current projected costs of the wind, solar, and batteries.

# TABLE 1 - 2023 Cost by Generation Source in Ontario, Canada

| Generation | GWh | Cost Millions | Cost per kWh |
|---|---|---|---|
| Nuclear | 78,765 GWh | $8,070. | 10.2 cents |
| Hydro | 37,889 GWh | $2,396. | 6.3 cents |
| Natural Gas | 20,630 GWh | $2,041. | 9.9 cents |
| Wind | 13,810 GWh | $1,914. | 13.8 cents |
| Solar | 3,784 GWh | $1,671. | 44.1 cents |
| Biofuel | 1,103 GWh | $ 213. | 19.3 cents |

Regarding "Cap and Invest", Table 3 below is also from the Cato Paper. It shows the carbon taxes required to achieve parity between nuclear and fossil fuel generation. With the High Cost nuclear, the carbon tax required to bring nuclear into parity with combined cycle gas generation is $196 per Metric Ton of CO2. According the EIA, combined cycle gas generation will yield 2.25 MWh per metric ton of $CO_2$ (976 pounds per MWh).[11] With wind being more expensive than nuclear by between 20% and 30%, it will cost between $235 - $275 per metric ton to bring wind and Combined cycle gas generation into parity. Doing the math, $235 / 2.25 to make wind cost effective when compared to natural gas, even with the current subsidies, the taxes would be over $100/MWh. It would double the cost of the energy in the entire downstate region. If electric heat is forced upon the downstate residents, a current doubling of operating costs will morph to a tripling or quadrupling of heating bills for downstate residents.

11 **Electric power sector $CO_2$ emissions drop as generation mix shifts from coal to natural gas**

https://www.eia.gov/todayinenergy/detail.php?id=48296

# TABLE 1A - BIDS FOR OFFSHORE WIND IN NY STATE [12]

**Requested increased price guarantees in New York for Offshore Wind**

| | Original $/MWh | Requested Increase $/MWh | % Increase | $/Year Added to Electric Bills | MW Capacity |
|---|---|---|---|---|---|
| Empire Wind 1 | $118.38 | $159.64 | 35% | $124 Million | 816 |
| Empire Wind 2 | $107.50 | $177.84 | 66% | $326 Million | 1,260 |
| Beacon Wind | $118.00 | $190.82 | 62% | $330 Million | 1,230 |
| Sunrise Wind | $110.37 | $139.99 | 27% | $102 Million | 934 |
| | Average | $167.07 | Total | $882 Million | 4,240 |

The new projects were approved by NYSERDA with an average nominal cost/ MWh of $145.07 which compares to $167.07 in the table above. The table prices were requested in December 2023 while the new projects bids were likely made in early 2023 and may not reflect the true cost needed to obtain financing today. The projects in the table most likely would have started construction in 2025 while the new projects are slated to start in 2030. It is highly likely that by 2030 the projects could not be built at these prices and the developers will come back for higher prices.

12 https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Offshore-Wind-Solicitations/2022-Solicitation#:~:text=The%20weighted%20average%20strike%20price%20of%20the%20awarded,average%20strike%20price%20of%20%24145.07%20per%20megawatt%20hour.

Information Courtesy of David Stevenson

Table 2

**Nuclear levelized costs (¢/kWh) with Inflation Reduction Act expanded clean energy production and investment tax credits**

| | | Base subsidy | | | | Energy community subsidy | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PTC (2.5 ¢/kWh) | | ITC (30 percent) | | PTC (2.75 ¢/kWh) | | ITC (40 percent) | |
| | Base-line | Sub-sidy | LCOE w/ subsidy | Sub-sidy | LCOE w/ subsidy | Sub-sidy | LCOE w/ subsidy | Sub-sidy | LCOE w/ subsidy |
| Low const. cost | 7.9 | 2.5 | 5.4 | 1.1 | 6.8 | 2.8 | 5.1 | 1.4 | 6.4 |
| Middle const. cost | 11.4 | 2.5 | 8.9 | 1.8 | 9.6 | 2.8 | 8.7 | 2.4 | 9.0 |
| High const. cost | 14.4 | 2.5 | 11.9 | 2.4 | 12.0 | 2.8 | 11.7 | 3.2 | 11.2 |

Source: Authors' calculations; baseline costs and calculations described in David Kemp and Peter Van Doren, "Nuclear Power in the Context of Climate Change," Cato Working Paper no. 68, July 26, 2022.

