THE NEW YORK POWER SURGE PLAN

A Blueprint to Close Reliability Gaps and Create Generational Jobs

By The Clean Energy Jobs Coalition

Fall 2024

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The New York Power Surge Plan is a comprehensive policy report responding to requests for comments on NYSERDA's *"Draft Blueprint for Consideration of Advanced Nuclear Technologies."* It presents zero-emission solutions aimed at closing New York's reliability gaps, creating jobs, and eliminating carbon pollution. The report comprises of the following sections:

Executive Summary: The New York Power Surge Plan

Coinciding with the fifth anniversary of the Climate Leadership and Community Protection Act (NYS Climate Act), state regulators acknowledged that New York cannot meet its 2030 climate targets if it continues to rely exclusively on intermittent energy sources such as wind and solar.

The New York Power Surge Plan remains optimistic, concluding that, ***"New York can still achieve its 2030 zero-emission vision by pursuing an 'All of the Above Energy Strategy' to secure 8,000 megawatts (MW) of reliable, decarbonized in-state power."*** This strategy includes:

- **4,000 MW of New Nuclear**
- **4,000 MW of Thermal Energy Networks (with a doubling effect)**
- **Bonus Benefit: 4,000 MW of Redirected Capacity**

These components would deliver a total of up to **8,000 MW of reliable, clean energy with virtually zero emissions and the bonus benefit of creating a more efficient use of installed capacity** by better equalizing summer and winter loads.

Key Findings & Highlights

Key findings from the report address energy capacity, environmental, economic, and labor challenges, offering clear pathways for overcoming these obstacles. Highlights include:

Energy Capacity and Policy Impact

- New York's generating capacity has declined by 14% since 2004, with a loss of 5,207 MW of in-state supply since 2019, mostly from zero-emission sources.
- NYISO identified 1,846 MW of new power needed to meet demand for "New large, economic development projects" by 2025, excluding demand from electric vehicles.
- NYISO projects a 6,000 MW shortfall by winter 2032-2033, underlining the urgency for new or modified generation.

Environmental and Emissions Concerns

- The closure of Indian Point Energy Center increased CO2 emissions by 12-15 million metric tons annually, almost a third of New York's electric sector.
- Downstate New York's reliance on fossil fuels increased from 68% in 2019 to 93% in 2022.

Economic and Consumer Impact

- Electricity prices in New York have surged, increasing by 32-39% across industrial, commercial, and residential sectors between 2019 and 2024.
- The *Power Surge Plan* proposes price relief through increased access to zero-emission power, driving down electricity costs and improving reliability.

Job Creation and Skilled Labor Opportunities

- Denied green upgrades at power plants displaced over 1,400 skilled tradespeople, highlighting the need for clean energy policies that align with job creation.
- 56% of Gen Z believe jobs in the skilled trades offers AI-proof careers that provide six-figure salaries without the burden of college debt.
- With over 500,000 construction job vacancies projected, investments in clean energy infrastructure are critical to addressing New York's labor shortage and meeting energy goals.

Clean Energy Solutions

- The *Power Surge Plan* strategy includes 4,000 MW of new zero-emission power generation from nuclear sources, while maintaining access to existing nuclear energy.
- The *Power Saver Plan* unlocks 4,000 MW of clean energy in two parts. It redirects 4,000 MW capacity by leveraging thermal's doubling effect, which reduces grid demand for heating and cooling while enhancing reliability.

The New York Power Surge Plan deploys an ***"All of the Above Energy Strategy"*** to provide a clear, actionable path to secure New York's energy future, meet New York Climate Act goals in advance of the 2030 deadline, and create sustainable, high-paying jobs for the current and next generation.

# # #

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About the Clean Energy Jobs Coalition

The Clean Energy Jobs Coalition represents over 230,000 union energy workers, management, and affiliate environmental and engineering groups throughout New York, advocating for advocating for a smooth transition to a clean energy future. www.cleanenergyjobsny.com

New York's Energy Deficit: A Growing Crisis

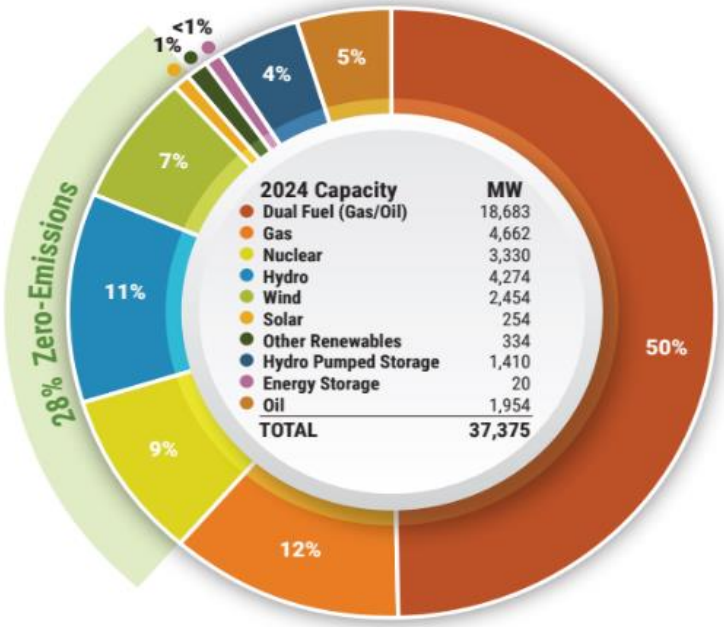
In 2004, New York had a generating capacity of 42,647 megawatts (MW).[i]

In 2024, New York's generating capacity shrank 14 percent to 37,375 MW[ii].

Numbers do not lie. Over the past two decades, New York's energy capacity has severely contracted.

Since 2019, New York State energy policies subtracted 5,207 MWs of in-state electricity supply, most of which were from zero emissions sources, from the energy equation.[iii]

NYCA Summer Installed Capacity 2024



Source: "Power Trends 2024," NYISO, page 50, Date: June 6, 2024

As a result, New Yorkers have paid a costly price in terms of money, power, pollution, and jobs neglect.

Today, only 28 percent of New York's power generation capacity is zero-emissions.[iv] Specific to downstate New York, power generation zones F-K, saw the most pronounced change in access to zero emissions energy from 15 percent in 2019 down to 2 percent in 2024 following the premature shutdown of Indian Point Energy Center. [v, vi]

With the Indian Point closure, transmission-congested Downstate New York's grid electric generation went from 68 percent fossil powered in 2019 to 93 percent in 2022. [vii]

The Climate Leadership and Community Protection Act's (NYS Climate Act) goals include carbon-free electricity by 2040. However, the closure of Indian Point caused annual greenhouse gas emissions to increase by 12-15 million CO_2-equivalent metric tons, nearly a third of New York's electric sector.[viii]

"Two massive fossil combustion plants, Cricket Valley Energy Center and CPV Valley Energy Center, came online to take the place of Indian Point's steady, 2,080 MW power, as forewarned by NYISO. To this day, CPV's plant operates without proper emissions permits, as news media reported in its special coverage of the aftermath related to the premature shuttering Indian Point.[ix x, xi, xii, xiii]

Meanwhile, between January 2019 and January 2024, electricity prices have increased dramatically, up 32 percent for industrial , 39 percent for commercial, and 35 percent for residential ratepayers– not factoring in inflation. [xiv, xv, xvi]

The New York Clean Energy Industry Report 2022 found that, "Traditional transmission, distribution, and storage saw the largest absolute employment decline, losing 1,208 jobs and decreasing by 2 percent. Employment in the traditional electric power generation sector decreased by 2 percent or 248 jobs between 2020 and 2021."

