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

Draft Clean Energy Standard Biennial Review

July 1, 2024

Table of Contents

Introduction

The Climate Leadership and Community Protection Act (CLCPA) of 2019 requires that the Public Service Commission (Commission) issue a review for notice and comment that considers "(a) progress in meeting the overall targets for deployment of renewable energy systems and zero emission sources, including factors that will or are likely to frustrate progress toward the targets; (b) distribution of systems by size and load zone; and (c) annual funding commitments and expenditures."[1] This Report serves to inform the Commission's review. It summarizes the progress made toward the renewable energy and zero emission goals set by the CLCPA since the establishment of New York State's Clean Energy Standard (CES), assesses what remains to be done to achieve those goals, presents policy options and proposals, and invites comments from stakeholders and the public on these or any other matters raised in this Report. The Report focuses in particular on New York's goal to obtain 70% of New York's electricity from renewable sources by 2030 (the 70% goal) and the related goal of 9 gigawatts (GW) of offshore wind by 2035.

Section 1 identifies the key regulatory actions taken to date to support renewable energy deployment in New York, including the establishment of the CES. Section 2 summarizes progress to date in achieving the CLCPA and CES goals in terms of current contributions of operational renewable energy systems and zero-emission sources to the State's energy portfolio. Section 3 offers a detailed assessment of major factors that have affected and will likely continue to affect progress towards the goals. Section 4 reports on the pipeline of contracted renewables from previous Tier 1 and offshore wind solicitations. Section 5 accesses the amount of renewables that would need to be procured, under the CES or a modified version of the program, to achieve the 70% goal and recommends adjustments to NYSERDA's procurement authorization that may be necessary to do so. Section 6 considers other programmatic options for accelerating development and construction of renewable energy resources. Policy options and proposals under consideration in this Report are limited to the CES itself.

Appendices A and B, respectively, provide further details on operational and contracted renewable energy projects by size and technology, and the analysis of the path to the 70% goal. Appendix A also provides CES funding and expenditures for recent years through 2023. Forward-looking cost estimates for the CES

[1] PSL §66-p(3). PSL §66-p(4) provides the Commission with authority to "temporarily suspend or modify" the obligations created by the Program if, after conducting a hearing, it finds that the Program "impedes the provision of safe and adequate electric service," "is likely to impair existing obligations and agreements," and/or is related to "a significant increase in arrears or service disconnections."

and other costs associated with pursuit of the CLCPA goals are provided separately in the Department of Public Service (DPS) Annual CLCPA Report.[2]

[2] The most recent such report was filed on July 20, 2023. Case 22-M-0149, Proceeding on Motion of the Commission Assessing Implementation of and Compliance with the Requirements and Targets of the Climate Leadership and Community Protection Act, New York State Department of Public Service First Annual Informational Report on Overall Implementation of the Climate Leadership and Community Protection Act (filed July 20, 2023). The next report is expected to be filed later in 2024.

1 Policy and Regulatory Background

New York has been a leader in building clean energy generation for over 20 years, since adoption of the 2002 State Energy Plan, which warned of the possible consequences of New York's fossil fuel dependency. In 2004, the Commission established an incentive program to support new renewable generation projects under the Renewable Portfolio Standard (RPS). The goal of the RPS was to increase the proportion of renewable energy New Yorkers used from 19.3% (using 2004 as the baseline year) to at least 25% by the end of 2013. On January 1, 2010, after a review of the RPS, the Commission raised the RPS goal from 25% by 2013 to 30% by 2015, using the same 2004 baseline.

The 2015 State Energy Plan required that renewable energy sources provide 50% of the State's electricity supply by 2030 as part of a strategy to reduce statewide greenhouse gas (GHG) emissions by 40% over the same period. On August 1, 2016, the Commission replaced the RPS Main Tier program with the CES through the Order Adopting a Clean Energy Standard (2016 CES Order).[3] The CES includes a Renewable Energy Standard (RES) and a Zero-Emissions Credit (ZEC) requirement. The RES established a Tier 1 program under which NYSERDA was authorized to procure eligible new large-scale renewables projects and a Tier 2 maintenance program to provide financial support for existing renewable facilities. The ZEC program was intended to support certain nuclear power facilities and is also referred to here as Tier 3. NYSERDA initiated the first solicitation under the CES in 2017.

The 2016 CES Order also recognized that New York had substantial potential for offshore wind production. The Commission requested that NYSERDA perform a study to identify mechanisms that could realize this potential. In July 2018, following completion of that study and presentation of NYSERDA's recommendations, the Commission issued an Order adopting the Offshore Wind Standard (Offshore Wind Order), which established the framework for the first phase of offshore wind generation solicitations.[4]

The 2016 CES Order further directed NYSERDA to undertake these procurements by employing Fixed-Price Renewable Energy Certificate (REC) contracts, pursuant to which winning bidders would receive a

[3] Case 15-E-0302, et al., Proceeding to Implement a Large-Scale Renewable Program and a Clean Energy Standard, Order Adopting a Clean Energy Standard (issued August 1, 2016).

[4] Case 18-E-0071, In the Matter of Offshore Wind Energy, Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement (issued July 12, 2018).

fixed as-bid REC price throughout the contract lifetime for the environmental attributes associated with every megawatt-hour (MWh) produced by their facilities. This structure provided developers with Fixed-Price RECs for the contract term at a price that does not respond to changes in market conditions and allowed developers to also sell energy and capacity as they see fit.

In 2018, the Commission's Offshore Wind Order modified this approach to renewable procurements to address the limitations of using Fixed-Price REC contracts to encourage development. The Offshore Wind Order directed NYSERDA to require each developer to provide both a Fixed-Price Offshore Wind REC (OREC) bid, similar to a Tier 1 Fixed-Price REC, and a bid based on what was termed the Index REC approach. An Index REC/OREC bid is the developer's proposed "strike price," or estimate of the developer's full revenue requirement, to be drawn from energy and capacity markets as well as RECs/ORECs. Under this approach, the amount the developer is paid for its ORECs varies and is based on a calculation that subtracts index prices for energy and capacity from the strike price. This formulation was intended to increase the likelihood that a developer would satisfy its revenue requirement for a project and ultimately reduce what ratepayers pay for each OREC.

In 2019, the CLCPA was signed into law.[5] The CLCPA increased and extended the goals set out in the 2016 CES Order by establishing two goals: (1) the State's Load Serving Entities (LSEs) should procure at least 70% of New York State electric load from renewable energy resources by 2030; and (2) the "statewide electrical demand system" should "be zero-emissions" by 2040. The CLCPA also includes technology-specific goals for offshore wind and solar resources, specifically a 9-gigawatt (GW) goal for offshore wind by 2035, a 6 GW by 2025 goal for distributed solar, and a 3 GW energy storage resources goal by 2030.

On January 16, 2020, the Commission further incorporated the use of index-based contracts into the CES by directing NYSERDA to offer bidders an Index REC price option in RES Tier 1 solicitations from 2020 on (Index REC Order).[6] In the Index REC Order, the Commission concluded that providing an Index-REC price option would (1) give developers more flexibility to adapt their bidding behavior to their financing and operational needs, (2) reduce the risk premiums that developers account for in their bids to accommodate for uncertainty in power market revenues, and (3) lower ratepayer costs on a per-REC basis. Building on this approach, on November 20, 2020, the Commission authorized NYSERDA to offer

---

5 PSL §66-p.

6 Case 15-E-0302, et al., Order Modifying Tier 1 Renewable Procurements (issued January 16, 2020).

eligible Tier 1 projects the one-time option to convert the Fixed-Price REC price term in their existing contract to an Index REC price approach.[7]

In May 2020, following the passage of the CLCPA, the Commission approved recommendations submitted by NYSERDA for the implementation of the statute's 6 GW distributed solar goal and the extension of the program through 2025.[8] Two years later, on April 14, 2022, the Commission further expanded the installation goal for the NY-Sun program to 10 GW by 2030.[9]

On June 18, 2020, DPS and NYSERDA jointly filed a white paper on Clean Energy Standard Procurements to Implement New York State's Climate Leadership and Community Protection Act (2020 CES White Paper).[10] On October 15, 2020, the Commission issued its responsive Order Adopting Modifications to the Clean Energy Standard (2020 CES Order).[11] In the 2020 CES Order, the Commission increased the 50% goal to 70% by 2030 and the offshore wind goal to 9 GW by 2035 and adopted several other modifications to align the CES with CLCPA goals. The 2020 CES Order also established a competitive procurement program under Tier 2 of the CES to secure the continued availability of existing renewable resources and authorized a new Tier 4 to support renewable energy projects that deliver energy to New York City.

On October 15, 2020, the Commission also issued its Order Approving the Build-Ready Program.[12] This program allows NYSERDA to secure development rights to underutilized properties and prepare them for the construction of renewable energy projects. The properties will ultimately be made available to private developers through competitive auctions, after which the private developers will construct and operate renewable energy systems on the properties.

---

7 Case 15-E-0302, Order Authorizing Voluntary Modification of Certain Tier 1 Agreements (issued November 20, 2020).

8 Case 19-E-0735, Proceeding on Motion of New York State Energy Research and Development Authority Requesting Additional NY-Sun Program Funding and Extension of Program Through 2025, Order Extending and Expanding Distributed Solar Incentives (issued May 14, 2020).

9 Case 19-E-0735, supra, Order Expanding NY-Sun Program (issued April 14, 2022).

10 Case 15-E-0302, White Paper on Clean Energy Standards Procurements to Implement New York's Climate Leadership and Community Protections Act (filed June 18, 2020).

11 Case 15-E-0302, Order Adopting Modifications to the Clean Energy Standard (issued October 15, 2020).

12 Case 15-E-0302, Order Approving Build Ready Program (issued October 15, 2020).

On April 20, 2023, the Commission again modified the CES by transitioning the CES Tier 1 compliance obligation for LSEs from the predetermined percentage-based obligation to a load share obligation, similar to other existing LSE obligations under the CES. Under the load share obligation, which will take effect in the 2025 Compliance Year, LSEs will be obligated to procure all Tier 1 RECs made available by NYSERDA, after the completion of sales to the voluntary market, in a proportion equivalent to their share of State load. The Phase 5 Implementation Plan filed by NYSERDA on August 30, 2023, details this new approach.[13]

On May 10, 2023, the Federal Energy Regulatory Commission (FERC) approved the New York Independent System Operator, Inc. (NYISO) Capacity Accreditation Rules, which took effect in May 2024 and are designed to better reflect the capacity value of generation and storage resources, based on their marginal contribution to resource adequacy. In response, NYSERDA filed a petition on June 29, 2023, seeking to revise the way in which future REC and OREC agreements that utilize an Index REC and Index OREC pricing mechanism calculate the Reference Capacity Price. On November 20, 2023, the Commission issued its Order Addressing Capacity Accreditation Rules, removing the obligation that resources include a set production factor in their bids to ensure that future CES solicitations can accommodate the new NYISO Capacity Accreditation Rules.[14]

In October 2023, Governor Hochul announced New York State's 10-Point Renewable Energy Action Plan (Action Plan). The Action Plan is an action-based set of directives needed to reinvigorate the State's efforts toward reaching its renewable energy goals. The highlight of the Action Plan is to continue with offshore wind and onshore renewables solicitations beyond those in 2022 to backfill any previous contracts that were terminated and establish a robust and predictable pathway for developers. While continuing to evaluate projects based on price, project viability, and economic development, the solicitations will continue to streamline the application process and support industry-wide competition to reduce project costs and incentivize timely construction and commercial operation.

The Action Plan also continues NYSERDA's goals of leveraging federal support and accessing low-cost financing for projects while supporting the projected $4.4 billion local transmission projects across New York State, increasing the interconnection of these clean, renewable energy projects into New York City, and supporting the Commission's approval of the Clean Energy Hub in Brooklyn. These actions will

---

[13] Case 15-E-0302, Phase 5 Implementation Plan (filed August 30, 2023).

[14] Case 15-E-0302, Order Addressing Capacity Accreditation Rules (issued November 20, 2023).

provide further impetus to build a clean energy workforce across the State, continue the transition of fossil fuel workers to clean energy careers, and prioritize benefits to disadvantaged communities.

2 Operational Renewables and Zero-Emission Resources

This section reports the results of New York's efforts to reduce emissions from its electricity system to date, as reflected in the composition of the State's electricity supply portfolio. New York's electricity system mix, the amount of renewable and zero-emission generation in the system mix, the statewide electric load, and the resulting percentage of renewables and zero-emission generation are all reported after the conclusion of each calendar year. The assessment in this section relies on data reported to NYSERDA through the end of the 2022 compliance year because that is the most recent completed compliance year for which final generation and load data have been published.[15] In addition, this section estimates the annual generation associated with renewables projects that came online after the 2022 compliance year.

For renewables specifically contracted under the CES, more detailed information is provided in Appendix A, both for operational projects and contracted projects still in development as of the date of this Report. Appendix A also includes details on the distribution of projects by size and load zone, as well as annual expenditure data for operational CES projects.

Progress toward the CES goal of 70% renewable energy is summarized below by source of energy supply and by technology (Tables 1 and 2, respectively). The data represents all compliance-year renewable energy supply settled in the State, through the New York Generation Attribute Tracking System (NYGATS), and considers all renewable energy imports and exports. The CLCPA's definition of "renewable energy systems" does not include biomass and biogas (earlier eligibility determinations previously allowed for biomass and biogas resources).[16]

With a view toward fully reflecting progress toward the CLCPA goal of a zero-emissions grid by 2040, Table 1 also provides data on nuclear generation. More fulsome consideration of the path to this goal is ongoing.[17]

---

15 Case 15-E-0302, Clean Energy Standard Annual Progress Report – 2022 Compliance Year (issued January 1, 2024).

16 2020 CES Order.

17 See, Case 15-E-0302, Order Initiating Process Regarding Zero Emissions Target (issued May 18, 2023).

In 2022, renewable energy resources supplied 25.1% of the State's electric load, reflecting total renewable generation of 38,061 gigawatt-hour (GWh) and statewide electric load of 151,836 GWh.[18] Combined with nuclear generation of 31,865 GWh, total renewable and zero emission generation in New York in 2022 amounted to 70,053 GWh or 46.1% of statewide load.

Table 1. 2022 Renewable and Zero-Emission Energy in New York by Program[19]

Generation Type	GWh
Generation from Baseline Renewable Energy	35,046[20]
Generation from Tier 1-Eligible Energy	3,142[21]
Total Renewable Energy Serving Load	**38,061**[22]
Nuclear generation under CES Tier 3 (ZECs)	31,865
Total Renewable and Zero-Emission Energy	**70,053**

Table 2. 2022 New York System Mix Renewable Energy by Technology[23]

Fuel Type[24]	GWh
Hydroelectric	30,446
Solar	4,239
Wind	3,376
Total	**38,061**

[18] Total load represents MWh in 2022 as reported in NYGATS.

[19] Source data from NYGATS.

[20] Excludes biogas and biomass and fuel cells. Includes imported renewable energy. Further information on imported renewables is available in the annual CES Progress Reports.

[21] Includes fuel cell and biogas.

[22] Tier 1 Energy includes generation from fuel cells that utilize natural gas as a fuel source as were previously eligible under Tier 1. Since these generation projects are fired with natural gas, their megawatt hours are reported as natural gas in the New York System Mix, which is consistent with the fuel reporting in the 2014 Statewide Fuel Mix. Therefore, the Baseline Renewable Energy plus Tier 1-Eligible Energy will not equal the Total Renewable Energy.

[23] Source data from NYGATS.

[24] The CLCPA's definition of "renewable energy systems" does not include biomass and biogas.

As noted, the above data reflects the calendar year 2022. However, since the 2022 reporting year, a number of Tier 1 renewable energy projects under contract to NYSERDA, as well as the South Fork offshore wind project, have begun operation. The estimated contribution of these new sources is included in Table 3. Generation shown for these projects reflects the contractual bid quantities or expected generation per year. This table does not include data for distributed/ behind-the-meter generation that has become operational since the end of 2022.