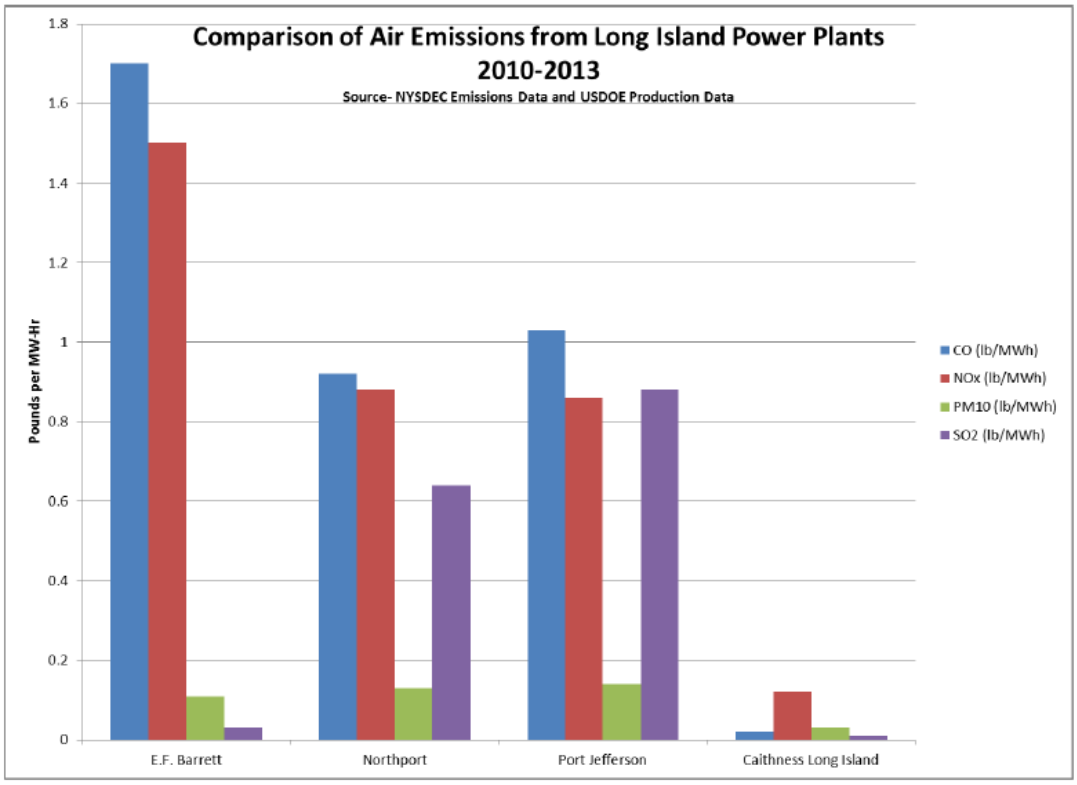
Table 3

**PTC and ITC effective carbon taxes ($/metric ton of $CO_2$) and additional carbon taxes needed for cost parity between nuclear and fossil fuel generators**

| | | Base subsidy | | | | Energy community subsidy | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | PTC (2.5 ¢/kWh) | | ITC (30 percent) | | PTC (2.75 ¢/kWh) | | ITC (40 percent) | |
| | Base-line | Effect. tax | Add'l. tax | Effect. tax | Add'l. tax | Effect. tax | Add'l. tax | Effect. tax | Add'l. tax |
| Low nuclear | | | | | | | | | |
| Coal | 0 | 20 | -20 | 9 | -9 | 22 | -22 | 11 | -12 |
| Low NGCC | 89 | 55 | 34 | 24 | 66 | 60 | 29 | 31 | 58 |
| Middle NGCC | 79 | 55 | 25 | 24 | 56 | 60 | 19 | 31 | 48 |
| High NGCC | 51 | 55 | -3 | 24 | 28 | 60 | -9 | 31 | 20 |
| | | | | | | | | | |
| Middle nuclear | | | | | | | | | |
| Coal | 28 | 20 | 8 | 14 | 14 | 22 | 6 | 19 | 9 |
| Low NGCC | 167 | 55 | 112 | 39 | 128 | 60 | 107 | 53 | 115 |
| Middle NGCC | 157 | 55 | 103 | 39 | 118 | 60 | 97 | 53 | 105 |
| High NGCC | 129 | 55 | 75 | 39 | 90 | 60 | 69 | 53 | 77 |
| | | | | | | | | | |
| High nuclear | | | | | | | | | |
| Coal | 52 | 20 | 32 | 19 | 33 | 22 | 30 | 26 | 27 |
| Low NGCC | 234 | 55 | 179 | 53 | 181 | 60 | 173 | 71 | 163 |
| Middle NGCC | 224 | 55 | 169 | 53 | 171 | 60 | 163 | 71 | 153 |
| High NGCC | 196 | 55 | 141 | 53 | 143 | 60 | 136 | 71 | 125 |

Note: Carbon taxes are approximate levels in 2020 if real carbon tax grows at 2 percent annual rate.
Source: Authors' calculations; baseline costs and calculations described in David Kemp and Peter Van Doren, "Nuclear Power in the Context of Climate Change," Cato Working Paper no. 68, July 26, 2022.