The truth is, today, New York is becoming more and more power *less*.

The agenda for the Clean Energy Jobs Coalition is to make New York power *full*, again.

Reliability Concerns Forecast

New York's ambitious goal of reducing energy consumption by 185 trillion Btus outlined in the Climate Leadership and Community Protection Act ("CLCPA" or "NYS Climate Act") demands bold and decisive action. [xvii]

The Clean Energy Jobs Coalition firmly believes that achieving this goal necessitates the construction of the cleanest energy system known to mankind. To electrify everything from cars to cooking and heating systems with 100 percent reliable zero-emissions energy sources– as has been mandated by legislative leaders - New York must urgently address its own in-state energy infrastructure challenges.

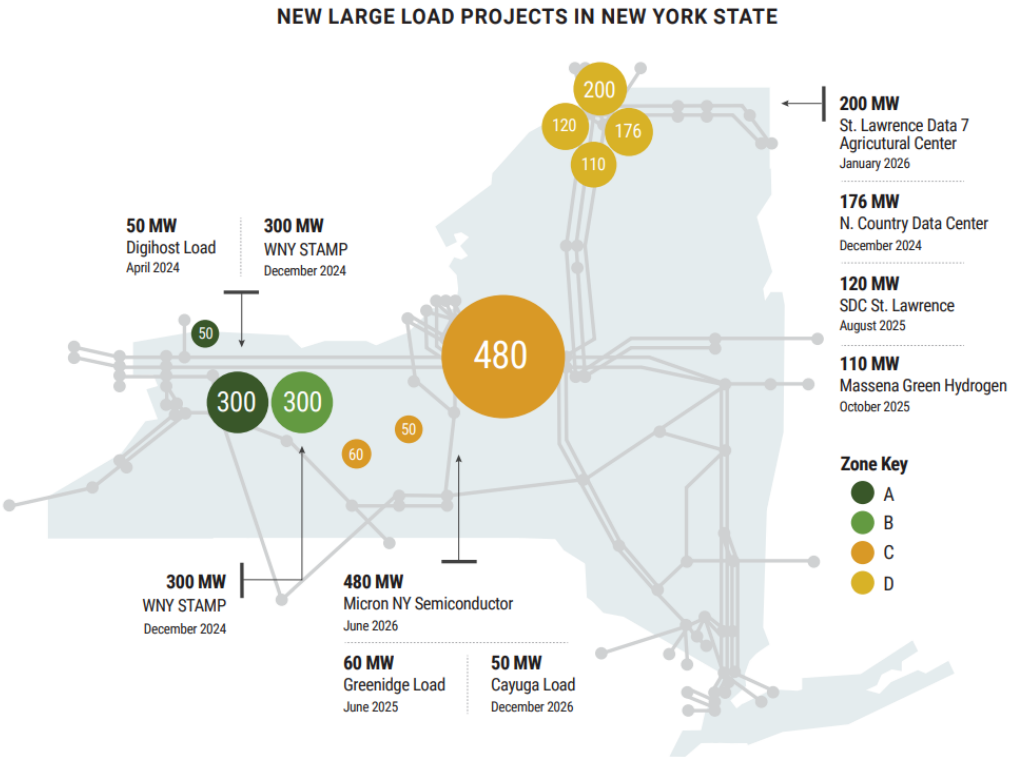
The New York Independent System Operator (NYISO) estimates a need for 111-124 gigawatts (GW) of new or modified generation by 2040, a massive tripling the current thermal generating capacity of 37.4 GW. At length, in its 2023-2032 Reliability Needs Assessment Report, NYISO observed:

- ***The pace of generation retirements has exceeded the pace of resource additions to date.*** *Should this trend continue, reliability needs will be identified both locationally and statewide.* [xviii]
- ***At least 95 GW of this capacity will consist of new generation projects and/or modifications to existing plants.*** *Even with these additions, New York still may not be able to fully meet CLCPA compliance criteria and maintain the reliable electricity supply on which New York consumers rely. The sheer scale of resources needed to satisfy system reliability and policy requirements within the next 20 years is unprecedented.* [xix]
- ***New York's current reliance on neighboring systems is expected to continue through the next ten years.*** *Without emergency assistance from neighboring regions, New York would not have adequate resources throughout the next ten years.* [xx]
- ***The New York statewide grid is projected to become a winter-peaking system in the mid-2030s, primarily driven by electrification of space heating and transportation.*** *[…] While deficiencies would arise as early as winter 2027-2028,* ***"This deficiency would grow to a 6,000 MW shortfall by winter 2032-2033."*** [xxi]

The grid operator raised additional concern on the growing number of New York generators reaching an age at which nationally, a vast majority of similar capacity has been deactivated.

More disconcerting is PJM Interconnection, the Midwest grid operator that exports power to NYISO, confirmed that it is facing serious electric supply shortages, leading to an 800% surge in prices as recently as July 2024. [xxii, xxiii]

Meanwhile, new economic development projects designed to power high-tech manufacturing and new technologies (like artificial intelligence) are currently in planning throughout the Empire State.



Source: "Power Trends 2024," NYISO, page 10, Date: June 6, 2024

Specifically, NYISO identified 1,846 MW of new power needed to meet demand for "New large, economic development projects as summarized in the above image and table below.[xxiv]

Table 1: Unmet Power Needs of Planned Energy Intensive Development Projects in New York

Project Name	Start Date	Megawatts (MW)
Digihost Load	Apr-24	50
WNY Stamp 1	Dec-24	300
WNY Stamp 2	Dec-24	300
Micron NY Semiconductor	Jun-26	480
Greenidge Load	Jun-25	60
Cayuga Load	Dec-26	50
St. Lawrence Data Agricultural Center	Jan-26	200
N. Country Data Center	Dec-24	176
SDC St. Lawrence	Aug-25	120
Massena Green Hydrogen	Oct-25	110
Est. Total New Power Needed		**1,846**

Source: *"2024 Power Trends Fact Sheet," NYISO, Date: June 6, 2024, Link: https://www.nyiso.com/documents/20142/23494579/2024-Power-Trends-Fact-Sheet.pdf/7cb06506-6565-158c-e906-6d95f604d30c?t=1717677829632*

Growing Energy Demand and Changing Energy Patterns

Data demonstrates energy demand continues to grow without abandon.