Table 3 Annual Estimated Generation for Projects that Became Operational between January 1, 2023 and June 1, 2024

Fuel Type	GWh
Solar	222
Land-Based Wind	1,559
Offshore Wind (South Fork)	464
Total	**2,245**

3 Factors Affecting Progress

The data in Section 2 summarize the extent to which New York's efforts to meet the CLCPA clean energy goals have delivered operational projects to date. This section provides context for those data by describing major factors that affect the development and deployment of renewables as well as the implications of future load growth for achievement of renewable supply objectives. Some of the factors influencing the pace of progress are national or global and thus beyond New York State's control. Others are more specific to the New York environment and may be appropriate for the Commission, or other New York State authorities, to address. This section identifies such issues and the Commission proceedings, interventions, and other initiatives underway that may reduce barriers towards achieving the 70% goal. Possible reforms to the design of the CES program itself are addressed below in Section 6.

3.1 Global Interest Rates, Inflation, and Supply Chain Pressures

New York's progress has been and will continue to be affected by conditions in the larger global markets. The complex renewable energy supply chain is a global network of materials procurement, processing, production, materials recovery, infrastructure, and logistics operations. As the United States and other nations raise their goals for emission reductions, those supply chains are stressed. Geopolitical tensions and policies incentivizing domestic production of major energy generation equipment also impact the cost and availability of materials and components. High interest rates and inflation – which were prevalent from mid-2021 through mid-2023 across the renewable energy supply chain – also play a role in raising the baseline for renewable energy input prices.[25] While such prices have recently stabilized, input prices are higher than what was forecasted prior to the 2021-2023 inflationary period.[26]

[25] Wood Mackenzie. Conflicts of Interest: The Cost of Investing in the Energy Transition in a High Interest-Rate Era, available at: https://www.woodmac.com/horizons/energy-transition-investing-in-a-high-interest-rate-era/.

[26] Case 15-E-0302, NYSERDA Comments on Petitions Requesting Price Adjustments to Existing Contracts, Appendix B: Industrial Economics, Incorporated, 2023 New York Large Scale Renewables Inflation Petitions Analytical Support (filed August 28, 2023) (IEc Report).

Recent events have raised awareness of supply chain vulnerabilities and inflationary pressure in relation to renewable energy.[27] As Industrial Economics (IEc) noted in 2023 in a review of inflation and supply chain trends on the renewable energy industry:

> Significant tension between two economic forces is pushing renewable energy development prices in opposite directions. On one hand, prices of frontier technologies such as those used in renewable energy generation typically decrease over time, as industries mature, achieve economies of scale, and incentivize competitors to join the market. On the other hand, persistent supply chain constraints and inflationary pressures in renewable energy sectors are pushing prices higher and could potentially offset or outweigh the secular downward trend in prices driven by efficiency gains in these sectors. It is uncertain if supply will keep pace with the heightened global demand for clean energy to alleviate the inflationary pressures specific to solar, onshore wind, and offshore wind development.[28]

The impact of supply chain constraints, inflation, and the rise of interest rates in recent years on renewable energy projects in New York was evidenced by petitions filed in 2023 by Empire Offshore Wind LLC and Beacon Wind LLC, Sunrise Wind LLC, the Alliance for Clean Energy New York, and Clean Path New York LLC. Discussed in more detail in Section 4, these petitions requested non-competitive price adjustments to their contracts, citing unexpected and unforeseeable inflation and supply chain costs and constraints associated with, among other things, the COVID-19 pandemic and the Russian invasion of Ukraine.

Another important supply chain challenge for the power sector relates to the global market for transformers, which has seen production shortages, long-lead times, and price increases. Large renewable energy generators need specialized and typically custom manufactured transformers in order to inject the power they generate onto the grid. Generally, electricity generated by wind and solar technologies is created at a lower voltage, which transformers step-up to a higher voltage for efficient transmission and distribution over the power grid. Reasons for transformer shortages and price spikes include increased raw material demand, a limited number of qualified firms producing such equipment, latent pandemic-related shortages and backlogs, labor constraints, shipping issues, dynamic changes to potential tariffs on

---

[27] NREL. Stronger Supply Chain Links to a Clean Energy Future, available at: https://www.nrel.gov/news/features/2022/stronger-supply-chain-links-to-a-clean-energy-future.html.

[28] IEc Report, p. 5.

imported equipment, and geopolitical tensions. The National Renewable Energy Laboratory's (NREL) "Major Drivers of Long-Term Distribution Transformer Demand" study found that utilities in the United States are experiencing extended lead times for transformers of up to two years – a fourfold increase on pre-2022 lead times – while reporting price increases of up to 900% over the past three years.[29] Long lead times can lead to owners and developers procuring major equipment before a project's design phase, increasing project risks by constraining the final project design, which can result in increased project costs.

While the renewable energy industry is still largely dependent on foreign supply chains, domestic content requirements for renewable projects were included in the Inflation Reduction Act of 2022 (IRA, see Section 3.5) and are often also included as requirements in State and federal funding opportunities, including NYSERDA's solicitations through the CES. While not certain, the domestic content requirements and an increase in domestic availability of renewable energy supply chain components may eventually contribute to reduced lead times for critical path items, such as major equipment, and may reduce costs and the time to market for renewable project development. These improvements are expected over time as the domestic supply chain responds to both economic stimulus and increased demand, and NYSERDA's solicitations are well positioned to support this effort by including local incentives for domestic content, whereby developers of projects that participate in NYSERDA's solicitations are favorably evaluated for committing to purchases of local goods and services sourced from New York State.

However, as noted by NYSERDA in response to the 2023 petitions, while the IRA is intended to provide economic incentives for the United States to create energy independence via the creation of a domestic renewable energy supply chain and associated manufacturing, it will likely take several years to stand-up the supply chain required to supply projects under development. In addition, with interest rates forecasted to remain elevated, project sponsors and developers will continue to have a relatively raised cost of capital to finance projects.[30]

---

[29] NREL, Major Drivers of Long-Term Distribution Transformer Demand, available at: https://www.nrel.gov/docs/fy24osti/87653.pdf

[30] Case 15-E-0302, NYSERDA Comments on Petitions Requesting Price Adjustments to Existing Contracts (filed August 28, 2023).

Solar

In recent years, the supply chain for solar photovoltaic (PV) has indicated mixed results, in part due to the technology's continuing emergence, variability in module pricing, and the supply chain of solar components being heavily concentrated and vulnerable to disruptions in China. As noted by IEc's 2023 assessment, "seven of the top ten suppliers of polysilicon suppliers are based in China and collectively hold 80 percent of global polysilicon capacity."[31] Severe U.S. supply chain risks revolve around federal policies that can be complex to navigate, fluctuating Section 201 and Section 301 tariffs, anti-dumping/countervailing duty investigations on PV and aluminum components, evolving eligibility for federal tax incentives, and the Uyghur Forced Labor Prevention Act.

Norton Rose Fulbright reported in a February 2024 Project Finance article that while supply chain issues have presented many challenges for the energy sector over the past few years, the situation seems to be improving for renewable materials, including solar components.[32] Solar Energy Industries Association (SEIA) and Wood Mackenzie found that utility-scale solar installations in the United States increased by 77% from 2022 to 2023, underscoring improvements in the solar supply chain.[33] The report states that 2023 was a year of recovery for the solar industry in the U.S. and that the momentum is expected to continue in 2024, however, it may be at a lower growth rate than 2023 since many projects delayed from 2022 were completed that year. The report posits that the temporary moratorium on new anticircumvention tariffs applicable to certain imports from four Southeast Asian countries also brought some stability to the solar supply chain, though it is noted that the moratorium concluded in June 2024.

Offshore Wind

The offshore wind industry has experienced interest rate, inflation, and supply chain vulnerabilities and constraints as well, although different from those applicable to the solar industry. Due to the magnitude of offshore wind projects and the upfront capital required to finance such projects, changes to the costs of capital and the costs of inputs can significantly impact financing models across the industry. Similarly unique to offshore wind projects is the need for suitable ports, installation vessels, and equipment such as

---

[31] IEc Report, p. 41.

[32] Norton Rose Fulbright, Project Finance, Current Market Conditions (February 25, 2024), available at: https://www.projectfinance.law/publications/2024/february/current-market-conditions/.

[33] SEIA and Wood Mackenzie, U.S. Solar Market Insight (March 4, 2024), available at: https://www.seia.org/us-solar-market-insight.

turbines, substructures, cables, and electrical components. This includes the offshore wind projects requiring high-voltage direct current (HVDC) transmission equipment, which is in limited supply and shortages of which may impact timelines for projects. Due to the magnitude and complexity of each project, delays in one project can result in a cascading delay to other projects, or even a loss of access to one or more of these resources necessary for construction, which can further extend delays.[34] In light of these near-term challenges to offshore wind, New York is proactively taking steps to progress its offshore wind portfolio and advance towards the goal of 9 GW of offshore wind by 2035.

In recognition of the offshore wind industry's supply chain needs and vulnerabilities, and in order to further support the development of offshore wind, New York State is making more than $700 million in investments in offshore wind ports, manufacturing, and infrastructure.[35] These investments are intended to increase access to critical offshore wind products through American-made supply and spur further economic development in the State. NYSERDA is also working with the State of New Jersey on a number of initiatives to coordinate on the development of a U.S. offshore wind supply chain and to help bring greater offtake certainty to the market.

New York's portfolio of offshore wind projects is currently supported by five State ports contributing to the localization of supply chain and economic benefits via two manufacturing facilities on the Hudson River. These ports include the Port of Albany, the Port of Coeymans, operations and maintenance hubs at Port Jefferson and Port of Montauk on Long Island, NY, and a premier 60 acre staging and assembly port at South Brooklyn Marine Terminal.

Workforce

In addition to competing in a global supply market, New York will need to attract an adequate labor pool to meet its 70% goal. However, there are indications that the domestic supply of skilled workers will be constrained as New York and other states ramp up their renewable energy programs. A recent report by NREL on the wind industry finds that by 2030 the national workforce demand for wind energy workers could rise to 258,000, while the supply may reach only 134,000, indicating a potential deficit of around

---

[34] Case 15-E-0302, NYSERDA Comments on Petitions Requesting Price Adjustments to Existing Contracts (filed August 25, 2023).

[35] New York State Empire State Development, Cleantech and Renewable Energy, available at: https://esd.ny.gov/industries/cleantech-and-renewable-energy.

124,000 wind energy workers nationwide.[36] The U.S. Bureau of Labor Statistics also expects the existing national gap in the availability of electricians to persist beyond 2030 as about 73,500 openings for electricians are projected each year.[37] According to the Office of Energy Efficiency and Renewable Energy's Solar Futures Study, in order to achieve the Biden-Harris administration's goal to transition to a fully decarbonized electricity system by 2035, the national solar workforce will need to grow from approximately 250,000 workers in 2021 to between 500,000 and 1,500,000 workers by 2035.[38] Employment of solar PV installers is projected to grow 22% from 2022 to 2032, with 3,500 openings projected each year through 2032.[39]

New York State – namely NYSERDA, the New York Power Authority (NYPA), and the New York State Department of Labor (DOL) – have developed and/or funded training programs to strengthen the skilled workforce. These efforts are listed below. Since NYSERDA's clean energy employment tracking began in 2015, the number of clean energy jobs in New York State has increased by 21%, adding nearly 30,000 jobs over eight years, through 2023. Clean energy job growth between 2021 and 2022 alone resulted in nearly $1.5 billion in gross State product (GSP).[40] However, the ultimate success of these initiatives is hard to predict, and therefore the availability of skilled workers may impact project development well into the future.

Action 7 of the October 2023 Action Plan noted that NYSERDA had previously committed more than $170 million to training programs, with an emphasis on prioritizing specific populations including those in disadvantaged communities, fossil fuel workers transitioning to clean energy, and priority populations. In addition, NYSERDA is allocating over $100 million to fund more renewables workforce training in

---

[36] NREL, Study Unlocks Opportunities to Bridge the US Wind Energy Workforce Gap (April 18, 2024), available at: https://www.nrel.gov/news/program/2024/study-unlocks-opportunities-to-bridge-the-us-wind-energy-workforce-gap.html.

[37] U.S. Bureau of Labor Statistics, Electricians: Occupational Outlook Handbook, available at: https://www.bls.gov/ooh/construction-and-extraction/electricians.htm#tab-6.

[38] U.S. Department of Energy, Solar Futures Study (September 2021), available at: https://www.energy.gov/sites/default/files/2021-09/Solar%20Futures%20Study.pdf.

[39] U.S. Bureau of Labor Statistics, Solar Photovoltaic Installers: Occupational Outlook Handbook, available at: https://www.bls.gov/ooh/construction-and-extraction/electricians.htm#tab-6.

[40] NYSERDA, 2023 New York Clean Energy Industry Report (November 2023), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Clean-energy-industry/2023-clean-energy-industry-report.pdf.

partnership with the private sector, academic institutions, and training centers.[41] Specific applications of these funds include multiple hands-on training opportunities for trainees. This includes NYSERDA's On-the-Job Training Program, which connects businesses with skilled job candidates, while providing financial incentives (up to 75% of a new hire's wages for their first 16-24 weeks of employment) to mitigate the financial risk of hiring and training new workers.[42] NYSERDA also offers businesses funding to hire paid interns via its Clean Energy Internship program, which can cover up to 90% of an intern's wages.[43] In addition, NYSERDA supports workforce training that aligns with organized labor, which can provide real-world experience for trainees.[44] A specific example of this commitment is the Laborers' International Union of North America Laborers Local 17, which used NYSERDA funding to develop a training program for large-scale, ground-mounted PV installers. This union program is anticipated to provide over 400 hours of classroom learning and 4,000 hours of on-the-job training to upwards of 100 individuals, including pre-apprentices, apprentices, and journey workers.[45] Coordinating with labor unions is a notable element of NYSERDA's workforce development efforts, as it demonstrates NYSERDA's stated commitment to high-quality, family-sustaining jobs.[46]

In addition to funding commitments as part of the Action Plan, New York has undertaken other commitments to fund workforce training. As part of the 2023-2024 State Budget Enactment, which expanded NYPA's role in the renewable energy sector, NYPA committed to up to $25 million annually to support the DOL's Office of Just Energy transition, to support renewable energy workforce training with a specific emphasis on workers on serving those who are traditionally underrepresented, especially within disadvantaged communities.

---

41 NYSERDA, New York State's 10-Point Action Plan to Expand a Thriving Large-Scale Renewable Industry (October 2023), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/10-point-plan.pdf.

42 NYSERDA, On-the-Job Training Program, available at: https://www.nyserda.ny.gov/All-Programs/On-the-Job-Training-Program.

43 NYSERDA, Funding Available to Hire Paid Interns, available at: https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Internship-Program/Clean-Energy-Business.

44 NYSERDA, For Organized Labor, available at: https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Workforce-Development-and-Training/For-Businesses/For-Organized-Labor.

45 NYSERDA, Case Studies: The Laborers' International Union of North America, available at: https://www.nyserda.ny.gov/About/Publications/Featured-Case-Studies/LiUNA.

46 NYSERDA, Clean Energy Economy, available at: https://www.nyserda.ny.gov/Impact-Clean-Energy-Economy.

New York State's offshore wind industry requires a wide range of occupations to support its projects. Specifically, the offshore wind occupations with the most severe workforce gaps are mainly in the construction and manufacturing industries, including plant and system operators, hoist and winch operators, continuous mining machine operators, and wind turbine service technicians.[47] To fill these roles, New York State has aligned with private, federal, and State funding resources to commit more than $77 million to offshore wind workforce training, as well as partnering with academia, trade, environmental justice and community partnerships. In 2020, the New York Offshore Wind Training Institute (OWTI) was launched through a partnership among SUNY's Farmingdale State College, Stony Brook University, and NYSERDA. The $20 million initiative was the largest public investment in offshore wind workforce development by any state in the U.S. The OWTI will certify and train 2,500 New York workers in 2024, bolstering the skilled labor resources for offshore and onshore renewable energy projects.[48] Numerous other clean energy workforce initiatives are being implemented across the State, including programs run by New York State Empire State Development, DOL, and others.