## Figure 2 Comparison of Emissions from Long Island Power Plants




Keep in mind that natural gas prices have dropped since 2022 so the actual tax would have to be higher in 2024.

These are the kinds of taxes that Cap and Invest will have to assess to make the plan work and they are ludicrous. Even without Cap and Invest, these are the additional costs that are going to be incurred by NY State ratepayers if the CLCPA keeps progressing. What makes this situation even worse is that the state can't effectively install generation that won't be taxed, building owners don't have space or can't afford upgrades to avoid penalties from the mandates, and the proponents of this plan can't define who is going to pay the tax, acting as if the ratepayers and the taxpayers are mutually exclusive. A Venn Diagram of NY State ratepayers and NY State taxpayers will have an enormous amount of overlap.

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**A VIABLE LOW CARBON / CARBON FREE SOLUTION THAT WILL NOT BANKRUPT NY STATE RESIDENTS AND BUSINESSES**

As nuclear generation takes years to get approved and sited, new combined cycle natural gas generation that feeds the CO2 emissions into greenhouses will provide low carbon energy at a low cost for NY State ratepayers in the near term. It is the least expensive generation to build and at present, it is also the least expensive generation to operate. It can provide baseload generation so it will eliminate the cost of battery storage. As it operates with a capacity factor two to seven times higher than

renewables, the cost per MWh of transmission will be that much less expensive. As an initial step, siting a large combined cycle generating plant in Central New York, near the Western end of CleanPath, would provide easy access to natural gas from Pennsylvania while also allowing CleanPath to be fully utilized, reducing its costs to taxpayers. Additionally, there is available land in Central NY that is already used for farming that would be ideal to support large greenhouses. Routes 81, 86, and 88 provide easy access for shipping the agricultural products to population centers in NY State within four hours.

As can be seen in the graph above, in Figure 2, that shows a comparison of the emissions of Long Island Generating plants, the newer Caithness plant, shown on the right, operates far more cleanly than the E F Barret Plant shown on the left. E F Barret, which is a conventional steam generating plant that is operating well past its useful lifetime because of flawed NY State policy, was supposed to be replaced by a combined cycle plant six years ago. However, the expectation that Offshore Wind would replace it has fallen flat and Long Island residents are suffering with higher emissions and twice the energy cost of what could have been built six years ago. The Offshore Wind, if it is ever built, will reduce the emissions but based upon the current cost structure, it will not improve upon the operating costs of the old plant. This issue was addressed at length in the earlier filing.

By feeding the $CO_2$ output of the combined cycle plants into large greenhouses, it can be used to increase crop yield by providing a twelve month growing season for NY State farms and increase food security in the state while using less land and water than existing farms. It will also use far less land than renewable generation. Additionally, it will harden farming in NY State to the effects of climate change.

Unlike the 25–37 Gigawatts of as yet unknown and non-existent Dispatchable Carbon Free Generation fantasized about in the CLCPA, this technology exists now[13] and the greenhouses will cost far less than the batteries while also generating revenue and extremely high crop yields. The greenhouses will also last well beyond the 10 year lifespan of the batteries so they are a far more cost effective capital investment to make.

Additionally, operating EV's from combined cycle gas generation is far more energy efficient than using internal combustion engines and will greatly reduce harmful pollutant emissions in the population centers.

## CONCLUSION

Interim Combined Cycle Natural Gas Generation phasing to nuclear over time is a far more cost effective and secure way to power the state than what the CLCPA is mandating. Recovering the Combined Cycle emissions in greenhouses will mitigate the negative effect of the carbon emissions. That will also provide energy security that renewables can't, while simultaneously providing food security as climate change makes food production more challenging.

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13 This Utah greenhouse can grow 750 acres worth of tomatoes using a fraction of the land and water

https://www.sltrib.com/news/2021/10/18/this-utah-greenhouse-can/