The US Energy Information Administration's (EIA) latest Short-Term Energy Outlook (STEO) predicts that U.S. power consumption will rise by 2.5 percent in 2024 alone.[xxv]

A Wall Street firm pegged electricity demand to grow as much as 20 percent by 2030.[xxvi]

This coincides with NYISO's outlook for New York, estimating demand to grow from 32,280 MW summer demand with a 24,530 MW winter demand in 2024 to a projected 36,930 MW summer demand and 44,800 MW winter demand by 2040 – effectively reversing summer and winter energy demand profiles.[xxvii]

On top of its estimated 350 MW energy consumption, the Metropolitan Transportation Authority (MTA) disclosed it will need access to "300 to 430 MW of new power supply at depots" to charge 5,800 electric buses soon.[xxviii] On a statewide basis, New York relies on about 45,000 school buses to transport 2 million students every day – each of which is expected to run on electricity (or an alternative zero emission fuel source) by 2035.[xxix]

Current forecasts find that Artificial Intelligence (AI) data centers are expected to add about 323 terawatts (or 36,870 MW) of electricity demand in the U.S. by 2030, which by comparison, is 7 times the electricity consumption of New York City's average 48 TW (or 5,480 MW). [xxx] Nationwide, Goldman Sach's estimates data centers will drive a 160 percent increase in power demand to represent 8 percent of total US electricity consumption over the same time period.[xxxi]

According to NYISO, these energy intensive projects include microchip manufacturing and high-tech data centers that *"are expected to consume massive amounts of energy, underscoring the need for additional large-scale electric generation and robust investments in transmission and distribution infrastructure."*[xxxii]

Presently, New York faces a decreasing power reserve margin, down to 20 percent, with warnings of an imminent shortage of 446 MW to 600 MW.[xxxiii]

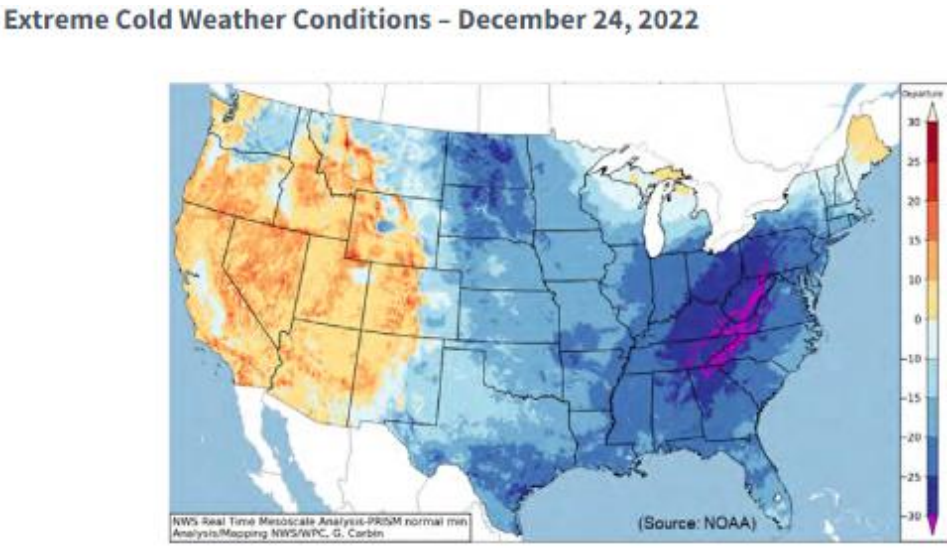
Collectively, an estimated 2,722 MW of new power is needed to meet projected demands for new statewide economic development projects (1,846 MW), the MTA's electric buses (430 MW), and plugging the hole in the foreign transmission electricity shortage (446 MW).

The grid operator warned that, *"With increasing winter peak loads and consideration of limitations on gas availability, there may be insufficient generation to serve forecasted demand for expected weather while maintaining required operating reserves."*[xxxiv]

In laymen terms, these collective shortages pose serious threats that could lead to potential cascading power outages if corrective measures are not implemented.

The Reality of Energy Vulnerabilities

Recent events, such as the winter storm Elliott, exposed critical flaws in the resilience of New York's energy systems. Power plant failures, exacerbated by cold weather, jeopardized the stability of the grid, posing significant risks to the state. The dire vulnerabilities highlighted by the Federal Energy Regulatory Commission (FERC) and the North American Electric Reliability Corporation "Final Report on Lessons from Winter Storm Elliott" demand immediate attention.[xxxv]



These concerns were echoed by NYISO in a similar report, warning that should New York face a heat wave of 98 degrees for three or more days, reliability margins are expected to be short 3,093 MW.[xxxvi] The tenuous situation would prompt the grid operator to activate emergency procedures to access 3,275 MW to prevent widespread power outages.[xxxvii]

Extreme Weather Drove Energy Demand to New Heights Over Past Decade

Ten years ago, New York State set significant records for both gas and electric demand in 2013 and early 2014.

The July 2013 seven-day national heat wave set a new state record demand of 33,955 MW, surpassing the previous record of 33,939 MW set on August 6, 2006. Con Edison also reported it set a new record for electricity demand on the same day, hitting 13,322 MW at its peak – 133 MW more than the previous record set on July 22, 2011. New York came close to these records in 2023 when summer peak demand reached 30,206 MW.[xxxviii]

The 2014 polar vortex set a new winter electric demand record of 25,738 MW of electricity on January 7, 2014, eclipsing the 2004 record of 25,541 MW.[xxxix]

The deep freeze also threatened grid reliability in Quebec, Canada. The Montreal Gazette reported that Hydro-Quebec was nearly unable to meet demand and required New York generated power to rescue their ratepayers from a catastrophic system blackout.[xl]

Had it not been for New York's fleet of nuclear power plants, which at the time included Indian Point Energy Center that supplied 30 percent of New York's electricity; however, the zero-emission power plant was prematurely shuttered in 2020 and 2021. Should another polar vortex descend upon the region, Quebec's problem could easily become New York's problem.

Today, Canadian wildfires signal that drought conditions are getting worse, possibly jeopardizing access to water sources to power past energy promises. In turn, this adds to FERC's caution on reliability impacts of imported power following the 2003 Blackout and again in its 2023 report on Winter Storm Elliott, emphasizing the need for in-state power generation close to load.

As a result, on June 15, 2023, FERC issued a final rule, (Order No. 896) directing NERC to develop a new Reliability Standard or modifications to Reliability Standard TPL-001-5.1 within 18 months to address reliability concerns pertaining to transmission system planning for extreme heat and cold weather events that impact the Reliable Operation of the Bulk Power System.[xli] The directive seeks to cover a broader range of extreme weather scenarios in addition to corrective action plans that include for instances where performance requirements are not met during heat and cold events.

"All of the Above Energy Strategy" is Required to Reliably Power New York

Prudent steps must be taken to embrace an "All of the Above Energy Strategy" to reliably power New York's current and projected energy needs.

Increasing access to zero emissions energy sources will enable the implementation of a "Just Transition" while bridging reliability gaps and reducing both the cost of electricity and carbon emissions.

Numerous zero-emission technologies are available to enhance efficiency and decarbonize electricity. This includes clean hydrogen, biogas, thermal energy systems, advanced nuclear power, and renewable natural gas–each of which are reliable 24/7 regardless of weather conditions.[1] These types of green infrastructure are viable, proven, and generate middle class sustaining jobs while solidifying reliability for years to come.