3.2 Transmission

As the energy supply portfolio changes and as electrification proceeds, New York's grid will need to be expanded to ensure that energy is delivered to customers across the State with the necessary level of reliability. Inadequacies in the existing system adversely affect the progress of renewable generation projects in at least two ways: (1) they reduce the amount of energy a project can inject to the grid, and (2), they increase the costs of interconnection. In recognition of this challenge, New York State has already begun investing in its transmission and distribution infrastructure, but the full cost of overhauling the grid to meet climate objectives is not yet known. In addition to these investments, New York has sought new authority to make needed infrastructure investments on expedited timeframes.[49]

---

[47] NYSERDA, New York State Offshore Wind Workforce Skills Analysis, 2022 (Report Number 23-12; March 2023), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/23-12-2022-New-York-Offshore-Wind-Workforce-Skills-Analysis-acc.pdf.

[48] NYSERDA, Offshore Wind, Workforce Development, available at: https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Supply-Chain-Economic-Development/Workforce-Development.

[49] Chapter 58 of the Laws of 2024, part O.

Projects approved by the Commission prior to the passage of the Accelerated Renewable Energy Growth and Community Benefits Act (Accelerated Renewables Act) and recently completed or in advanced development that will improve the efficiency of the transmission system include:

- **Central East Energy Connect Transmission Line.**[50] A joint project by LS Power Grid New York and NYPA, this upgrade allows for the flow of more renewable energy across the state, aligning with New York State's clean energy goals.
- **Empire State Line.**[51] NextEra Energy Transmission New York completed the Empire State Line, a new 20-mile 345-kV transmission line, which became operational in June 2022. This line allows the integration of 3,700 MW of clean energy onto New York State's grid and enables access to additional energy from the Robert Moses Niagara Hydroelectric Power Plant and electricity imports from Canada.[52]
- **Clean Path NY Project**.[53] This project, which is expected to be online by 2027, will provide a new transmission line to make access to resources from upstate and western regions of the State available into New York City, further contributing to clean energy integration (see, Section 4.3).
- **Champlain Hudson Power Express.**[54] The Champlain Hudson project is under construction and is expected to begin delivering clean power from Canadian sources to New York City by 2026 (see, Section 4.3).

---

50 NYSERDA, New York and New Jersey Offshore Wind Supplier Forum (January 11th, 2024), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/NY-NJ-Supplier-Forum-Presentations-01112024.pdf.

51 NYSERDA, Governor Hochul Announces Finalized Contracts For Clean Path NY and Champlain Hudson Power Express to Deliver Clean Renewable Energy from Upstate New York and Canada to New York City (November 30, 2021), available at: https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-11-30-Clean-Path-NY-Champlain-Hudson-Power-Express-Renewable-Energy.

52 UtilityDive, New York turns to transmission expansion to meet clean energy goals as NextEra energizes 3.7-GW line (July 12, 2022), available at: https://www.utilitydive.com/news/new-york-transmission-next-era-clean-energy/627025/.

53 NYSERDA, Governor Hochul Announces Finalized Contracts For Clean Path NY and Champlain Hudson Power Express to Deliver Clean Renewable Energy from Upstate New York and Canada to New York City (November 30, 2021), available at: https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-11-30-Clean-Path-NY-Champlain-Hudson-Power-Express-Renewable-Energy.

54 NYSERDA, Governor Hochul Announces Finalized Contracts For Clean Path NY and Champlain Hudson Power Express to Deliver Clean Renewable Energy from Upstate New York and Canada to New York City (November 30, 2021), available at: https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-11-30-Clean-Path-NY-Champlain-Hudson-Power-Express-Renewable-Energy.

These projects aim to increase power transfer capacity, enable the flow of renewable energy, and enhance grid reliability and resiliency while aligning with the CLCPA.

In 2020, the State passed the Accelerated Renewables Act, which mandated new efforts to identify system upgrades needed to meet CLCPA goals and provided authority to expedite certain upgrades. To implement these directives, the Commission opened a proceeding that to date has led to action on both near and long-term transmission infrastructure needs. For example, the Commission recently approved over $5 billion in transmission investments that are specifically designed to support the integration of renewable energy sources. These investments, which are anticipated to be in-service by 2030, include:

- Smart Path Connect - Led by NYPA and National Grid, the Smart Path Connect project will modernize over 100 miles of transmission lines in the North Country and the Mohawk Valley.[55]
- Phase 1 Projects – 30 upgrades to utility local transmission systems that, when completed, will add close to 4,000 MW of capacity for renewable energy.[56]
- Area of Concern Projects – a total of 62 local transmission upgrades that will add 3,400 MW of capacity once in-service.[57]

Since 2020, the Commission has also taken measures to ensure interconnection for up to 9 GW of offshore wind generation capacity. These efforts involve the NYISO as the administrator of the public policy planning process under its FERC-approved tariffs. This mechanism allows the Commission to determine a Public Policy Transmission Need (PPTN) and initiate a solicitation for competitive transmission solutions. To date, the Commission has initiated two infrastructure projects needed to support offshore wind using this planning tool:

- **Propel New York.** In March 2021, the Commission determined that additional transmission facilities were needed to deliver renewable power to Long Island and from there to the rest of

---

55 NY Power Authority, The Smart Path Connect Transmission Project, available at: https://www.nypa.gov/power/transmission/transmission-projects/smart-path-connect.

56 Case 20-E-0197, Proceeding on Motion of the Commission to Implement Transmission Planning Pursuant to the Accelerated Renewable Energy Growth and Community Benefit Act, Order Authorizing Development of Phase 1 Transmission Projects and Cost Recovery Measures (issued July 14, 2022).

57 Case 20-E-0197, supra, Order Approving Phase 2 Areas of Concern Transmission Upgrades (issued February 16, 2023).

New York State.[58] The NYISO conducted a competitive solicitation for solutions to address the Long Island Offshore Wind Export PPTN and selected the Propel NY Energy project to address the need in June 2023. Figure 1 illustrates the Long Island PPTN project.

Figure 1. Propel NY LI PPTN Solution[59]

- **NYC PPTN.** In June 2023, the Commission declared a PPTN for infrastructure to support the integration of at least 4,770 megawatts of offshore generation with the New York City grid. The NYISO issued its solicitation for proposed solutions to the NYC PPTN on April 4, 2024, with submissions due on June 17, 2024.[60] 28 proposed projects were submitted by four developers in response to the NYISO's solicitation.[61] The NYISO currently expects to select the more efficient

---

58 Case 20-E-0497, In the Matter of New York Independent System Operator, Inc.'s Proposed Public Policy Transmission Needs for Consideration for 2020, Order Addressing Public Policy Requirements for Transmission Planning Purposes (issued March 19, 2021).

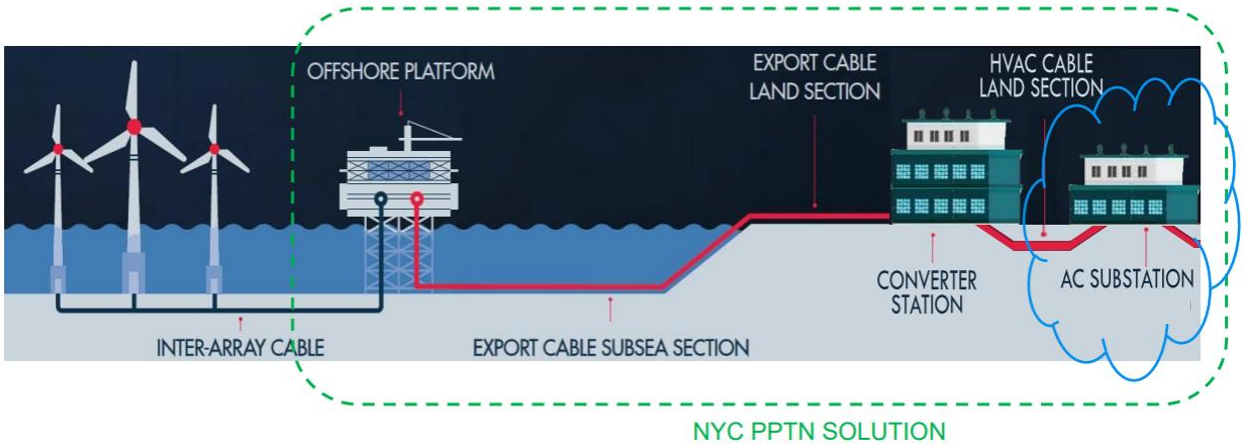
59 Propel NY, Propel NY Energy, available at: https://static1.squarespace.com/static/621797f51f11ca0489f2df6e/t/660bfb781e7471458bd3b8bc/1712061304476/PropelNYEngergy_2.24_Master_FactSheet.pdf.

60 NYISO, NYC PPTN Update, Electric System Planning Working Group (ESPWG) (June 7, 2024), available at: https://www.nyiso.com/documents/20142/45141681/10_NYCPPTN_ESPWG_2024_06_07.pdf/c023c5fc-060b-e409-2660-9805f45fb5fb.

61 NYISO, New York City Offshore Wind PPTN Project Descriptions (June 25, 2024), available at: https://www.nyiso.com/documents/20142/40894368/New-York-City-Offshore-Wind-PPTN-Project-Descriptions.pdf/30e66bde-7e68-11da-b4a3-9b0b2569f18b.

or cost-effective solution in late 2025. Figure 2 illustrates NYC PPTN Competitive Offshore Wind Transmission Solicitation Solution Requirements.

Figure 2. NYC PPTN Competitive Offshore Wind Transmission Solicitation Solution Requirements



- **Brooklyn Clean Energy Hub.** In April 2023, the Commission approved Con Edison's proposal to develop the Brooklyn Clean Energy Hub to address the local reliability needs and increased demand associated with the electrification of vehicles and buildings in New York City as well as provide interconnection points for 4,500 MW of renewable energy resources. The project is under construction.[62]

Coordinated Grid Planning Process

As directed by the Accelerated Renewables Act, the Commission and the utilities have developed a new Coordinated Grid Planning Process (CGPP) that focuses on identifying the transmission investments needed to meet CLCPA goals.[63] The study process is underway, and the utilities and LIPA are expected to submit a report with recommended system investments to the Commission by January 2026. The CGPP is intended to provide the Commission with an overview of the upgrades needed at all levels of the system, resulting in a cost-effective transmission investment plan that supports the CLCPA. It will be repeated in two- or three-year cycles to allow for periodic reassessment of both system needs and progress toward the climate goals.

---

62 Case 20-E-0197, supra, Order Approving Cost Recovery for Clean Energy Hub (issued April 20, 2023).

63 Case 20-E-0197, supra, Order Approving a Coordinated Grid Planning Process (issued August 17, 2023).

3.3 Interconnection

In order to connect to the grid, most proposed new generation projects must adhere to the NYISO interconnection process.[64] The process determines, among other things, what system upgrades are needed to permit a new generator to connect to the transmission system. Both the length of time needed to study a generator's impacts and the costs of the resulting system upgrades have been and continue to impact the pace at which new renewable resources are added to the portfolio.

Generators begin the process by entering the interconnection queue and then undergo several technical studies. These studies identify the: (a) Attachment Facilities that are necessary to directly and reliably interconnect the generator to the system; (b) System Upgrade Facilities needed to ensure that the generator has no adverse reliability impacts to the system; and (c) System Deliverability Upgrades for those generators intending to sell capacity that would not be fully deliverable on the existing system without such upgrades. Thus, the studies determine a generator's interconnection costs. Developers and investors rely on information about interconnection costs and timing to make decisions about whether to proceed with their projects.

The NYISO has historically managed the interconnection queue by studying groups of projects on a "Class Year" basis. The interconnection queue was originally designed for fossil fuel plants. However, the increased numbers of renewable energy projects entering the process in recent years, spurred by the CLCPA and the CES, has put great stress on the system. As the number of projects in the interconnection queue has increased, so has the time to complete a Class Year, with recent trends of 18-months or longer. To enable the process to work, each Class Year has a closing date by which generators must have met certain development criteria in order to participate. If a generator is not advanced enough to make a Class Year when it closes, it must wait an additional two years to enter the next Class Year, even if it succeeds in meeting the relevant development milestones earlier. Similarly, a project that participates in a Class Year but rejects the cost obligations resulting from the study is also required to wait for the next open Class Year in order to be re-studied. Overall, many projects experience a three- to four-year timeline (median duration), or longer in some cases, to complete the interconnection process.[65]

---

[64] NYISO, Interconnection Process, available at: https://www.nyiso.com/interconnections.

[65] Lawrence Berkeley National Laboratory, Queued Up: 2024 Edition, Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2023 (April 2024), available at: https://emp.lbl.gov/queues.

The NYISO has been seeking solutions to mitigate interconnection delays as far back as 2019 and perhaps longer, citing issues such as project proximity, technical challenges at proposed Points of Interconnection, the surge in new interconnection requests, aspects of the interconnection process initially designed for fossil fuel plants, and staffing shortages.

In 2022, efforts were made to expedite the grid impact study process such as removing duplicative and unnecessary processes in the System Reliability Impact Study, facilitating a smoother progression of projects through the queue. Additionally, numerous forums and focus groups with various stakeholders were conducted to identify and implement necessary transparency improvements, which are currently being developed. Significant investments have been made in the interconnection team and the technology used by developers and utilities to monitor progress and manage deliverables. This includes hiring more planning engineers for system analyses, as well as project managers and customer service agents to assist developers through the process. The synergy of skilled personnel, process efficiencies, and advanced technology is crucial for ongoing progress.

On July 28, 2023, FERC issued Order 2023 which mandates the elimination of separate feasibility and system impact studies, integrating them into a single comprehensive cluster study process. The NYISO is now in the process of implementing FERC Order 2023 and the new "cluster" study process. The intent of these changes is to standardize the time to interconnection study completion for projects going through the process, provide cost certainty to developers and financiers, and streamline the path to construction.[66]

Although the NYISO has announced a plan to commence its first cluster study in the summer of 2024, it is clear that interconnection will likely remain a lengthy and costly process, even after all of FERC's reforms are integrated into the NYISO's tariff. It will be another two to three years before the NYISO has enough data to assess whether these changes have a material impact on interconnection timelines. Furthermore, the high costs of interconnecting will continue to affect generation developers, even if the process is streamlined.

3.4 Capacity Accreditation

[66] New Project Media, QUEUE UPDATE: After Years of Delays, NYISO Wants Shorter Transition to New Cluster Studies (March 5, 2024), available at: https://newprojectmedia.com/news/queue-update-after-years-of-delays-nyiso-wants-shorter-transition-to-new-cluster-studies.

Wholesale market design also impacts renewable resource development. The treatment of capacity is an example of one such feature that has a significant impact. This section provides an overview of capacity market changes that were recently instituted by the NYISO and the Commission's order addressing these changes in the context of the CES.

Federal Energy Regulatory Commission Approval

On May 10, 2022, under FERC Docket No. ER22-772-001, FERC approved capacity market changes for Capacity Accreditation as part of the NYISO's Comprehensive Mitigation Review filing. The order approved changes including but not limited to:[67]

- The NYISO will exclude new capacity resources required to satisfy the CLCPA's goals from its buyer-side market power mitigation rules. The change will automatically eliminate offer floors for wind, solar, storage, hydroelectric, geothermal, fuel cells that do not use fossil fuel, demand response, and other qualifying resources under the CLCPA.
- The NYISO will also adopt a new, marginal capacity accreditation design that values installed capacity (ICAP) suppliers based on their marginal contribution to system reliability, instead of an average contribution. The NYISO plans to rely on the same resource adequacy model database that it uses to establish its locational minimum ICAP requirements and installed reserve margin to value the resource adequacy contribution of different classes of resources.

NYISO Implementation Plan

Starting with the Capability Year beginning in May 2024, Capacity Accreditation Factors (CAFs) will reflect the marginal reliability contribution of the ICAP Suppliers within each Capacity Accreditation Resource Class (CARC) toward meeting New York State Reliability Council LLC resource adequacy requirements for the upcoming Capability Year. Under this plan, the NYISO will annually update the CAFs and CARCs, and also review the Peak Load Window associated with the bidding requirements for Resources with Energy Duration Limitations and modify the Peak Load Window accordingly.[68]

---

[67] RTO Insider, FERC OKs NYISO Capacity Market Changes Stemming from NY Climate Law (May 11, 2022), available at: https://www.rtoinsider.com/30107-ferc-oks-nyiso-capacity-market-changes/.