Although conventional solar, wind, and battery storage technologies dominate attention as the main renewable power sources, they often face extensive opposition from host communities. Most recently lithium-ion battery farms came under fire by residents in East Hampton on Long Island, and in Somers, located in Westchester County, NY. [xlii, xliii]

"If planned generation projects are not built or are delayed, a system deficiency may occur," NYISO recently declared.[xliv]

In its 2022 Reliability Needs Assessment, the base cases relied upon approximately 3,350 MW of assumed resources additions to the power grid by 2025. [xlv] To date, the majority of these additions have not happened as planned. Instead, 4,870 MW in deactivations were impacted "by the DEC Peaker Rule."[xlvi]

[1] For extended comments, please see *"Comments of the New York State Pipe Trades Labor-Management Partnership"* as submitted to the New York State Climate Action Council Draft Scoping Plan, July 1, 2022 for more details on this subject and other related issues to ensure alignment with "NYS Just Transition" provisions.

On November 20, 2023, NYISO moved to keep only two natural gas peaker plants – the Gowanus 2 & 3 and Narrows 1 & 2 barges – online past their planned 2025 retirements to solve a 446-MW shortfall in New York City.[xlvii]

As previously mentioned, approximately 2,722 MW of new power is needed to meet projected demands for new statewide economic development projects.

Further, if the Climate Scoping Plan's prediction of 3 million zero-emission vehicles on New York State roads, bridges, and parking structures by 2030, and 10 million by 2050, comes true, power needs will increase by an estimated 2,000 MW to 4,000 MW respectively.[xlviii]

Taken together, on a straight-line basis, New York faces an estimated 8,072 MW energy shortage over the next several years.

How NY Can Activate 8,000 MW of Decarbonized Power, Quickly

New York can address short-term needs through the pursuit of an 'All of the Above Energy Strategy,' starting with the immediate construction of 4,000 MW of new nuclear, zero-emission power generation, and addressing another 4,000 MW of demand for heating and cooling through Thermal Energy Networks (TENs). This combination provides New York with quick and reliable access to at least 8,000 MW of decarbonized energy.

With the passage of the ADVANCE Act by the U.S. Senate and Congress, and its signing into law by President Joe Biden, the deployment of new nuclear technologies is being expedited.[xlix, l] This makes it feasible for New York to be among the first in the nation to deploy 4,000 MW of small modular reactors at former nuclear or mothballed coal plant sites, significantly bolstering grid reliability.

In fact, during a panel discussion at New York's "Future Energy Economy Summit," Christine King, Director of the U.S. Department of Energy's (DOE) Gateway for Accelerated Innovation in Nuclear Program, said that New York can start an environmental permitting process for new nuclear power "through an 'Early Site Permit' with a plant parameter envelope." [li, lii] This echoed comments made earlier by Georges Sassine, Vice President, Large Scale Renewables, New York State Energy Research and Development Authority (NYSERDA), who said that New York will need "hyper collaboration" to reform its permitting process to accelerate access to renewable energy at scale, inclusive of nuclear, geothermal, and clean hydrogen infrastructure.[liii]

Additionally, New York can double its climate gains by tapping into 4,000 MW of decarbonized capacity power by transitioning to geothermal for heating and cooling. The U.S. DOE recognizes geothermal as a clean energy cousin of solar and wind.[liv] The difference is geothermal systems are 300-600 percent more efficient than current technologies and produce 100 percent reliable, renewable heating and cooling 24 hours per day/7 days per week, regardless of weather conditions.[lv]

They work by moving heat energy underground–as little as 10 feet below grade to several miles deep–to the surface. The DOE said, "Using a heat exchanger, a geothermal heat pump can move heat from one space to another. In summer, the geothermal heat pump extracts heat from a

building and transfers it to the ground for cooling. In winter, the geothermal heat pump takes natural heat from the ground and transfers it to the home or building for heating." [lvi]

As a result, "**Geothermal heat pumps** can reduce energy consumption and emissions up to 44% compared to air-source heat pumps and 72% compared to standard air-conditioning equipment."[lvii]

The legal framework to implement geothermal systems exists under the "Utility Thermal Energy Network & Jobs Act (UTENJA)," that New York Governor Kathy Hochul signed into law in 2022. The purpose of the renewable infrastructure law is to:

> *"remove the legal barriers to utility development of thermal energy networks and require the public service commission to direct utilities to commence thermal energy network pilots in each major utility territory. This bill directs the public service commission to develop a regulatory structure for utility thermal energy networks that scales affordable and accessible building electrification, protects customers, and balances the role of incumbent monopoly utilities with other market and public actors. This bill ensures the development of and access to well trained, highly skilled craft persons needed to support timely, reliable, high-quality thermal energy network projects and promotes good jobs for local residents in the expanding decarbonization sector."*[lviii]

In 2023, the New York Power Authority took the UTENJA a step further by launching the "Decarbonization Leadership Plan" to propel *"the new carbon reduction initiative with the City University of New York (CUNY), Department of Corrections and Community Supervision (DOCCS), Office of Mental Health (OMH), the Office of General Services (OGS), and the State University of New York (SUNY)."*

These decarbonization efforts at some of New York's highest emitting facilities carry the potential to remove 4,000 MW of grid demand for heating and cooling and replacing it with 100 percent renewable, reliable thermal energy to supply zero emission heating during winter and cooling during the summer.

Accordingly, when we combine the 4,000 MW of new nuclear power with the 4,000 MW unlocked by TENs, this creates approximately an 8,000 MW benefit that allows for a more efficient use of installed capacity by better equalizing summer and winter loads.

Geothermal: A Key to Energy Efficiency and Grid Relief

As mentioned, the biggest benefit thermal networks provide is a "doubling effect," whereby it removes grid demand and frees up capacity power to serve other needs. In an interview with "In These Times," an energy expert explained that it does so by "using four times less electricity than the current gas system — an especially important statistic given the projected deficiencies in New York State's electric grid in the coming years." [lix]

"A new analysis from Oak Ridge National Laboratory (ORNL) and the National Renewable Energy Laboratory (NREL) found that, coupled with building envelope improvements, installing geothermal heat pumps in around 70% of U.S. buildings could save as much as 593

terawatt-hours of electricity generation annually and avoid seven gigatons of carbon-equivalent emissions by 2050," [lx]

"Widespread geothermal heat pump installations could also save 24,500 miles of new grid transmission lines from needing to be built (36.7 TW-mi)—the equivalent of crossing the United States eight times—because of a reduced need for generation capacity, storage, and transmission compared to other energy pathways," the DOE stated.[lxi]

The long-term savings on energy costs and the low maintenance requirements make thermal energy networks a financially viable option, akin to an annuity that pays you back overtime.

For example, in the case of SUNY, which is projecting a $1.1 billion annual budget shortfall, converting to geothermal energy networks could yield annual savings on utilities with 90 percent reductions in emissions, at least 10 percent water conservation, and 500 percent efficiency gains in heating and cooling across 64 college campuses. Implementing geothermal energy networks (or TENs), the SUNY system could potentially offset its projected $1 billion in financial losses and generate long-term benefits, paying dividends in terms of real monies saved, water conserved, emissions curtailed, and grid demand reduced.

JOBS IMPACT: The Case for Building Zero-Emission Baseload Generation

The Urgent Need for Skilled Labor

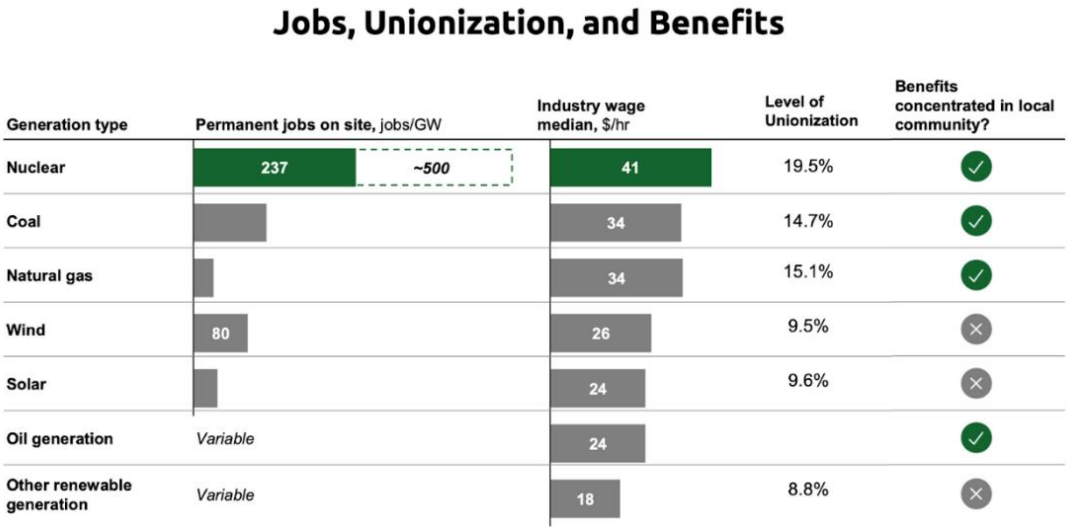
The jobs benefit of building zero-emissions generation resources, such as nuclear and geothermal power plants, is undeniable.

According to the Association of Builders and Contractors, the demand for skilled labor remains at a generational high, with an anticipated 500,000 construction job vacancies.[lxii] This presents a significant opportunity for New York to capitalize on job creation through the development of clean energy infrastructure.

Current Job Market Dynamics

The Department of Labor's "March 2024 Jobs Report" underscores a nationwide surge in construction jobs, with a notable increase of 39,000 positions in March alone, surpassing the average monthly gain over the previous year.[lxiii] However, New York stands out for its decline in construction jobs, losing 15,600 jobs (-3.9 percent) between December 2022 and December 2023.[lxiv] Despite this setback, New York is positioned to rebound with billions planned for upgrading housing, transitioning to cleaner energy, and building high-tech manufacturing facilities.

Impact of Clean Energy Projects



US Department of Energy. Pathways to Commercial Liftoff: Advanced Nuclear. Washington, DC. 2023.
https://liftoff.energy.gov/wp-content/uploads/2023/03/20230320-Liftoff-Advanced-Nuclear-vPUB.pdf

The U.S. Department of Energy's United States Energy & Employment Report 2022 found that of all technologies, geothermal has the highest concentration of workers (57 percent) in construction, whereas advanced nuclear and natural gas have the highest concentration of workers in utilities at 61percent each.[lxv]

More, thermal energy networks are eligible for billions in federal funding, pivotal in water conservation, and is projected to support up to 262,000 jobs by 2050. [lxvi]

In its latest publication, "Pathways to Commercial Liftoff: Advanced Nuclear," the U.S. Department of Energy affirmed that jobs creation and wages paid by nuclear power facilities far outweigh those of other power sources.

The same clean energy promises spelled jobs peril for New York's skilled trades sector with the dual denial of green infrastructure upgrades at two power plants, specifically "Danskammer" in Poughkeepsie, NY, and "NRG Astoria" in Queens, NY. [2] These missed opportunities entailed:

- **Danskammer Repowering**: The proposed CLCPA plant enhancements would have resulted in using "approximately 50 percent less fuel on a per-megawatt-hour basis" while creating 450 construction jobs with $200 million in payroll over its duration.[lxvii]

- **NRG Astoria**: The NYS Climate Act compliant upgrades would have reduced emissions 5 million tons, increased efficiency by 36 percent, and generated 1,000 construction jobs, providing for more than $325 million in economic benefits.[lxviii]

[2] For an expanded comparison of "Reliable v. Renewable Energy: Jobs Impact," see Appendix A.

Consequences on Displaced Energy Workers

Current strategies for the clean energy transition, such as closing power plants without providing viable alternative jobs, have left many workers unemployed and separated from their loved ones.

For example, an article from "In These Times" profiled the plight of displaced energy workers. One of which is steamfitter Peter Prince from Poughkeepsie, New York who was forced to travel across the nation to find powerhouse work following premature plant closures, "resettling in Massachusetts, Pennsylvania, Wisconsin, Minnesota, Illinois and Arizona."[lxix] The article reads,

> "Since 2018, Prince has been on-the-road for 12 months out of the year, returning home for Christmas and his daughters' birthdays. "I'm far away. I don't see my family," Prince told *In These Times*, "I don't speak to my kids except for a few minutes a day." According to Prince, this is a hardship shared by the majority of his colleagues." [lxx]

Another victim of New York's energy denial policy explained,

> "Five years ago, Caitlin Heerdt, a [union] welder from Long Island, found herself forced out of New York to find work. When her father passed away from Covid-19, she was unable to find a job in her home state to spend time grieving with her family. For Heerdt, thermal energy networks offer the possibility of "bringing people like myself home." [lxxi]

The experiences of these New York natives reflect the broader narrative of hundreds of displaced energy workers who are eager to contribute to the development of clean energy infrastructure essential for a sustainable transition. Projects like Danskammer and NRG Astoria, had they been approved for CLCPA upgrades, could have provided these workers with the opportunity to rebuild their careers, be home with their families, and support the state's clean energy goals.

A more thoughtful approach that ensures job creation alongside plant closures is essential for worker stability.

Addressing the Worker Shortage

With the $1.2 trillion Bipartisan Infrastructure Bill set to invest heavily in local economies, addressing the worker shortage is crucial.[lxxii] Prioritizing job training will enable New Yorkers to participate in the clean energy transition. As codified in the NYS Climate Act's "Just Transition" provisions, the focus should be on promoting careers in the skilled trades, which offer largely debt-free, tech-proof opportunities.

Future Job Creation and Sustainable Growth

The geothermal industry alone has the potential to support up to 262,000 jobs by 2050, showcasing significant economic benefits and opportunities for a just transition towards a clean energy future.[lxxiii] Additionally, the U.S. Bureau of Labor Statistics projects a need for at least 42,600 new plumbers, pipefitters, and steamfitters along with 73,500 new electricians each

year over the next decade.[lxxiv, lxxv] The estimated 1.5 million skilled trades roles are needed to support the growth in commercial, industrial, residential, datacom, and linework sectors.