[68] NYISO, Capacity Accreditation: Implementation Details (December 14, 2022), available at: https://www.nyiso.com/documents/20142/34963268/4%20CA%20Capacity%20Accreditation%20pres.pdf.

The primary renewable energy capacity accreditation resource classes include solar, land-based and offshore wind, and run-of-river and large hydroelectric generators.

NYSERDA Petition and Commission Ruling

In response to the NYISO's Comprehensive Mitigation Review filing, NYSERDA issued Request for Information (RFI) LSRRFI22-1 on July 7, 2022, and the subsequent RFI LSRRFI23-1 on January 6, 2023. Both RFIs were open to external stakeholders to review and comment on proposed modifications to the Index REC and OREC pricing formulas to account for the new NYISO Capacity Accreditation rules. After reviewing and considering this stakeholder feedback, on June 29, 2023, NYSERDA filed a petition with the Commission requesting revisions to the Index REC and OREC pricing formulas. The Commission issued an Order Addressing Capacity Accreditation Rules on November 20, 2023, addressing NYSERDA's June 29, 2023 petition.[69] The Order noted that the new rules are designed to better reflect the capacity value of intermittent renewable resources based on their marginal contribution to resource adequacy and authorized revisions to the Reference Capacity Price by removing the obligation that resources include a set production factor in their bids. This will ensure that future CES solicitations can accommodate the new NYISO Capacity Accreditation Rules.

3.5 Federal Initiatives Including the Inflation Reduction Act

This section provides an overview of key legislation, programs, and related initiatives led by the federal government relevant to renewable energy development and deployment in the State.

Federal Support and Partnerships

New York State has actively engaged with the federal government to bring forward market solutions benefiting in-state renewable energy development. This includes establishing a Memorandum of Understanding (MOU) with the U.S. Department of Energy (DOE) Load Programs Office (LPO) for access to low-cost financing for large-scale renewable projects, advocating for updated guidance on clean energy tax credits, and a Federal-State revenue sharing program.

The MOU between the DOE and NYSERDA, announced in September 2023, allows New York State to leverage the DOE LOP through a defined process to facilitate the review of applications from utility-scale

[69] Case 15-E-0302, Order Addressing Capacity Accreditation Rules (issued November 20, 2023).

solar, onshore wind, and offshore wind clean energy projects applying for financing through the LPO. Under the Title 17 Loan Guarantee Program, the LPO may, subject to obtaining required credit approvals, provide financing to eligible projects for up to 80% of qualified project costs with a tenor dependent on project needs and expected asset life, and in any event, not to exceed 30 years. This partnership will enable clean energy projects in New York State to access alternative financing options considering the recent inflationary environment and high interest rates affecting construction financing. Any cost savings that could benefit projects by accessing LPO loans could be shared with New York State ratepayers and potentially enable billions of dollars in savings.

The Inflation Reduction Act

The IRA extended and expanded the production tax credit, clean energy tax credit, and Modified Accelerated Cost Recovery System (MACRS) to provide further economic incentives for renewable energy supply chains and deployment, all of which support New York State's CLCPA goals. Qualifying renewable energy projects that meet specific criteria may also be eligible for additional tax credit amounts, known as bonuses, including:

- Low-income communities and tribal lands (updated Aug. 10, 2023)
- Energy communities (added April 4, 2023)
- Prevailing wage & apprenticeship (updated Aug. 29, 2023)
- Domestic content (added June 15, 2023)

Much of the guidance from the Internal Revenue Service (IRS) for the new IRA provisions is still pending; therefore, the information provided in this section is subject to change and is not intended to interpret the IRA or provide tax guidance.

Production Tax Credit

The renewable electricity production tax credit (PTC) is a per kilowatt-hour (kWh) federal tax credit included under Section 45 of the U.S. tax code for electricity generated by qualified renewable energy resources.[70] Section 13101 of the IRA extends and expands the production tax credit for renewable electricity production in section 45 of the Internal Revenue Code. Most applicable to the CES, for

[70] U.S. Environmental Protection Agency, Renewable Electricity Production Tax Credit Information (December 2023), available at: https://www.epa.gov/lmop/renewable-electricity-production-tax-credit-information (EPA PTC Resource).

facilities placed in service after December 31, 2021, the PTC provides a corporate tax credit of up to 2.75 cents/kWh for electricity generated from wind, closed-loop biomass, and geothermal resources. The credit applies on all eligible generation for 10 years after the qualifying equipment is placed in service. The IRA also extended the "commence construction" window for wind energy facilities to January 1, 2025.[71] The change allows wind energy facilities to be considered under construction if physical work of a significant nature has begun or if at least 5% of the facility's total costs are incurred.

Clean Electricity Tax Credit

Section 13702 of the IRA made several significant changes to the business investment tax credit (ITC), including expanding the eligible technologies, extending the expiration date, modifying the scheduled step-down in its value, providing for new bonus credits, and establishing new criteria to qualify for the full credit. It also phases out the ITC under section 48 of the Internal Revenue Code and replaces it with a new technology-neutral clean energy tax credit for investment in qualifying zero-emissions electricity generation facilities or energy storage technology under section 48E of the Internal Revenue Code.[72]

Eligible projects under 1 MW commencing construction between January 1, 2022 and December 31, 2024 can receive a full ITC credit of 30%, while projects that commence construction on or after January 1, 2025 can receive a tax credit under the Clean Electricity ITC (48E).[73] "Projects [larger than] 1 MW that begin construction 60 days after the Treasury Secretary releases labor guidelines (January 29, 2023) and no later than January 1, 2025 will receive a base tax credit of 6%. However, projects can qualify for the full 30% tax credit if they ensure that all laborers and mechanics involved in the construction of the project or the maintenance of the project for 5 years after project completion are paid wages at rates not

---

71 Sabin Center for Climate Change Law, Inflation Reduction Act Tracker, IRA Section 13101 – Production Tax Credit For Electricity Produced From Certain Renewable Sources, available at: https://iratracker.org/programs/ira-section-13101-production-tax-credit-for-electricity-produced-from-certain-renewable-sources/#:~:text=Section%2013101%20of%20the%20IRA%20extends%20the%20%E2%80%9Ccommence%20construction%E2%80%9D%20window,0.5%20cents%20per%20kilowatt%20hour.

72 N.C. State University, N.C. Clean Energy Technology Center, DSIRE, Business Energy Investment Tax Credit (August 29, 2023), available at: https://programs.dsireusa.org/system/program/detail/658/business-energy-investment-tax-credit-itc (ITC Overview).

73 Id. Projects under 1 MW (or larger projects that are commenced no more than 60 days after the Treasury Secretary develops labor guidelines) do not need to meet the new labor standards established by the Inflation Reduction to receive the full 30% tax credit.

less than prevailing wages. Projects must also ensure that a percentage of total labor hours are performed by qualified apprentices."[74]

The IRA also includes the creation of a new tax credit, the Clean Electricity ITC, to replace the traditional ITC for qualifying clean energy systems that commence construction on or after January 1, 2025. The new tax credit is functionally similar to the ITC, only it is not technology-specific. The tax credit applies to all generation facilities and energy storage systems that have an anticipated greenhouse gas emissions rate of zero, though the offered credit amount will be gradually phased out as the U.S. meets greenhouse gas emission reduction targets. The tax credit will not be reduced for a project whose construction is commenced in the year following the year where greenhouse gas emissions from electricity production in the United States are equal to or less than 25% of 2022 levels. However, for projects commenced in the second year following that target being met, the tax credit will be worth 75% of what it would otherwise be. Projects commenced in the third year will receive a credit worth 50%, and all projects commenced after then will not be eligible for a tax credit.[75]

Modified Accelerated Cost Recovery System

Section 13703 of the IRA "allows a five-year recovery period for the depreciation of clean electricity facilities placed in service after [December 31,] 2024."[76] Owners of qualified property and energy storage technology facilities may be eligible for the 5-year MACRS depreciation deduction. The MACRS establishes classes of facility lifespans ranging from three to 50 years; many renewable energy technologies are classified as five-year properties under the MACRS.

Bonuses

The IRA provides four additional, or "bonus", tax credit opportunities relevant to clean energy:

- **Low-income communities and tribal lands**. Section 13103 of the IRA "modifies the energy tax credit to allocate 1.8 gigawatts for environmental justice solar and wind capacity credits in low-income communities and Indian lands in 2023 and 2024. Facilities receiving allocations must be

---

74 ITC Overview.

75 ITC Overview.

76 U.S. Congress, H.R. 5376 – Inflation Reduction Act of 2022 (2022), available at: https://www.congress.gov/bill/117th-congress/house-bill/5376 (Inflation Reduction Act).

placed in service within four years after the allocation date."[77] This adder is not applicable to the PTC. The ITC provides "solar and wind facilities less than 5 MW may also be eligible for low-income bonuses. A project built in a low-income community as defined by the New Markets Tax Credit or on Indian Land can receive an increased tax credit of 10 percentage points. The DOE has also released a GIS map showing qualifying low-income communities. A project associated with a low-income residential building project, or a low-income economic benefit project can receive an increased tax credit of 20 percentage points. These bonuses are capped at 1.6 GW of projects per year."[78]

- **Energy communities.** Section 13101 of the IRA establishes a bonus tax credit (e.g., 10% for PTC) for projects located within an energy community, which is defined as "a brownfield site or an area with reliance on coal, oil, or natural gas extraction historically part of its economy coupled with high unemployment."[79] More specifically, "energy community" includes:
    - Brownfield sites as defined under Sections 101(39)(A), (B), and (D)(ii)(III) of the Comprehensive Environmental Response, Compensation, and Liability Act;
    - As determined by the Secretary of Labor, (1) a metropolitan or non-metropolitan statistical area with unemployment rates, from the previous year, at or above the national average and (2) at least 0.17% of employment or 25% of local tax revenues are related to the extraction, processing, transport, or storage of coal, oil, or natural gas at any time beginning in 2010; and
    - Census tracts, plus their adjacent census tracts, where a coal mine closed after 1999 or a coal-fired power plant was retired after 2009.[80]

  "For projects that are under 1 MW and projects that are larger than 1 MW and meet the labor requirements specified above, the Energy Community Bonus increases the tax credit [ITC] by 10

---

77 Id.

78 ITC Overview.

79 EPA PTC Resource.

80 SEIA, Adder Credits for Domestic Content and Energy Communities, available at: https://www.seia.org/modules/adder-credits-domestic-content-and-energy-communities-0 (SEIA Domestic Content Resource).

percentage points. For larger projects that do not meet the labor requirements, the Energy Community Bonus increases the tax credit by 2 percentage points."[81]

- **Prevailing wage and apprenticeships**. The IRA established new prevailing wage and apprenticeship requirements in Section 13101 for systems greater than 1 MW in size and placed in service after 2021. The prevailing wage rate requirements apply to "any laborer or mechanic employed in the construction, alteration, or repair of a facility, property, project, or equipment by the taxpayer or any contractor or subcontractor of the taxpayer."[82] Projects using the ITC must comply with new prevailing wage and apprenticeship requirements for larger system to qualify for the full 30% tax credit. The PTC offers a base rate of 0.30 to 0.55 cents per kilowatt hour of electricity produced, but the projects qualify for the full credit of up to 2.5 cents per kilowatt hour if the IRA labor-related requirements are met.[83] If the project meets the prevailing wage and apprenticeship standards, it is eight additional ITC percentage points for a total of ten percentage points. That would mean a total of a 40% ITC. On the PTC for solar, a company will receive an additional 10% of what it qualified for, meaning a total of 110% of the PTC. [84]
- **Domestic content.** The IRA also provides bonus tax credits for the use of certain steel, iron, and manufactured products made in the U.S.[85] SEIA details the ITC and PTC bonuses for domestic content as:

> An additional eight percentage points of bonus ITC credit is available for projects that meet domestic content requirements. The domestic content standard will be set by Treasury under 661 of Federal Regulations. For projects electing the PTC, the 40% manufactured products requirement applies through 2024, followed by 45% in 2025, 50% in 2026, and 55% in 2027 and beyond.[86]

---

81 ITC Overview.

82 Department of the Treasury, Internal Revenue Service, Domestic Content Bonus Credit Guidance under Sections 45, 45Y, 48, and 48E, available at: https://www.irs.gov/pub/irs-drop/n-23-38.pdf (Notice 2023-38).

83 EPA PTC Resource.

84 SEIA Domestic Content Resource.

85 Inflation Reduction Act.

86 SEIA Domestic Content Resource.

The required percentage of domestic manufactured products for offshore wind facilities is 20%. The IRS issued Notice 2023-38 in May 2023, which provided guidance on the domestic content bonus.[87]

Tariffs and Import Policies

Section 201 and Section 301 Tariffs

In January 2018, President Trump approved the U.S. Trade Representative's (USTR) recommendations to impose safeguard tariffs on imported solar cells and modules, based on the investigations, findings, and recommendations of the U.S. International Trade Commission.[88] On June 13, 2019, the USTR determined that bifacial solar modules would be excluded from the Section 201 tariffs, though the exclusion has been subsequently withdrawn, challenged, and ultimately reinstated. In February 2022, President Biden announced a four-year extension and modification of the Section 201 tariffs, extending the exemption for bifacial solar panels as well.[89]

In March 2018, the USTR also released findings of its investigation into China's acts, policies, and practices related to technology transfer, intellectual property, and innovation, resulting in Section 301 tariffs being imposed on a range of import items that included solar inverters and AC modules. In May 2024, following a statutory four-year review by the USTR, President Biden directed an expansion in Section 301 tariffs. The expansion included additional tariffs on solar cells (whether or not assembled into modules), semiconductors, and steel and aluminum products, while establishing an exclusion process for machinery used in the domestic manufacturing of certain solar manufacturing equipment.[90]

---

87 Notice 2023-38; see also, ITC Overview.

88 Executive Office of the President, To Facilitate Positive Adjustment to Competition From Imports of Certain Crystalline Silicon Photovoltaic Cells (Whether or Not Partially or Fully Assembled Into Other Products) and for Other Purposes (January 25, 2018), available at: https://www.federalregister.gov/documents/2018/01/25/2018-01592/to-facilitate-positive-adjustment-to-competition-from-imports-of-certain-crystalline-silicon.

89 Office of the United States Trade Representative, Section 201 – Imported Solar Cells and Modules, available at: https://ustr.gov/issue-areas/enforcement/section-201-investigations/investigation-no-ta-201-75-cspv-cells.

90 Office of the United States Trade Representative, U.S. Trade Representative Katherine Tai to Take Further Action on China Tariffs After Releasing Statutory Four-Year Review (May 14, 2024), available at: https://ustr.gov/about-us/policy-offices/press-office/press-releases/2024/may/us-trade-representative-katherine-tai-take-further-action-china-tariffs-after-releasing-statutory.

Investigations into Antidumping and Countervailing Duties

On August 18, 2023, the U.S. Department of Commerce announced its final determination of its circumvention inquiries, finding that certain Chinese producers were shipping their solar products through Cambodia, Malaysia, Thailand, and/or Vietnam (CMTV) to avoid paying antidumping and countervailing duties (AD/CVD). Because circumvention was found to be occurring in each of the countries, the department issued "country-wide" circumvention findings. Accordingly, imports of solar cells and modules from the four countries will face tariffs beginning June 6, 2024, following a temporary moratorium pursuant to the Waiver Declaration issued by the Biden Administration implementing an AD/CVD exemption for covered solar cells and modules.[91] Further AD/CVD tariffs on imports of solar cells and modules from CMTV or otherwise would have additional implications on solar PV development.

3.6 Siting

Land-Based Renewable Energy Permitting

New York's permitting processes for renewable energy projects depend primarily on a proposed project's size and technology. Prior to 2021, major renewable electric generating facilities equal to or larger than 25 megawatts (MW) were sited pursuant to the Public Service Law Article 10 process. Presently, these projects are required to seek permits through the New York State Office of Renewable Energy Siting and Electric Transmission (ORES). ORES was established, as set forth in Public Service Law Article 8, to streamline and accelerate the environmental review and permitting of major renewable energy facilities.[92] The process is crafted to support the State's renewable energy goals while safeguarding the environment and considering all relevant social, economic, and environmental factors, including environmental justice.