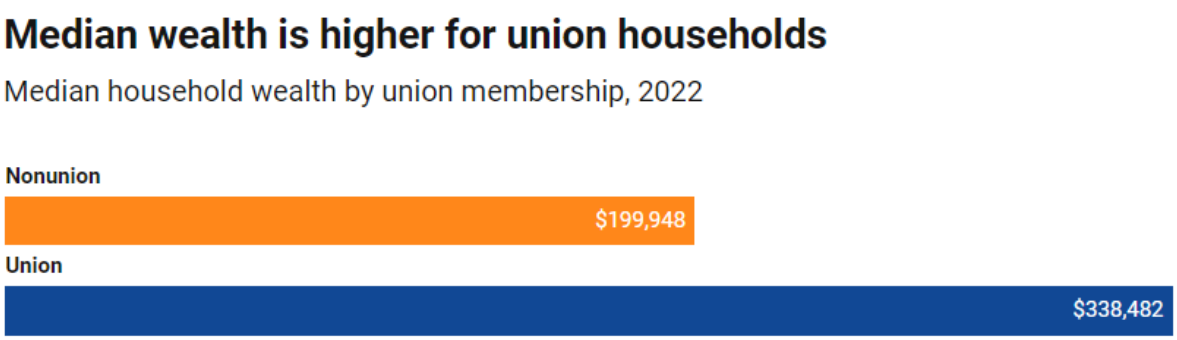
Reinforcing Blue-Collar Labor

"ABC estimates that the U.S. construction industry needs to attract about a half million new workers in 2024 to balance supply and demand," said Michael Bellaman, ABC president and CEO. "Not addressing the shortage through an all-of-the-above approach to workforce development will slow improvements to our shared built environment, worker productivity, living standards and the places where we heal, learn, play, work and gather." [lxxvi]

This situation coincides with the Biden Administration's bipartisan infrastructure bill, which is allocating $11.7 billion to the New York economy, $6 billion to New Jersey, and $2.9 billion to Connecticut.[lxxvii, lxxviii, lxxix] There has never been a more critical time to reinvest in blue-collar labor and educate a new generation about the advantages of joining a union.

Economic Benefits of Union Membership

FIGURE 1



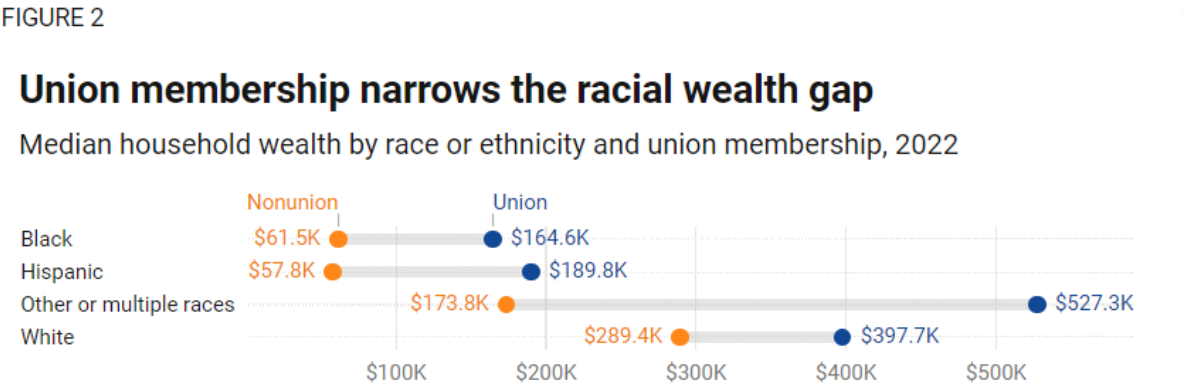
Note: All monetary amounts are in 2022 U.S. dollars, adjusted for inflation using the Urban Consumer Price Index Retroactive Series (CPI-U-RS). "Union" households include a head of household or spouse covered by a union contract. The sample only includes households with a head of household or spouse age 25 or older, nonretired, and earning a wage or salary.

Source: Board of Governors of the Federal Reserve System, "2022 Survey of Consumer Finances," available at https://www.federalreserve.gov/econres/scfindex.htm (last accessed February 2024); U.S. Bureau of Labor Statistics, "Consumer Price Index: R-CPI-U-RS Homepage," https://www.bls.gov/cpi/research-series/r-cpi-u-rs-home.htm (last accessed January 2024).Chart: Center for American Progress

A recent analysis of the Federal Reserve's "Survey of Consumer Finances" by the Center for American Progress highlights the economic advantages of union membership, noting that union households possess 1.7 times the median wealth of nonunion households.[lxxx] Furthermore, membership in a union increases median wealth between 167 percent and 228 percent for households of color.

The research also observed that investing in green infrastructure projects that support union jobs contribute to greater economic equity.

FIGURE 2



Note: All monetary amounts are in 2022 U.S. dollars, adjusted for inflation using the Urban Consumer Price Index Retroactive Series (CPI-U-RS). "Union" households include a head of household or spouse covered by a union contract. The sample only includes households with a head of household or spouse age 25 or older, nonretired, and earning a wage or salary.

Source: Board of Governors of the Federal Reserve System, "2022 Survey of Consumer Finances," available at https://www.federalreserve.gov/econres/scfindex.htm (last accessed February 2024); U.S. Bureau of Labor Statistics, "Consumer Price Index: R-CPI-U-RS Homepage," https://www.bls.gov/cpi/research-series/r-cpi-u-rs-home.htm (last accessed January 2024).Chart: Center for American Progress

In terms of addressing income inequality, Federal Reserve data revealed:

> *"As shown in Figure 2, median union household wealth is $397,700 for white households, $164,557 for Black households, $189,835 for Hispanic households, and $527,342 for other or multiple race households. Therefore, the union wealth premium is 137 percent for white households but 267 percent for Black households, 328 percent for Hispanic households, and 304 percent for other or multiple race households. Since the union wealth premium is much higher for households of color, union membership can help narrow the racial wealth gap. Union contracts can thereby help address systemic racial inequality."* [lxxxi]

Addressing Generational Jobs Uncertainty

Two new reports emphasize that the Class of 2024 recognizes the disconnect between jobs security and an uncertain economy.

One study by labor analytics firm Burning Glass Institute and Strada Education Foundation shows that roughly 52 percent college graduates end up in jobs where bachelor degrees aren't needed.[lxxxii, lxxxiii]

The other survey by Handshake Network Trends reported that 70 percent acknowledge that debt will influence their decision to work multiple jobs upon college graduation, prompting high school graduates to say they're disinclined to take on college debt.[lxxxiv]

This underscores why Chris Hyams, CEO of Indeed.com, observed the unprecedented pace of technological innovation putting college degrees at risk of obsolescence, emphasizing the indispensable role skilled tradespeople will play in shaping our real economy.[lxxxv]

Clean Energy Jobs Provide a Direct Pathway to the Middle Class

Applying an "All of the Above Energy Strategy" to the New York Climate Act paves a direct pathway to the middle class through skilled trades training programs, ensuring a "Just Transition." This shift is supported by rising interest in vocational training, as overall enrollment in community colleges and four-year institutions has declined.

According to the National Student Clearing House, enrollment in trade-related programs like Mechanic and Repair Technologies (57.5%), Precision Production (60.0%), and Construction Trades (61.5%), as well as fields like Computer Science (57.7%) and Business (56.3%), has seen some of the highest persistence rates among the ten most popular fields of study.[lxxxvi] Notably, there has been a 23% increase in students pursuing construction trades. [lxxxvii]

Meanwhile, the rise of generative AI is challenging career options across the board. Jobber surveyed Gen-Z and found that 56% thought blue-collar jobs offered better job security than white-collar ones, given the growth of AI. [lxxxviii]

Rigorous apprenticeship programs combining classroom learning with practical experience can lead to rewarding careers without college debt. These programs offer the prospect of six-figure salaries and play a crucial role in facilitating a smooth transition to a clean energy future.

By investing in new nuclear and geothermal infrastructure, New York can not only address its current job market challenges but also pave the way for sustainable economic growth and energy security. This approach will ensure a robust, resilient workforce ready to lead the state into a cleaner, greener future.

New York Should Sign the U.S. Pledge to Triple Nuclear Power by 2050

As Bill Gates championed, new nuclear power is a "huge milestone for the local economy, America's energy independence, and the fight against climate change."[lxxxix]

In the most concrete action to date, on May 29, 2024, U.S. President Joe Biden convened thought leaders and deployed federal resources to finance and bolster the domestic nuclear power industry to advance America's clean energy future. This includes federally funded mandates to revive and revitalize existing nuclear reactors and directing the United States Army to construct new, advanced nuclear reactors at multiple Army sites across the nation.[xc]

Comments by U.S. Energy Secretary Jennifer Ganholm reaffirmed the President's actions by advocating for "recently retired nuclear power plants to help meet rising demand for zero emissions electricity, or add reactors to existing sites."[xci]

Similar sentiments were also expressed by New York Governor Kathy Hochul when discussing the prospect of small modular reactors to play a role in achieving Climate Act goals, including

most recently at the Future Energy Economy Summit held in Syracuse, NY on September 4-5, 2024. [xcii, xciii]

During her opening remarks at the summit, Governor Hochul asked participants to "do not let me down" when advocating for nuclear power and next-generation technologies to be included in New Yorks's energy mix to achieve a smooth transition to a cleaner-energy grid.[xciv] Specifically, she said, "From wind and solar to geothermal and hydrogen or even splitting an atom, this is the possibility that lies before us." [xcv] She added, "And I'll move heaven and earth. I will move heaven and earth to make sure that we have the strongest economy with the strongest energy plans that protect Mother Earth from this long, long assault by mankind." [xcvi]

Additionally, in late 2023, the United States pledged to lead a coalition of 20 other nations to triple nuclear power by 2050 to achieve net-zero carbon emissions and limit climate change.

In lieu of growing support for nuclear power, New York should sign this pledge and build a modern generation of advanced nuclear reactors to facilitate a smooth transition to dependable, decarbonized clean energy.

Recommendations for a Smooth Clean Energy Transition

To achieve a smooth clean energy transition and address urgent power reliability gaps identified by NYISO, **the Clean Energy Jobs Coalition recommends policymakers:**

- **Expedite the siting and construction of at least 8,000 MW of new in-state zero emission generation sources (4,000 MW of new nuclear and 4,000 MW of TENs) to resolve immediate New York State reliability concerns.**
- **Immediately retrofit existing New York State power generation resources to produce 100 percent reliable clean energy that is not weather dependent.**
- **Secure 4,000 MW of flex capacity by installing thermal energy networks, removing 4,000 MW of heating and cooling demands from the New York State grid by fulfilling the funded goals of NYPA's Decarbonization Leadership Program.**

The **"New York Power Surge Plan"** urges policymakers to build the necessary 124 GW of zero emission generation sources (largely new nuclear, TENs, and clean hydrogen) to provide baseload decarbonized power in-state by 2050. This approach will enable New York to electrify everything by following these 10 steps:

1. **Prioritize Reliability:** Take a "do no harm approach" to protect the health and safety of millions of New Yorkers by maintaining access to reliable power.

2. **Aggressive Pursuit of New Technologies:** Encourage and *expedite* the siting and construction of new nuclear technology, hydrogen gas, and geothermal solutions alongside efforts to build solar and wind farms.

3. **Maintain Existing Infrastructure:** Maintain existing natural gas infrastructure by incorporating the use of hydrogen and clean, renewable gas technology.

4. **Upgrade Existing Power Plants:** Support upgrades at existing power plants to reduce emissions in impacted neighborhoods as replacement renewable energy sources are developed.

5. **Recognize All Zero Emission Energy Sources:** New York should acknowledge clean hydrogen, renewable natural gas, biogas, thermal energy systems, and advanced nuclear power as zero emission energy sources. The move will create clean energy jobs and enable access to billions in federal funding to:
    a. Save American families up to $38 billion on electricity bills.
    b. Double the share of American electricity generated by clean sources to 80 percent.
    c. Accelerate the electrification of the American vehicle fleet, with share of zero-emission light-duty vehicle sales reaching up to 65 percent.

6. **Comprehensive Cost and Reliability Analysis:** Require a comprehensive cost and 100 percent reliability analysis for the construction of traditional renewables and other non-carbon energy sources.

7. **Workforce Training:** Invest in workforce training programs to equip skilled tradespeople for the evolving energy landscape.

8. **Project Labor Agreements:** Advocate for Project Labor Agreements as part of the "Just Transition" to ensure fair labor practices and project efficiency.

9. **Implement the Decarbonization Leadership Program:** Implement the "Decarbonization Leadership Program" to reduce carbon emissions at the state's largest facilities to set industry example and start the clean energy transition for all of New York.

10. **Eliminate Transmission Bottlenecks Statewide:** Include thermal energy solutions as part of the design requirements to expand the transmission capabilities between Long Island, NYC, and the rest of the state by at least 3,000 MW to efficiently move power reliably and support state climate mandates for offshore wind requirements.[xcvii]

Securing New York's Clean Energy Future

By implementing the **Power Surge Plan**, which focuses on rapidly deploying new nuclear and TENs, New York can secure a stable, reliable, and sustainable energy future. These energy sources, like the Cricket Valley Energy Center—operating on an emergency basis since the premature shutdown of Indian Point—should be prioritized for their reliability.

Unlike wind and solar, nuclear power and thermal networks provide continuous, emission-free energy, effectively meeting New York's growing demands without the challenges of intermittency.

Cricket Valley Energy Center, a 1.1 GW natural gas-fired power plant in Dover, New York, has been pivotal in maintaining power supply in the region. As per news reports, operating with an emergency permit, Cricket Valley demonstrates how existing infrastructure can be leveraged to address immediate energy needs efficiently within a climate emergency policy framework.[xcviii]

To better understand the requirements to achieve 124 GW of new, decarbonized power, this is the equivalent of installing approximately 141,714 wind turbines.[3][xcix] Imagine if each wind turbine were 300 feet tall, this would be like placing one every 500 feet along the entire coastline of the United States, stretching from Maine to California and back again several times. This number of turbines would create a vast and continuous line of windmills along the entire U.S. coast multiple times over.