The State has further indicated its commitment to reducing siting and permitting timelines by adopting the Renewable Action Through Project Interconnection and Deployment (RAPID) Act that transferred ORES to DPS and established a new Article VIII, expanding ORES' mission to now include the environmental

---

[91] Department of Commerce, International Trade Administration, Enforcement and Compliance, Procedures Covering Suspension of Liquidation, Duties and Estimated Duties in Accord With Presidential Proclamation 10414 (September 16, 2022), available at: https://www.federalregister.gov/documents/2022/09/16/2022-19953/procedures-covering-suspension-of-liquidation-duties-and-estimated-duties-in-accord-with.

[92] Chapter 58 of the Laws of 2020, part JJJ.

review and permitting of major electric transmission facilities.[93] Overall, the ORES process is intended to provide a single forum for reconciling a project's design with State and local requirements.

On average, under the former Article 10 process for new generation, it took 3.5 years from the initial filing to a permit being issued. By contrast, ORES is obligated to make a final decision on a generation siting permit within one year from the date the application is considered complete, or within 6 months if the facility is planned to be situated on a brownfield, former commercial or industrial site, landfill, former power plant, or other abandoned or underutilized site.[94] Projects under the ORES process have taken an average of 1.2 years to receive a permit (i.e., from time of complete application to issuance of permit).[95]

Projects smaller than 25 MW typically require permits issued by local land use authorities and are subject to the State Environmental Quality Review Act (SEQR). Additionally, a developer may need to obtain other discretionary and ministerial permits depending on applicable local laws for renewable energy projects. Timelines for approving these projects vary and local permits may be difficult to obtain. There is a tendency for local resistance to increase as more projects in this size range are proposed.

In addition to State and local approvals, many generation projects also require federal permits. Federal permits fall into several categories including wildlife protection, air and water protection, and protected land usage. Projects that may affect endangered species, fisheries, any natural body of water, marine mammals, migratory birds, or bald or golden eagles, require a consultation and/or special permits.[96] The Federal Environmental Review and Authorization Inventory identifies the most common federal environmental reviews, authorizations, licenses, approvals, findings, determinations, and other decisions that agencies consider in permitting timetables.[97] Federal permits also require evaluation and findings under the National Environmental Policy Act.

---

93 Chapter 58 of the Laws of 2024, part O.

94 New York State, Office of Renewable Energy Siting, About Us, available at: https://ores.ny.gov/about-us.

95 New York State, Office of Renewable Energy Siting, Permit Applications, available at: https://ores.ny.gov/permit-applications.

96 Brookings, How does permitting for clean energy infrastructure work? (September 28, 2022), available at: https://www.brookings.edu/articles/how-does-permitting-for-clean-energy-infrastructure-work/.

97 Permitting Dashboard, Federal Environmental Review and Authorization Inventory (September 10, 2021), available at: https://www.permits.performance.gov/tools/federal-environmental-review-and-authorization-inventory.

Already complex, the generation siting process is likely to increase in difficulty over time, from a developer perspective, as "good" sites are exhausted and resource protection laws become more stringent. The scarcity of feasible sites will tend to drive development costs up and slow the pace of development. For example, the 2022-23 budget passed by the New York State Legislature includes an historic expansion in the protection of New York's freshwater wetland resources.[98] Before the enactment of the legislation, State regulations provided protection exclusively for freshwater wetlands that were at least 12.4 acres in size or wetlands deemed to have "unusual local importance." Numerous smaller wetlands remained outside the scope of state protection. The revised law extends protections to smaller wetlands of "unusual importance," altering the previous criterion of "unusual local importance," beginning in 2025. Furthermore, starting in 2028, all freshwater wetlands larger than 7.4 acres will be protected.

A second example of evolving regulation that may constrain renewable energy siting is protection of agricultural lands and forests. Agricultural lands are often identified as suitable locations for large-scale ground mounted solar development. Reasons include the physical characteristics of the land (relatively flat, minimal shading, cleared of vegetation), proximity to important grid infrastructure (high voltage transmission lines, substations, existing roads), and social and economic considerations (fewer residential or commercial neighbors, lower land costs). However, New York State is committed to protecting agricultural lands and forests given their value to the economy and as natural resources.[99] Keeping forests as forests is critical to maintaining and increasing levels of carbon sequestration and storage and preventing emissions, as forests sequester and store much more carbon than any other land use in New York. These two land cover types combine for over 25 million acres or approximately 85% of the State's total land area.[100]

The land leases associated with renewable energy projects provide stable long-term revenue streams for landowners. The projects will pay their share of taxes, commonly in the form of a negotiated payment in lieu of taxes, to the applicable taxing jurisdictions and at times enter into separate host community benefit agreement to support a particular endeavor identified by the community involved. Agricultural lands also

---

98 Carter Ledyard & Milburn LLP, NY Budget Bill Institutes Historic Reforms to the Protection of Freshwater Wetlands (May 23, 2022), available at: https://www.clm.com/ny-budget-bill-institutes-historic-reforms-to-the-protection-of-freshwater-wetlands/.

99 New York State Climate Action Council, Scoping Plan (December 2022), available at: https://climate.ny.gov/Resources/Scoping-Plan.

100 New York State's Constitution holds that "the policy of the State shall be to conserve and protect its natural resources and scenic beauty and encourage the development and improvement of its agricultural lands for the production of food and other agricultural products." NYS Const. Art. XIV §4.

provide opportunities for co-location of renewable energy and agricultural production, often referred to as agrivoltaics.

Recognizing the intrinsic link between agriculture and clean energy, New York State has forged a progressive framework of siting controls, underscoring its commitment to avoid, minimize, and mitigate adverse impacts on natural resources. Following adoption of the CES, NYSERDA introduced a number of measures that incorporate agricultural and forest protection policies into the procurement process. These were developed through collaborative endeavors with multiple State agencies such as the New York State Department of Agriculture and Markets (AGM), DPS, New York State Department of Environmental Conservation (DEC), ORES, and through key stakeholder groups like the Agricultural Technical Working Group (A-TWG) with the intent of establishing a holistic approach to renewable energy development that nurtures agricultural viability and forest protection.[101]

Specifically, since the adoption of the CES in 2016, an increasing number of programmatic measures that incorporate agricultural and forest protection policies have been implemented. These include:

- **Permitting Plan**: Past NYSERDA solicitations required a comprehensive Permitting Plan be submitted with each proposal. In the Permitting Plan, the proposer had to include "the direct conflict with or proximity to preserved land and open space, degradation of wildlife habitat and adverse impacts on wildlife, negative impacts on ecosystems such as forests, wetlands, and grasslands, and impacts on agricultural production and soil quality".[102] Proposers were directed to: (1) include plans to minimize, remediate or offset potential agricultural impacts and encouraged to avoid siting solar projects on mineral soil groups (MSG) 1-4 and land with active farming activities; (2) consider incorporating dual-use strategies by co-locating farming activities within the solar panel area to support agricultural production in the project site, such as integrating sheep grazing and implementing apiaries along with pollinator-friendly vegetation management practices; and (3) include an assessment of any anticipated tree clearing in woodlands and forests for the construction or operation of the facility, and/or whether the project site is directly adjacent to forests or woodlands. In the expedited RESRFP23-1, the solicitation's minimum permitting threshold has been increased such that proposers must provide proof that the application for their key permit for the bid facility either has been submitted and such

[101] New York State Agricultural Technical Working Group (A-TWG), available at: https://www.nyatwg.com.

[102] NYSERDA, RESRFP21-1 Appendix 2 Permitting Plan Requirements and Guidelines, available at: https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00Pt000000UOZuXEAX.

application is either under review by, or has been issued by, the applicable jurisdictional permitting authority. Thus, eliminating the need for a comprehensive permitting plan to be submitted.

- **Smart Solar Siting Scorecard**: The Scorecard was introduced into RESRFP21-1 as a voluntary measure. The subsequent RES solicitations have since incorporated the Scorecard into the non-price factor evaluation criteria as a required part of applications. The Scorecard works to addresses multiple solar siting considerations and site management practices from the perspective of agricultural, forests, and climate interests.[103] The majority of the Scorecard's point structure is allocated to the agricultural and forested land protection sections. A proposer can obtain points based on the proposed project's Facility Area to avoid exceeding certain threshold impacts to active agricultural land MSG 1-4 and forested lands. The Scorecard offers additional points to applications that elect to commit to optional minimization strategies such as soil conservation, integration of agricultural co-utilization activities, reforestation, and employment of certain community engagement/collaboration participation strategies, among others. The Scorecard has been incrementally improved since its inception in 2021, largely based on feedback from the A-TWG and its specialist committees. One particularly relevant improvement incorporated in 2023 was the integration of Climate and Applied Forest Research Institutes' (CAFRI) New York Forest Carbon Assessment data[104] into the forest lands protection section. The latter enhancement now enables NYSERDA, in collaboration with the CAFRI/SUNY College of Environmental Science and Forestry, to qualify the impact a project may have in terms of carbon stored in aboveground & belowground biomass of living woody vegetation. This is incredibly valuable as a siting tool to be able to differentiate the carbon stocks of forest lands.
- **Agricultural Mitigation Payment**: This provision is a financial disincentive for solar projects that develop on MSGs 1-4. The payment is required for a solar project in an Agricultural District whose constructed Facility Area footprint overlaps with more than 30 acres of MSG 1-4. This policy, beginning with the 2020 RES solicitation, replaced the former Site Character policy that was intended to also protect the State's prime farmland but via a "carrot" approach as opposed to

[103] NYSERDA, RESRFI22-1 Appendix 2. RESRFP22-1 Smart Solar Siting Scorecard, available at: https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00P8z000001Lxl7EAC.

[104] State University of New York College of Environmental Science and Forestry, Climate & Applied Forest Research Institute, available at: https://www.esf.edu/cafri-ny/index.php.

the current "stick" approach. Agricultural Mitigation Payments will be directed to the Farmland Viability Protection Fund.[105] In 2022, to encourage the development of dual-use solar projects, NYSERDA introduced an option to solar projects subject to the agricultural mitigation payment, to request the payment to be deferred and potentially offset by implementing accepted agricultural co-utilization activities. This request is subject to NYSERDA's review and acceptance, in consultation with AGM, of the developer's submitted Agricultural Co-utilization Plan.

- **AGM's Solar Construction Guidelines**: All solar awardees of projects located in New York State are to adopt and employ the provisions of the AGM's Guidelines for Solar Energy Projects - Construction Mitigation for Agricultural Lands.[106]

- **Maintenance of NYSERDA Soils Data and web map viewer**: AGM issues on an annual basis a new version of the New York State Agricultural Land Classification. This resource historically has only been a tabular list of soils by county. In 2020, NYSERDA, in collaboration with AGM and Cornell University, developed a geospatial means to view the New York State Agricultural Land Classification's MSGs and made this tool publicly available to serve as a siting resource to renewable project developers. NYSERDA updates these resources on an annual basis and makes them available through Open-NY.[107]

- **Agrivoltaics**: The state is currently exploring the use of agrivoltaics, which is the co-location of solar PV systems and agricultural activities on the same land, to encourage further development of solar while maintaining and demonstrating viable commercial agriculture operations. Studies are reporting that agrivoltaics can reduce the land-use conflict between solar development and agriculture and boost public support.[108] In 2023, NYSERDA commissioned the Growing Agrivoltaics report to identify potential opportunities and constraints associated with increasing

---

105 New York State Finance Law §99-PP.

106 New York State Department of Agriculture and Markets, Guidelines for Solar Energy Projects - Construction Mitigation for Agricultural Lands (October 18, 2019), available at: https://agriculture.ny.gov/system/files/documents/2019/10/solar_energy_guidelines.pdf.

107 New York State, Open NY, NYSERDA 2024 Soils Data for use in the Large-Scale Renewables and NY-Sun Programs (May 29, 2024), available at: https://data.ny.gov/Energy-Environment/NYSERDA-2024-Soils-Data-for-use-in-the-Large-Scale/7xrz-ds9m/about_data.

108 Green Technology, Resilience, and Sustainability, Do agrivoltaics improve public support for solar? A survey on perceptions, preferences, and priorities (October 23, 2022), available at: https://link.springer.com/article/10.1007/s44173-022-00007-x.

uptake of agrivoltaics projects.[109] NYSERDA's Environmental Research Program issued an Agrivoltaics Research and Demonstration RFP 5752 in hopes to accelerate the identification of New York State appropriate and scalable agrivoltaic opportunities that can support farm viability.

Overall, to support and advance the future project development of renewable energy projects that are compatible with agricultural lands and forests, it is important to execute further assessment and to continue engagement with relevant stakeholders and facilitate the integration of smart siting practices. A-TWG's RAISE committee is working to identify drivers of agricultural land conversion to better understand tradeoffs of solar development related to New York State's agricultural industry and identify feasible study approaches for assessing solar development impacts on regional agricultural productivity and economies.[110] Through RAISE and the Scorecard metrics from each subsequent solicitation, NYSERDA will continue to monitor the program policies effectiveness. To enable interested stakeholders to track and monitor these program policies implementation activity, NYSERDA will be reporting out through Open-NY the agricultural mitigation payments processed from large-scale solar projects and will be making the Scorecards of awarded solar projects from solicitations publicly available once the contracts are executed. This will provide transparent information on the smart solar siting commitments made by each project, such as certain degrees of agricultural/forest avoidance, minimization strategies elected, community engagement claims, and/or mitigation requirements.

Lastly, to achieve the 70% goal, New York State is tasked with balancing renewable energy project development with the protection and enhancement of its agricultural lands and forests. This necessitates the adoption of siting strategies and project procurement practices aimed at mitigating adverse effects of renewable energy initiatives on these key natural resources. Simultaneously, there is a need to maximize the co-benefits and synergies that can be derived from integrating these land uses. However, adding restrictions to the procurement process may limit the land area available for some types of development and add complexity and cost to a project.

---

[109] NYSERDA, Growing Agrivoltaics in New York State: Advancing Understanding of Opportunities to Integrate Renewables into Working Landscapes (Report Number 23-25; October 2023), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Other-Technical-Reports/23-25-Agrovoltaics-in-New-York--acc.pdf.

[110] New York State Agricultural Technical Working Group (A-TWG), Regional Agronomic Impact From Solar Energy (RAISE) Specialist Committee (SC), Meeting Materials (March 1, 2024), available at: https://www.nyatwg.com/raise-specialist-committee.

Transmission Permitting

Given the importance of the grid to supporting renewable energy, transmission siting procedures also impact the pace at which new renewable resources can be interconnected and their level of contribution to the overall energy supply. The State has taken steps to accelerate the pace at which necessary transmission upgrades are identified and constructed.

Beginning in 2020, the Commission has required the utilities to develop plans for transmission investment needed to meet CLCPA goals. Over $5 billion in local transmission investments, which directly impact existing and contracted projects, were identified and approved through 2023. The majority of these upgrades are in advanced development or under construction.

Under the recently enacted RAPID Act, ORES will assume responsibility for transmission permitting on an expedited schedule. ORES's first task under the statute is to issue regulations under Article VIII, which are expected to go into effect in 2025. The full impact of the RAPID Act on transmission siting will not be known until the agency and transmission developers build experience under the new regulations.

Offshore Wind Permitting

Achieving the State's goals for offshore wind generation will depend largely on the efficiency of federal permitting processes. The federal paradigm, as it is presently established in the relevant governing statutes and regulations, involves years of data collection and stakeholder engagement to produce detailed permit applications.[111] Application reviews for the projects that New York is supporting through OREC contracts have required as much as six to eight years.

During the permitting process, there are designated periods for public input. The regulatory agencies involved in the permitting process take these public comments into account, evaluating them to make informed decisions on whether to approve, adjust, or deny the proposed project plans.

To enable offshore wind projects to supply renewable energy to the residents of New York, the energy produced must be integrated with, or transmitted to, the electricity grid of New York. Any segment of the project situated within the territorial limits of New York State, which includes land areas and waters up to

[111] NYSERDA, Offshore Wind, Permitting and Approvals, available at: https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Permitting.

three nautical miles offshore, is subject to adherence to the state's regulations. Table 4 shows the state permitting and consultation requirements for offshore wind development in New York.