If we were to use solar power only, this would mean installing approximately 1.55 billion solar panels (mostly made in China), which is enough to cover an area of about 10,000 square miles.[4] This is equivalent to covering the entire land area of New Jersey with solar panels, and still having enough left over to cover parts of neighboring states – but only providing power during daylight for New York, none for the inconvenienced host state.

While wind and solar power should play an energy resiliency role, the above analogies are not feasible, nor advisable – they are for illustrative purposes only.

By adopting "The New York Power Surge Plan" as part of an "All of the Above Energy Strategy,"–inclusive of clean hydrogen, biogas, thermal energy systems, advanced nuclear power, and renewable natural gas–New York can prevent a policy-induced blackout, create jobs, reduce electricity costs, and decrease carbon emissions.

The Clean Energy Jobs Coalition is committed to playing an active role in building a reliable, 24/7 cleaner energy grid that ensures a just transition for workers and a sustainable future for all New Yorkers.

# # #

About the Clean Energy Jobs Coalition

The Clean Energy Jobs Coalition represents over 230,000 union energy workers, management, and affiliate environmental and engineering groups throughout New York, advocating for advocating for a smooth transition to a clean energy future. www.cleanenergyjobsny.com

[3] See Appendix B: Calculating 124GW of Decarbonized Energy for Nuclear, Wind, and Solar Power Plants
[4] See Appendix B: Calculating 124GW of Decarbonized Energy for Nuclear, Wind, and Solar Power Plants

APPENDIX A

"Reliable" v. "Renewable" Energy: Jobs Impact

*Clean Energy Jobs Coalition—NY**

Prepared by the United Association of Plumbers & Pipe Fitters

Project Name	Energy Source (Capacity)	Construction Jobs Created	Maintenance + Operation Jobs ("M+O") Created	Workers/MW Ratio *(Construction only)*	Workers/MW Ratio *(M+O only)*	**Increase % in Construction Jobs v. Wind / Solar	Increase % in M+O Jobs v. Wind / Solar
Flint Mine Solar (NY)	Solar (100 MW)	284 to 362	1 to 2	2.84 to 3.62	0.01 to 0.02	-	-
Bluestone Wind (NY)	Wind (122 MW)	150	7	1.23	0.06	-	-
Modeled 100 MW Small Modular Reactor (SMR)	Nuclear (100 MW)	1,238	374	12.38	3.74	+242% to 336% (solar) +907% (wind)	+18,600% to 37,300% (solar) +6,133% (wind)
TerraPower Natrium reactor (Advanced)	Nuclear (345 MW)	2,000	250	5.80	0.72	+60% to 104% (solar) +372% (wind)	+3,500% to 7,100% (solar) 1,100% (wind)

Project Name	Energy Source (Capacity)	Construction Jobs Created	Maintenance + Operation Jobs ("M+O") Created	Workers/MW Ratio *(Construction only)*	Workers/MW Ratio *(M+O only)*	**Increase % in Construction Jobs v. Wind / Solar	Increase % in M+O Jobs v. Wind / Solar
Plant Vogtle 3 & 4 (Advanced)	Nuclear (2,234 MW)	9,000	800	4.03	0.36	+11.33% to 41.9% (solar) +228% (wind)	+1,700% to 3,500% (solar) +524% (wind)
Altavista Power Station (VA)	Bioenergy (51 MW)	*(Data Unavailable)*	31	*(Data Unavailable)*	0.61	*(Data Unavailable)*	+2,950% to 6,000% (solar) +954% (wind)
Bay Front Power Plant (WI)	Bioenergy (56 MW)	*(Data Unavailable)*	35	*(Data Unavailable)*	0.63	*(Data Unavailable)*	+3,050% to 6,200% (solar) +987% (wind)
ReEnergy Black River (NY)	Bioenergy (60 MW)	178	33	2.97	0.55	Up to +4.6% (solar) +142% (wind)	+2,650% to 5,400% (solar) +862% (wind)

APPENDIX B: Calculating 124GW of Decarbonized Energy for Nuclear, Wind, and Solar Power Plants

Nuclear Power Plants

To determine how many nuclear power plants are needed to meet a total capacity of 124 GW:

- Average capacity factor for a nuclear power plant: 90%.
- Typical capacity of a large nuclear power plant: 1,000 MW (or 1 GW).

First, calculate the effective power output of one nuclear power plant considering the capacity factor:

Effective Power Output per Plant = 1 GW × 0.90 = 0.9 GW

Now, to meet 124 GW of capacity:

$$\frac{124 \text{ GW}}{0.9 \text{ GW / nuclear plant}} \approx 138 \text{ nuclear plants}$$

Analogy: This would mean building 138 nuclear power plants. Imagine fitting each plant within a small campus of a few square miles. This is like having a network of small university campuses spread across the country. Importantly, many of these plants could be located at existing power plant sites or former nuclear or coal plant locations, satisfying the need for sites under New York's Article 10 siting law. This approach would utilize already developed areas, minimizing the need for new land and taking advantage of existing infrastructure. Nuclear power plants are compact, taking up significantly less land compared to other energy sources, and they provide a safe, reliable, and consistent energy supply regardless of weather conditions.

Wind Power Plants

To determine how many wind turbines are needed to meet a total capacity of 124 GW:

- Average capacity factor for wind turbines: 35%
- Typical capacity of a modern wind turbine: 2.5 MW.

First, calculate the effective power output of one wind turbine:

Effective Power Output per Turbine = 2.5MW × 0.35 = 0.875MW

Now, to meet 124 GW of capacity:

$$\frac{124{,}000\ \text{MW}}{0.875\ \text{MW / turbine}} \approx 141{,}714\ \text{turbines}$$

Analogy: This would mean installing approximately 141,714 wind turbines. Imagine if each wind turbine were 300 feet tall, this would be like placing one every 500 feet along the entire coastline of the United States, stretching from Maine to California and back again several times. This number of turbines would create a vast and continuous line of windmills along the entire U.S. coast multiple times over.

Solar Power Plants

To determine how many solar panels are needed to meet a total capacity of 124 GW:

- Average capacity factor for solar panels: 15-25% (we'll use 20% as a mid-range estimate).
- Typical capacity of a modern solar panel: 400 W (0.4 kW).

First, calculate the effective power output of one solar panel:

Effective Power Output per Panel = 0.4 kW × 0.20 = 0.08 kW = 80 W

Now, to meet 124 GW of capacity:

$$\frac{124{,}000{,}000\ \text{kW}}{80\ \text{W / solar panel}} \approx 1{,}550{,}000{,}000\ \text{solar panels}$$

Analogy: This would mean installing approximately 1.55 billion solar panels, which is enough to cover an area of about 10,000 square miles. This is equivalent to covering the entire land area of New Jersey with solar panels, and still having enough left over to cover parts of neighboring states – just to power New York during periods of daylight.

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