Table 4. State permitting and consultation requirements for offshore wind development in New York[112]

Permitting/Consultation Requirement	State Regulatory Agency
Receive permit for the transmission system connecting the offshore wind farm to New York's electricity grid	New York State Public Service Commission
Receive permits for coastal environmental impacts	New York State DEC, New York State Public Service Commission
Receive an easement for underwater cables	New York State Office of General Services
Federal Consistency Review under the New York State Coastal Management Program	New York State Department of State
Receive permit for work on State-owned roads	New York State Department of Transportation

The National Environmental Policy Act (NEPA) differs as it does not require a separate permit. It is a procedural law that mandates an environmental impact assessment for any significant federal action, including projects that receive federal permits. Offshore wind projects are subject to NEPA review.[113]

Most minor and routine actions are exempt from NEPA reviews under categorical exclusions. Projects that are not exempt must undergo an Environmental Assessment, which is an initial evaluation of environmental impacts. Major projects likely to significantly impact the environment require an Environmental Impact Statement, which includes a public review and comment period for local communities and interest groups. Where federal agency approvals are needed, most significant renewable energy projects necessitate a NEPA review.

The federal government has recognized the need to streamline the process for offshore wind projects. For example, in 2020 the Biden Administration introduced the FAST-41 process to improve coordination, transparency, and accountability.[114] However, it is not clear what impact these federal efforts will have on

---

112 Id.

113 U.S. Department of Interior, Bureau of Ocean Energy Management, National Environmental Policy Act and Offshore Renewable Energy, available at: https://www.boem.gov/renewable-energy/national-environmental-policy-act-and-offshore-renewable-energy.

114 Permitting Dashboard Federal Infrastructure Projects, FAST-41 Covered Projects, available at: https://www.permits.performance.gov/projects/fast-41-covered.

the timing of future offshore wind generation projects. Projections for offshore wind's contribution to State goals should remain conservative in terms of permitting time frames.

3.7 State Electric Load

The 70% goal in the CLCPA requires that the State's LSEs procure at least 70% of the State's electric load from renewable resources. Accordingly, progress towards and achievement of this goal depends significantly on both the projected future statewide electric load and the actual statewide electric load in the year of goal achievement.

After two decades of stable electricity demand, the United States is projecting an increase in electricity usage in part due to data center expansion, clean tech manufacturing growth, and electrification efforts.[115] New York State faces similar challenges as large load customers are expected to come online due to economic development and as electrification efforts continue to shape the State's energy landscape.[116] Load forecasts developed by the NYISO have been increasing steadily over the past few years.[117] The implications of this recent expected increase in statewide electric load on the amount of renewable generation needed to reach the 70% goal and the path towards achieving the goal are addressed in Section 5.

National Perspective

The national increase in energy demand is driven by economic development projects including clean-technology manufacturing facilities and data centers.[118] As of April 2024, IRA incentives and investments have supported the announcement of over 300 new clean economy projects and created over 100,000

---

[115] U.S. Energy Information Administration, Use of Electricity (December 18, 2023), available at: https://www.eia.gov/energyexplained/electricity/use-of-electricity.php; Grid Strategies, The Era of Flat Power Demand is Over (December 12, 2023), available at: https://gridstrategiesllc.com/reports/.

[116] New York Independent System Operator, Inc., 2023-2032 Comprehensive Reliability Plan (November 28, 2023), available at: https://www.nyiso.com/documents/20142/2248481/2023-2032-Comprehensive-Reliability-Plan.pdf.

[117] NYISO, 2024 Load and Capacity Data, available at: https://www.nyiso.com/documents/20142/2226333/2024-Gold-Book-Public.pdf/170c7717-1e3e-e2fc-0afb-44b75d337ec6.

[118] Grid Strategies, The Era of Flat Power Demand is Over (December 12, 2023), available at: https://gridstrategiesllc.com/reports/.

jobs.[119] The majority of these jobs are in clean tech manufacturing supporting solar, storage, EV, and hydrogen initiatives.

Table 5. Clean Energy Works – total projects announced by industry type, August 2022–April 2024[120]

Type	Projects	Jobs	Investment (Millions)
Generation	37	3,744	$8,615
Manufacturing	254	100,950	$112,081
R&D	10	610	$453
Recycling	4	150	$71

While manufacturing increases electric demand, the significant increase in demand for power is largely attributed to data centers, due to the rapid advancements in artificial intelligence and crypto-mining in which currencies like bitcoin are transacted and minted.[121] Figure 3 illustrates the forecasted increase in demand in North America due to data centers.[122]

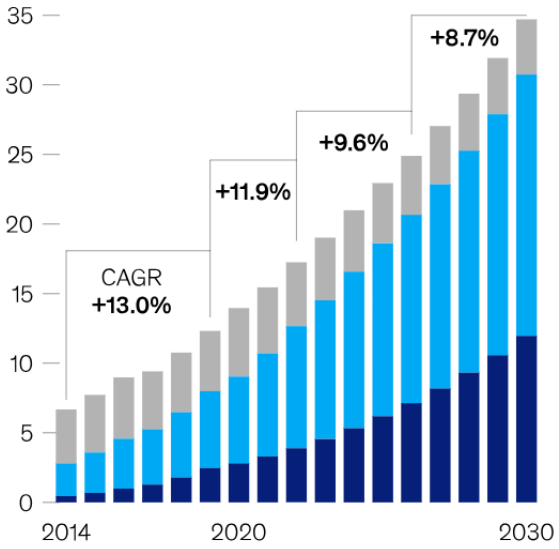
[119] E2, Clean Economy Works, available at: https://e2.org/announcements/.

[120] E2, 100,000 Clean Energy Manufacturing Jobs Announced Since IRA (May 7, 2024), available at: https://e2.org/releases/100000-clean-energy-manufacturing-jobs-announced-since-ira-companies-add-1500-new-jobs-in-april/.

[121] Grid Strategies, The Era of Flat Power Demand is Over (December 12, 2023), available at: https://gridstrategiesllc.com/reports/.

[122] McKinsey and Company, Investing in the rising data center economy (January 17, 2023), available at: https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/investing-in-the-rising-data-center-economy. Demand is measured by power consumption to reflect the number of servers a data center can house and includes MWs for storage, servers, and networks.

Figure 3. Forecasted National Energy Demand due to Data Centers (GWs)

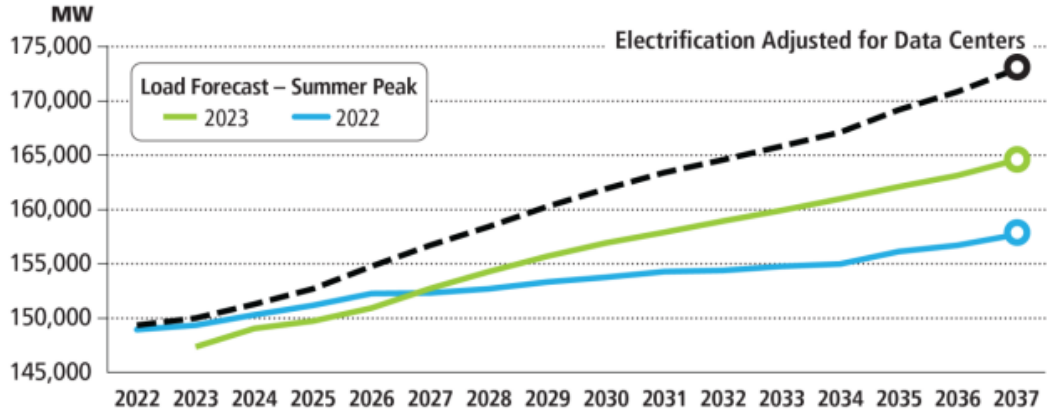


Regional Perspective

In the Mid-Atlantic states, impacts of clean technology manufacturing, data centers, and electrification are expected to increase demand. Figure 4 illustrates how updated electrification and data center demand load assumptions are forecasted to increase both overall demand and summer peak demand in the PJM Interconnection, LLC (PJM) territory.[123]

[123] PJM, Energy Transition in PJM: Resource Retirements, Replacements & Risks (February 24, 2023), p. 15, available at: https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx.

Figure 4. PJM Impacts of Electrification and Data Center Load on Demand Forecasts



4 Contracted Renewables

NYSERDA's pipeline of contracted renewables[124] from previous Tier 1 and offshore wind solicitations has undergone significant change since the 2022 CES Annual Progress Report, primarily as a result of the supply chain and related challenges discussed above in Section 3.[125] This section provides updated information on these changes as well as the additional renewables projects added to NYSERDA's portfolio of contracted renewables from the most recent Tier 1 and offshore wind solicitations. Further data is also provided in Appendix A, which includes both operational projects and contracted projects still in development, and sets out details on distribution of projects by size and load zone.

Since the outset of the CES and the passage of the CLCPA, and as of October 2023, NYS has awarded more than 170 large-scale renewable projects representing nearly 20,000 MW, which if built would reflect more than $55 billion in project investment, and add thousands of jobs to the 171,000 jobs already represented in New York's clean energy sector in 2022.

However, on June 7, 2023, the Alliance for Clean Energy New York, Sunrise Wind, and Empire Offshore Wind/Beacon Wind filed separate petitions collectively asking the Commission to authorize NYSERDA to amend existing contracts for 86 land-based large scale renewable projects and four offshore wind projects outside of the competitive process. The petitions argued that the projects had been exposed to unprecedented global and regional supply chain bottlenecks, high inflation, and increases in the cost of capital, driven by rising interest rates. In addition, the petitions identified impacts associated with the war in Ukraine, including increased global demand for renewable energy and resulting shortages and price increases for key components and equipment. In the course of that proceeding, the NYSERDA also submitted comments, articulating that despite "petitioners claims that high interest rates were unforeseen, it does not appear reasonable for developers to have assumed that a low interest rate environment would persist throughout the period in which their projects were to be financed."[126]

---

[124] Throughout this Report, the term "contracted renewables" is used to identify projects that are under contract but not yet operational.

[125] Case 15-E-0302, Clean Energy Standard Annual Progress Report – 2022 Compliance Year (filed January 1, 2024).

[126] Case 15-E-0302, NYSERDA Comments on Petitions Requesting Price Adjustments to Existing Contracts (filed August 28, 2023), p. 10.

On October 12, 2023, the Commission issued its Order Denying Petitions Seeking to Amend Contracts with Renewable Energy Projects (October 2023 Order) on the grounds that competitive solicitations remain the best mechanism by which to meet the Commission's obligation to establish just and reasonable rates for renewable generation on the path to meeting the renewable energy goals of the CLCPA.[127] Project developers subsequently canceled contracts associated with 88 projects.[128]

Following the October 2023 Order, New York State released the Action Plan to support continued development and growth for large-scale renewable energy development in the State. As part of the Action Plan, NYSERDA launched expedited competitive solicitations for both the Tier 1 (land-based) and Offshore Wind programs.[129]

4.1 Tier 1

As noted above, the Commission's October 2023 Order resulted in the development of the Action Plan, which offered a path to allow uneconomic Tier 1 agreements to terminate and participate in future solicitations.

On November 30, 2023, NYSERDA issued the seventh annual RES request for proposals, RESRFP23-1.[130] As a condition of participation in this solicitation, renewable energy projects that held a NYSERDA contract or award were required to mutually terminate their contracts or rescind their awards prior to participation in RESRFP23-1. Per the Action Plan, this accelerated competitive procurement offered an opportunity for projects impacted by the October 23 Order to seek new contracts. The results of this

---

127 Case 15-E-0302, Order Denying Petitions Seeking to Amend Contracts with Renewable Energy Projects (issued October 12, 2023).

128 New York State Open NY, Large-Scale Renewable Projects Reported by NYSERDA: Beginning 2004, available at: https://data.ny.gov/Energy-Environment/Large-scale-Renewable-Projects-Reported-by-NYSERDA/dprp-55ye. Case 15-E-0302, Order Denying Petitions Seeking to Amend Contracts with Renewable Energy Projects (issued October 12, 2023).

129 NYSERDA, Solicitations for Large-Scale Renewables, available at: https://www.nyserda.ny.gov/All-Programs/Large-Scale-Renewables/RES-Tier-One-Eligibility/Solicitations-for-Long-term-Contracts. Offshore Wind Solicitations, available at: https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/Focus-Areas/Offshore-Wind-Solicitations.

130 NYSERDA, 2023 Solicitation, available at: https://www.nyserda.ny.gov/All-Programs/Large-Scale-Renewables/RES-Tier-One-Eligibility/Solicitations-for-Long-term-Contracts.

expedited solicitation, announced on April 29, 2024, included provisional awards for 24 solar and wind projects, amounting to more than 2.4 GW of new renewable energy capacity.

On June 20, 2024, NYSERDA issued the eighth annual RES request for proposals, RESRFP24-1. Through the 2024 solicitation, NYSERDA seeks to procure Tier 1 eligible RECs from eligible facilities that enter commercial operation on or after January 1, 2015, and on or before November 30, 2026, unless extended to November 30, 2029. Step One Eligibility Applications are due by July 15, 2024, and Step Two Bid Proposals are due by August 8, 2024.

Table 6 summarizes the status of awarded and contracted facilities from each solicitation as of June 1, 2024, and details Bid Quantity (in GWh) and the number of Tier 1 projects that are operating, under development, or awarded but not yet contracted.

Table 6. Bid Quantity (GWh) and Number of Awarded and Contracted Facilities for RPS and RESRFP Solicitations as of June 1, 2024[131]

Bid Quantity (GWh)		Tier 1 RPS	17-1	18-1	19-1	20-1	21-1	22-1	Total
Operational	GWh	1,398	1,067	262	119	6	0	0	2,852
	# Projects	15	10	2	3	1	0	0	31
Under Development	GWh	54	342	320	37	0	0	0	752
	# Projects	2	2	1	1	0	0	0	6
Contract Pending	GWh	0	0	0	0	0	0	3,959	3,959
	# Projects	0	0	0	0	0	0	16	16
Total GWh		1,452	1,409	582	156	6	0	3,959	7,564
Total # Projects		17	12	3	4	1	0	16	53

[131] Contract Pending status does not include projects from RESRFP23-1 as details on awards will be published once agreements associated with these awards are executed.

NYSERDA provides data updates regarding CES procurements through the large-scale renewables dataset on Open-NY.[132] Projects reported by NYSERDA represent projects which NYSERDA has awarded, approved, or are pending approval of NYSERDA agreements. Details on awards resulting from solicitations in 2023 and later will be published once agreements associated with these awards are executed.

4.2 Offshore Wind Standard

Following NYSERDA's July 2022 offshore wind solicitation (ORECRFP22-1), three provisional awards were announced in November 2023 totaling 4,032 MW of offshore wind energy to Attentive Energy One (1,404 MW), Community Offshore Wind (1,314 MW), and Excelsior Wind (1,314 MW). However, subsequent to the provisional award announcement, material modifications to the projects caused technical and commercial complexities between provisional awardees and their partners, resulting in the provisionally awarded parties' inability to come to terms. Of note, GE Vernova's offshore wind turbine product pivot away from the initially proposed 18 MW Haliade-X turbine platform to a 15.5/16.5 MW platform caused material changes to projects proposed into ORECRFP22-1. Given these developments, no final awards were made under this solicitation and ORECRFP22-1 was concluded.

Separately, and in parallel with the petition on inflationary pressures from supply chain shortage and high-interest rates affecting onshore projects, offshore wind developers holding contracts with New York State also petitioned the Commission in June 2023 for financial relief to defray increasing costs of renewable energy projects. While the Commission's October 2023 Order rejected the requests based on a long history of relying on competitive procurements to secure the best prices, in parallel New York State also issued the Action Plan, reinforcing the State's commitment to renewable energy development.[133] Among other actions, the Action Plan identified an expedited OREC RFP and the completion of Master Plan 2.0 for new federal lease areas as next steps to continue development of offshore wind in New York.

On November 30, 2023, NYSERDA issued its fourth offshore wind solicitation (ORECRFP23-1) on an accelerated timeline with proposals due January 25, 2024. Following the release of the solicitation,

---

[132] See, Open NY, Energy And Environment, available at: https://data.ny.gov/browse?category=Energy+%26+Environment&utf8=%E2%9C%93.

[133] NYSERDA, New York State's 10-Point Action Plan to Expand a Thriving Large-Scale Renewable Industry (October 2023), available at: https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Programs/Offshore-Wind/10-point-plan.pdf.

mutual termination agreements were reached between NYSERDA and the Empire Wind 2 and Beacon Wind 1 projects, which were selected under NYSERDA's second offshore wind solicitation (ORECRFP20-1). The two projects selected in the first solicitation (ORECRFP18-1), Empire Wind 1 and Sunrise Wind, both re-bid their projects into the fourth solicitation (ORECRFP23-1), along with a new project, Community Offshore Wind 2.

On February 29, 2024, Governor Hochul announced the conditional award of two offshore wind projects from the fourth offshore wind solicitation – a planned 810-megawatt project, Empire Wind 1 (developed by Equinor ASA), and Sunrise Wind, a planned 924-megawatt project (developed by Ørsted and Eversource). Both contracts were executed by June 2024. These projects, totaling over 1,700 megawatts of clean energy, will be the largest power generation projects in New York State in over 35 years once they enter operation in 2026 and will continue progress towards achievement of the goal to develop 9 GW of offshore wind energy by 2035.[134] Table 7 summarizes the Bid Quantity (in GWh) and number of State offshore wind facilities as of June 1, 2024. This includes two contracted facilities under OREC solicitation ORECRFP23-1 as well as South Fork Wind Farm which is under contract with LIPA. Information regarding OREC agreements is reported in Open NY.[135]

Table 7. Bid Quantity (GWh) and Number of NYS Offshore Wind Facilities as of June 1, 2024

[134] New York State, Governor Hochul Announces Two Offshore Wind Project Awards (February 29, 2024), available at: https://www.governor.ny.gov/news/governor-hochul-announces-two-offshore-wind-project-awards-deliver-clean-power-2026.

[135] New York State Open NY, Large-Scale Renewable Projects Reported by NYSERDA: Beginning 2004, available at: https://data.ny.gov/Energy-Environment/Large-scale-Renewable-Projects-Reported-by-NYSERDA/dprp-55ye.

Bid Quantity (GWh)		LIPA	23-1	Total
Operational - *Not Under NYSERDA Contract*	GWh	464	0	464
	# Projects	1	0	1
Under Development	GWh	0	7,539	7,539
	# Projects	0	2	2
Total GWh		464	7,539	8,003
Total # Projects		1	2	3

4.3 Tier 4 – New York City Renewable Energy

The PSC's 2020 CES Order established a new Tier 4 program within the CES. This program aims to increase the penetration of renewable energy in New York City and thereby reduce reliance on fossil fuel generation in this densely populated area. Eligible Tier 4 resources include electricity generated through the use of the following technologies: solar thermal, solar PV, on-land wind, hydroelectric, geothermal electric, geothermal ground source heat, tidal energy, wave energy, ocean thermal, and fuel cells that do not utilize a fossil fuel resource in the process of generating electricity. Non-hydroelectric resources must have entered commercial operation on or after October 15, 2020, and hydroelectric resources must be existing or already under construction as of October 15, 2020. All eligible resources must be either located in New York City, or their energy must be delivered through a new transmission interconnection to the City.

NYSERDA issued a Tier 4 Request for Proposals on January 13, 2021,[136] and evaluated bids from seven proposers. On September 20, 2021, the selection of two projects was announced: the Clean Path NY (CPNY) project and the Champlain Hudson Power Express (CHPE) project. Following contract negotiations, two executed contracts were submitted by petition for Commission approval on November 30, 2021,[137] followed by a public comment period that ran through February 21, 2022. On April 22, 2022,

[136] NYSERDA, Solicitation and Award: Tier 4 2021 Solicitation (Closed), available at: https://www.nyserda.ny.gov/All-Programs/Large-Scale-Renewables/Tier-Four/Solicitation-and-Award.

[137] Case 15-E-0302, Petition Regarding Agreements for Procurement of Tier 4 Renewable Energy Certificates (filed November 30, 2021)

the Commission issued an Order approving the 25-year contracts for CPNY and CHPE.[138] Energy delivery from the two Tier 4 contracts is expected in 2026 and 2027, allowing ample time for a thoughtful and considered planning process to address the complexities associated with the Tier 4 program without risk to program delivery.

These are the largest transmission projects contracted in New York State in the last 50 years and will add 2,550 MW to the State's grid using HVDC technology. The CPNY project leverages the State's portfolio of large-scale renewable energy projects, while the CHPE project will deliver clean, reliable, hydropower from Quebec. The projects are expected to deliver 18 million MWh of renewable energy to Zone J annually, more than a third of New York City's annual electric consumption and will greatly reduce the City's reliance on fossil fuel combustion for electricity.

NYSERDA's contracts with each project are for the purchase of RECs for clean energy delivered into New York City. NYSERDA's purchase of these RECs will commence for each respective project once the project has: (1) obtained all required permits and local approvals; (2) completed construction; and (3) is delivering power to New York City. The CHPE project began construction in late 2022 and is expected to begin operation in 2026. The CPNY project is actively moving though the required permitting processes and is expected to begin operation in 2027.

[138] Case 15-E-0302, Order Approving Contracts for the Purchase of Tier 4 Renewable Energy Certificates (issued April 14, 2022)

5 The Path to the 70% Goal

This section updates the quantification of the amounts of renewable resources still to be procured to reach the 70% goal. The total amount of renewables that will be needed depends on the statewide electric load forecast; the amount still to be procured is derived by deducting the amount of operational renewables and current commitments, as quantified further in this Report, from the estimated future electric load. Based on this approach, this section offers recommendations on renewables procurement quantities going forward.

5.1 Load Forecast

The 2020 CES Order estimated the 2030 statewide electric load as 151,678 GWh.[139] This Report updates that projection to a base case load expectation of 164,910 GWh in 2030, building from NYSERDA's Integration Analysis Reference Case.[140] Key assumptions of this revised forecast are as follows:

- Most notably, when compared to the forecast utilized in the 2020 CES Order, this Report's forecast includes a significantly higher estimate of load growth associated with large industrial loads, quantified as an additional 10,030 GWh by 2030 based on NYISO projections. This additional load expectation reflects a recent increase in industrial development both in New York and across the nation and accounts for almost the entire increase in load forecast compared to the expectation in 2020. Large loads are discussed in more detail in Section 3.7.
- In all other respects, this Report's base case reflects the Reference Case presented in NYSERDA's Integration Analysis. In particular, the forecast includes 3,105 GWh of load associated with new demand from air- and ground-source heat pumps, which equates to 4% of primary building heating system stocks by 2030, and 8,985 GWh of additional load from electric vehicles, which equates to 17% of on-road vehicle stocks by 2030. Note that the load associated with primary building heating systems includes energy savings due to the impact of energy efficiency. The energy efficiency implicit in the building load reflects annual adoption rates of

[139] 2020 CES Order.

[140] See, Studies Completed by NYSERDA Supporting the Greenhouse Gas Emission Report and the Integration Analysis, available at: https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/Greenhouse-Gas-Emissions.

efficient lighting, Heating Ventilation Air Conditioning (HVAC), non-HVAC appliance equipment, and efficient building shells as depicted in the Integration Analysis Reference Case.[141]

The analysis for this Report also considers sensitivities addressing potential higher and lower load growth outcomes:

- **Low load growth sensitivity**: The scale and timing of additional large industrial loads is uncertain. A low load growth sensitivity assumes that the additional 10,030 GWh of large loads in the base case do not become operational by 2030 and, accordingly, reflects a load forecast of 154,880 GWh by 2030, or only a 3,202 GWh increase compared to the load forecast that underpinned the 2020 CES Order.

- **High load growth sensitivity**: A high load case reflects the CGPP State Scenario, provided as input to the 2024 NYISO System Resource Outlook.[142] The assumptions employed in the State Scenario are informed by NYSERDA's Integration Analysis Scenario 2. The high load sensitivity includes 10,640 GWh of electric vehicle demand, a 1,655 GWh increase beyond the reference case assumption. Electrification demand assumptions more than triple when compared to that of the reference case, reaching a 2030 demand of 15,575 GWh. Again, note that the load associated with primary building heating systems includes energy savings due to the impact of energy efficiency. Large load assumptions are consistent with those of the base case. This case projects 2030 statewide load of 174,876 GWh.

5.2 70% Goal Quantification

Under the base case load forecast assumption of 164,910 GWh by 2030 as described above, the 70% goal equates to 115,437 GWh. Table 8 below summarizes the contributions towards the goal from currently operational and contracted renewables, as set out above in Section 2 and Section 4 of this Report. In addition, it projects 10 GW of distributed generation by 2030 secured outside the CES framework.

Sections 2 and 4 quantify operational and contracted/awarded renewables based on, respectively, the actual historic data for existing renewables and the expected amount of future generation from currently

---

[141] Id.

[142] Case 21-E-0629, In the Matter of the Advancement of Distributed Solar, New York's 10 GW Distributed Solar Roadmap (filed December 17, 2021) (10 GW Roadmap).

contracted projects. For the purpose of the assessment of the path towards the 70% goal, this section adds further considerations in terms of the extent to which generation from existing renewables may reduce over the coming years and contracted future renewables may not be deployed or deployed in time (attrition). The 2020 CES White Paper conducted a similar analysis assuming 20% attrition on contracted renewables. Based on the challenges and resulting attrition experienced for both Tier 1 and offshore wind projects, in particular over the past twelve months, as described in Sections 3 and 4, this Report applies a more conservative assumption of 30% attrition of contracted and yet-to-be-procured projects. Similarly, where the 2020 CES White Paper assumed negligible levels of reduction in generation from baseline renewables, recent observations indicate significant uncertainty in generation amounts from these resources, in particular regarding imported renewable energy.[143] Accordingly, this Report applies a more conservative approach also for the amount of imported baseline renewables shown in Table 8, also assumed as a reduction of 30%.

With these conservative assumptions, the expected amount of renewable generation from operational and awarded/contracted sources in 2030 totals 73,292 GWh. Under the base case forecast for the 2030 statewide electric load, there is a renewable energy supply deficit of 42,145 GWh that would have to be addressed through future procurements in order to reach the 70% goal amount of 115,437 GWh.

[143] See, Hydro Quebec, Strategic Plan 2022-2026, available at: https://www.hydroquebec.com/about/publications-reports/strategic-plan.html.

Table 8: Progress towards 70% Goal

Renewable generation (GWh)	2030 after assumed attrition/ reduction
Operational as of 2022	29,289
Imports 2022	6,158
Operational after 2022	2,245
Contracted onshore	17,417
Contracted offshore wind	7,539
NY Sun 10 GW target by 2030	10,644
Total	**73,292**
70% Goal (base load forecast, 2030)	115,437
Gap to 70% Goal (2030)	42,145

Note: "Imports 2022" is 8,797 GWh before reduction assumptions are imposed, and "Contract onshore" is 20,242 GWh before attrition assumptions are imposed.

To fill the expected gap, three Tier 1 annual solicitations – those for 2024, 2025, and 2026 – are currently scheduled and will seek projects capable of deploying by 2030.[144] However, the amounts procured in these solicitations would need to be adjusted to secure the needed quantity of 42,145 GWh. The analysis suggests NYSERDA would have to procure approximately 14,048 GWh per solicitation, assuming no project attrition, or, assuming a 30% attrition rate, an amount of 20,068 GWh per solicitation. This volume is significantly higher than the annual procurement quantity of 4,500 GWh per Tier 1 solicitation (before attrition) estimated in the 2020 CES White Paper and 2020 CES Order.

This quantification confirms the impact of the combination of challenging recent dynamics discussed in more detail in Section 3, most prominently:

[144] Offshore wind projects to be procured in upcoming solicitations under the Offshore Wind Standard are not expected to be completed in time for 2030 and are not included in this discussion.

- The global pressures from high inflation, high interest rates, and supply chain cost increases and the resulting recent attrition of contracted Tier 1 and offshore wind resources (leading also, as described above, in more conservative future attrition assumptions being applied in the estimates presented here); and
- Significant increases in expected electric load growth over the next several years, both from economic development and industrial growth as well as from beneficial electrification efforts on electric vehicle and heat pump deployment, compared to the earlier electric load forecast.

The amounts of Tier 1 project deployment that would be needed, as quantified above, in order to achieve the 70% goal in 2030 may far exceed what the renewables industry could be expected to develop in this timeframe. Appendix B estimates that the maximum annual new project development rate would likely be in the range of 6,000-7,000 GWh per year at least in the near term, and even this range of project development may not translate to Tier 1 awards, since not all projects would be assessed as suitable for award in the competitive solicitation process.

Table 9 below illustrates feasible timeframes reflecting updated development estimates, new load growth forecasts, and CES reform options that can accelerate progress. Key considerations for this assessment include:

- Statewide load continues to increase under each of the three load forecasts discussed above, such that the amount of renewable generation needed to achieve the goal increases year by year, implying that if the 70% goal is to be achieved after 2030, continued renewables deployment will need to exceed such load increase.
- Authorized renewable procurement that is expected to deploy after 2030 currently only includes offshore wind under the 2035 9 GW offshore wind goal. In line with the overall conservative assessment approach set out above, Table 9 assumes that approximately 6 GW of the 9 GW offshore wind goal would achieve deployment by 2033, and the remaining 3 GW closer to the 2035 goal date.
- In addition to offshore wind, the quantification in Table 9 assumes continued deployment of both Tier 1 and distributed generation resources beyond 2030 (without prejudice to the Commission's determination in this regard). Deployment of distributed generation assumes the increase of the

2030 10 GW goal currently under consideration by the Commission,[145] as well as continued roll-out of distributed generation beyond 2030 at an annual amount of 1 GW (consistent with the approximate annual rate of progress on the way towards the 10 GW goal). This Report does not include analysis on action needed to enable such continued deployment of distributed generation, and the assumption made in this respect is thus subject to such further analysis, development of proposals, and consideration by the Commission.

Table 9 Illustrative Path to 70% Goal

GWh, cumulative		2030	2031	2032	2033
Statewide load forecast	Base	164,910	167,130	169,630	172,390
	Low	154,880	157,100	159,600	162,360
	High	174,876	183,360	191,930	200,610
70% goal	Base	**115,437**	**116,991**	**118,741**	**120,673**
	Low	108,416	109,970	111,720	113,652
	High	122,413	128,352	134,351	140,427
Currently operational and contracted, incl 10 GW DG		73,292	73,292	73,292	73,292
Offshore wind beyond NY4		0	6,251	12,502	18,753
Distributed generation beyond 10 GW goal		1,512	2,722	3,932	5,142
Tier 1 for 6 RfPs 2024-2029 @ GWh/y		11,760	15,680	19,600	23,520
Total Renewables		86,565	97,946	109,327	120,707
Gap to 70% (base load forecast)		**28,872**	**19,045**	**9,414**	**0**

All scenarios reflected in this analysis represent positive and transformative levels of renewable energy deployment across New York State, involving hundreds of renewable energy projects that will mitigate climate change by reducing greenhouse gas emissions, improve local air quality, and foster clean energy careers and economic development. Moreover, much of the load growth reflected in the analysis is driven by the beneficial electrification of transportation and buildings, which will also significantly contribute to attainment of overall emissions reduction goals. For example, the increased use of electric vehicles will decrease reliance on fossil fuels, while the electrification of heating systems in buildings will reduce the carbon footprint of the residential and commercial sectors, leading to healthier communities and a more sustainable environment.

While various dynamic factors impact the trajectory to 70% renewable electricity, Table 9 illustrates a potential path to achieving the goal assuming all the various factors listed above. It shows that, as the statewide load increases, the renewable energy needed to achieve 70% also increases from 115,437 GWh

[145] https://www.nyserda.ny.gov/About/Funding/Regional-Greenhouse-Gas-Initiative; https://www.epa.gov/greenhouse-gas-reduction-fund/solar-all; see, 10 GW Roadmap.

to 120,673 GWh by 2033. This drives the incremental deployment needed from 42,145 GWh to 47,381 GWh over that period. Incremental contributions from offshore wind and distributed generation, based on the assumptions discussed above, are quantified as 23,895 GWh by 2033. This leaves a remaining gap of 23,486 GWh, which this Report proposes to fill through expanded procurement of onshore large-scale renewables resources, quantified here through a total of six Tier 1 solicitations – the three discussed above, plus three further solicitations through 2029 assumed here to enable continued Tier 1 deployment beyond 2030.[146]

To achieve this pathway, just over 3,900 GWh of onshore large-scale renewables resources would need to be procured per year, or approximately 5,600 GWh per year with attrition. This would be an increase from the 4,500 GWh per year (before attrition) estimated in the 2020 CES Order.

This combination of efforts may result in achievement of 70% statewide power generation from renewables before 2033 if actual load growth is lower than the base case forecast, in 2033 under the base case scenario, or by 2035 in the high load growth scenario. Further considerations to goal achievement under higher and lower load forecast scenarios are included in Appendix B.

The approach suggested by the above scenario analysis does not eliminate future uncertainty on goal achievement, but the more conservative assumptions applied significantly reduce it. This quantification demonstrates the important contribution of offshore wind projects in reaching the increased renewables level needed to achieve 70% as swiftly as possible after 2030 as the load forecast continues to increase.

Given the various dynamic factors at play and the high level of uncertainty (including the scale and timing of load growth), the current biennial review cadence of the CES is appropriate to continue reviewing future developments. The next CES Biennial Review is expected to take place in 2026, and another in 2028, both of which will provide opportunities for refreshed assessments of progress and serve to manage uncertainty.

---

[146] While this analysis assumes that the Tier 1 program will continue to be the main mechanism for procuring large-scale onshore renewables, the quantification presented here would include such resources from all sources within or outside the Tier 1 program, including voluntary RECs and any renewables procured by NYPA or LIPA whether through Tier 1 or otherwise.

5.3 Proposals

The 70% target envisioned by the CLCPA is extraordinarily ambitious and has subsequently been rendered even more ambitious by the combination of deployment headwinds and load growth tailwinds. The Commission, NYSERDA, and the State as a whole have undertaken an unprecedented mobilization of procurement, permitting reform, workforce development, and complementary actions to drive progress toward the 70% goal. While the above analysis concludes that a delay in achieving the 70% goal may be unavoidable, the path set out in this Report involves a combination of actions that are realistically achievable and designed to reach the 70% goal as rapidly and cost effectively as possible. On this basis, this Section recommends the following steps with regard to the Tier 1, offshore wind, and distributed generation programs in order to pursue this path.

Tier 1

The analysis presented above recommends that the average annual Tier 1 solicitation amount be updated to 5,600 GWh per year of Tier 1 eligible RECs. As per the 2020 CES Order, this Report recommends maintaining the current approach whereby that figure is neither applied as a minimum or maximum amount but rather a guideline. The advantage of this approach is that it enables NYSERDA in any given procurement to either procure more and further reduce any delay to achieving renewable energy goals, or, conversely, procure less if insufficient suitable projects are available for award. This Report recommends that future revisions of this average annual amount should take place through upcoming CES Biennial Reviews, the next of which will take place in 2026.

As noted in Section 3, transmission constraints and interconnection costs contribute to curtailment and generation project attrition. To meet objectives, generation procurement strategies should take into account the critical need for transmission infrastructure to be in place in a time frame that supports the interconnection of the resources needed to meet the CLCPA goals. Thus, increased generation solicitations should align with known plans and schedules for transmission investment, both in terms of quantities solicited and delivery expectations.

The above analysis also shows the importance of continued Tier 1 procurement beyond the current authorization end date of 2026 to enable the 70% goal to be achieved if not in 2030, as soon as possible thereafter. This Report recommends that NYSERDA’s Tier 1 procurement authority be extended by at least three years to 2029.

Such an extension of NYSERDA's Tier 1 procurement authority would also fit with the timeframes for identifying and executing on transmission investment that would maximize the ability of the generation infrastructure to meet the 70% goal in the nearest possible time frame.

These recommendations also fulfill a critical role in promoting long-term certainty to renewables project developers and investors, helping to further increase the level of project development activity and continuing to attract project developers and renewables supply chain investment to New York.

Offshore wind

As discussed in Section 3 and 4, recent challenges affecting progress have not been limited to onshore renewables and have also impacted New York's offshore wind procurement efforts. As in the Tier 1 program, project attrition and delay are a risk that should also be considered in the design of the Offshore Wind Standard. Solicitations for more than 9 GW may therefore be needed and appropriate in order to deliver deployment of the goal amount of offshore wind by the deadline of 2035. At the same time, the above analysis emphasizes the significance of offshore wind deployment not only to achieve the 9 GW offshore wind target but also to the 70% renewables goal. Accordingly, this Report recommends that the Commission approve procurement flexibility such that NYSERDA and DPS Staff be given the authority to seek more than 9 GW of offshore wind if and to the extent this is assessed as necessary to cost-effectively achieve the 9 GW goal.[147]

Distributed Generation

While this Report is limited to consideration of CES programs, this Report recommends that NYSERDA be instructed to carry out further analysis and develop proposals for an increase in the goal and authorization levels for distributed generation beyond the current goal of 10 GW by 2030, and any Commission or programmatic action needed to enable achievement of such proposals. To the extent such further consideration of the role of distributed generation would lead to a higher or lower level of distributed generation by 2030 and beyond than assumed in the above analysis, this could lead to a

[147] Procurement of more than 9 GW offshore wind may necessitate additional environmental review as the prior Supplemental Generic Environmental Impact Statement envaulted the impacts of procuring up to 9 GW of offshore wind generation; see, Case 15-E-0302, Final Supplemental Generic Environmental Impact Statement for the Climate Leadership and Community Protection Act (issued September 17, 2020).

corresponding adjustment of the annual Tier 1 procurement amount of 5,600 GWh proposed above, which would be considered at the next Biennial Review.

6 CES Reform Options

Section 5 proposes critical adjustments to NYSERDA's procurement authorization and the procurement contribution of the Tier 1 program needed to achieve the 70% goal, as well as recommending further procurement flexibility for the Offshore Wind Standard and a follow-up process to consider an extension of goals for distributed generation. At the same time, achieving the 70% goal is not solely dependent on procurement amounts. It is important to also consider the extent to which the design of these programs throughout their operation, since 2016 for Tier 1 and since 2019 for the Offshore Wind Standard, has been successful in incentivizing and selecting the renewable projects that are most likely to succeed and offer the greatest value to ratepayers. This section considers several options for improvement and reform of the design of the Tier 1, Tier 2, and offshore wind programs, as well as an option for an expanded utility role in developing generation, and invites views from stakeholders. In doing so, it reflects on some of the factors affecting progress discussed in Section 3 where opportunities can be identified to reduce the extent to which projects are exposed to risk and uncertainty through the design of these CES programs.

6.1 Tier 1 Program

NYSERDA, acting as the State's central clean energy procurement agency, currently conducts annual competitive solicitations for long-term purchase of eligible Tier 1 RECs. Tier 1 solicitations are continually adapted to changing market conditions. The most recent Tier 1 solicitation, RESRFP24-1 issued on June 20, 2024, included key provisions from the latest rounds of renewable energy procurements related to inflation indexing, labor provisions, stakeholder engagement requirements, new requirements emphasizing the importance of climate resiliency in project design, disadvantaged community commitments, agricultural land preservation, and other priorities intended to maintain the policy objectives introduced in prior solicitations to ensure an equitable energy transition.

This section presents potential program design adjustments and improvements related specifically to the Tier 1 program, which are intended to award projects with the greatest value to New York State and minimize attrition of awarded projects.

Project Selection

Under the current Tier 1 solicitation scoring structure, 70% of the scoring criteria relates to the bid price of the project, while 30% is related to non-price factors (20% Project Viability, Operational Flexibility and Peak Coincidence; and 10% Economic Benefits to New York State). Under this model, the projects

that deliver the most MWh for the lowest cost generally rank the highest and are more likely to be awarded REC purchase contracts. However, other criteria, including deliverability, impacts to agricultural land, capacity factor, and when a resource generates energy, are also important factors in determining both the success of the project achieving operational status and for supporting the future electricity generation needs of New York State.

Dedicating 70% of scoring to price has been a foundation of RES Tier 1 procurements and reflects the emphasis on cost containment while pursuing the State's clean energy goals. This construct was reaffirmed in the 2020 CES Order while at the same time recognizing the growing importance of project viability within the bid evaluation and award process.[148] The RES program continues to grow and evolve along with the Tier 1 market in New York and over time a few trends have become apparent:

1. Large-scale solar projects are more competitive under the current scoring framework compared to large-scale onshore wind projects.
2. The current scoring framework favors projects that bid and are modeled as least expensive based on their REC pricing, potentially, in some cases, over projects that could be more viable and offer greater net value to New York State.

As noted above, bid price is the primary component of RES Tier 1 solicitation evaluation and scoring, accounting for 70% of the total score. Taken at face value, this approach focuses on cost containment by rewarding projects with the lowest bid price. However, experience has shown that the cheapest project is not necessarily the best value for the ratepayers, in particular to the extent lower-priced projects end up unable to successfully reach the deployment stage, potentially preventing more mature projects with a greater opportunity to be successful from being selected, and thus contributing to delays in the pursuit of the 70% goal. With these trends in mind, consideration should be given to adjusting the relative weight of the scoring categories with the goal of identifying projects offering the best value to the ratepayer.

An examination of bids to recent NYSERDA RES Tier 1 solicitations shows that, in many cases, solar proposal pricing is significantly lower than wind, such that even wind projects that score more highly in the other 30% of the criteria than solar projects do not typically achieve an overall ranking sufficient to be awarded at a higher rate than has been seen historically. A direct way to address this issue would be to

[148] See, 2020 CES Order.

lower the relative weight of the Price component and reallocate those points into the Project Viability, Operational Flexibility and Peak Coincidence components as presented in Option (i) below. A benefit of this approach is that it takes more of a total value approach to scoring and further rewards proposals with non-price benefits, such as less impact to agricultural lands and better coincidence with future electric peak demand. In addition, experience with NYSERDA's Tier 1 portfolio has shown that the apparent least-cost projects may not always be financially viable projects, while projects with a better balance across all attributes may provide greater value for the State's ratepayers as they lead to less impact on the transmission system, have greater peak coincidence, and have a greater likelihood of proceeding through development to commercial operation.

i. **Option: Reduce 70% price scoring component.** An option to be considered in mitigating this risk could be to reduce the 70% bid price component to a smaller share of overall evaluation scoring and re-allocate those points into Project Viability, Operational Flexibility and Peak Coincidence.

ii. **Option: Expand definition of cost component beyond bid price.** Alternatively, or in addition to Option (i), reform of what constitutes that 70% could be considered. Currently, the 70% cost component for RES Tier 1 solicitation scoring is based solely on the strike price, reference energy price, and reference capacity price in the case of index REC bids, or the bid price in the case of fixed-price bids. The bid prices are converted into a Levelized Net REC Cost (LNRC) in base $/year for both bid types to allow for comparison among proposals with different pricing structures, REC quantities, and contract tenors. While this method provides a consistent and reliable method for bid evaluation and program cost forecasting, the reliance solely on REC cost may underrepresent full ratepayer costs in certain situations, particularly with respect to unintended transmission impacts and congestion. It is worth exploring whether the 70% cost component of RES Tier 1 solicitations should be permitted to incorporate other external ratepayer cost factors and indirect benefits rather than examining only the cost of RECs themselves. For example, the cost component of proposals could be adjusted for evaluation purposes, based on the input of experts on the Technical Evaluation Panel and specialist reviewers convened for the bid evaluation of each RES Tier 1 solicitation. The goal of any adjustment would be to more accurately and fully account for external costs and indirect benefits that may be borne by ratepayers in addition to the REC costs associated with the proposed project.

iii. **Option: Consolidation and re-allocation of non-price points.** Consideration could be given to re-allocating points within the 20% component of Project Viability, Operation Flexibility and Peak Coincidence, such that greater weighting within this 20% non-price score would be given to attributes that reflect more mature projects with attributes such as firm supply chain commitments, an Engineering Procurement and Construction firm under contract, and/or confirmed interconnection costs. This would further make mature projects more competitive overall relative to projects that simply have a lower price component without having progressed far enough in development to have more viable project cost estimates.

Delving further into the issue of which technologies are being awarded in the RES program, recent solicitations have experienced decreasing competition from onshore wind generation projects. Of the 135 awards made in the annual RES Tier 1 solicitations from 2017 to 2022, 15% were onshore wind generation while 83% were for solar generation (with the remaining 2% going to Tier 1 eligible hydroelectric generation).[149] Furthermore, this trend appears to be accelerating. Looking just at more recent RES solicitations from 2020 to 2022, only 11% of the awarded projects were for onshore wind generation and all but one of those projects were repowering of existing onshore wind generation facilities. If this trend continues, it could become self-perpetuating, as few awards to onshore wind generation reduce the incentive for onshore wind project development, which in turn leads to fewer onshore wind projects competing and being awarded.

There are compelling reasons to consider addressing this trend as the State pursues the goals of the CLCPA. Compared to solar generation, onshore wind power typically has a higher capacity factor and produces energy at times when solar does not. In this way, onshore wind and solar are complimentary generation sources in an emissions-free electricity system. Onshore wind power also has high co-usability of land, particularly with agriculture. Analysis on what an optimal mix of these technologies will look like for New York beyond the near-term is not comprehensive at the present time. Ongoing analysis in the context of the CES proceeding is expected to offer further insight in this regard.[150] In the meantime, any approach should offer sufficient flexibility for a variety of technologies to be successful in Tier 1 solicitations.

---

[149] New York State Open NY, Large-Scale Renewable Projects Reported by NYSERDA: Beginning 2004, available at: https://data.ny.gov/Energy-Environment/Large-scale-Renewable-Projects-Reported-by-NYSERDA/dprp-55ye.

[150] See, Case 15-E-0302, Order Initiating Process Regarding Zero Emissions Target (issued May 18, 2023).

In addition to the three options discussed above, there are several other possible enhancements to RES Tier 1 procurements that could support additional onshore wind generation.

iv. **Option: Onshore wind-specific Tier 1 carve-out.** A certain quantity of MWh per solicitation could be set aside with preference for onshore wind generation. Any onshore wind generation proposals received would be scored and ranked in the bid stack and then awarded first within the carve-out until either all onshore wind proposals were awarded or the carve-out was filled. Once the allocated quantity is awarded, any additional onshore wind generation projects could still be considered and awarded depending on their ranking in the overall combined bid stack of bids from all generating technologies. Although competing in a carve-out, onshore wind proposals would still be subject to the confidential Benchmark LNRC, as all projects in the RES Tier 1 solicitations are today, and other program cost and performance guardrails, including the Portfolio Risk Factors, would still apply. Because of the need to continually adapt to a portfolio of awarded projects that changes over time, NYSERDA, in consultation with DPS Staff, could re-assess and establish the onshore wind carve-out quantity individually for each solicitation.

v. **Option: Onshore wind-specific solicitation(s).** Under this approach, NYSERDA would conduct one or more onshore wind-specific RES Tier 1 solicitations. This would provide a stand-alone mechanism for onshore wind generation to compete for Tier 1 awards without having to also compete against solar generation or other technologies within the Tier 1 solicitation scoring framework. As a technology-specific solicitation, this approach could be customized to the onshore wind generation market in New York.

vi. **Option: Price bonus for onshore wind generation projects.** Under this option, the existing 70-20-10 percent bid evaluation framework could be maintained or modified, but a "bonus" to onshore wind generation projects could be awarded in the cost category that better reflects the incremental value to the system such projects offer compared to an alternative system mix with suboptimal levels of onshore wind generation. This would improve the competitiveness of onshore wind generation's bid price evaluation. Options for this include using a more beneficial discount rate for calculating the LNRC for onshore wind proposals, adding a less-than-one multiplier to the LNRC for all onshore wind projects, or modifying onshore wind strike prices for the purpose of LNRC calculations.

Strike Price Adjustment

The CES has evolved over time to adapt to the changing Tier 1 and offshore wind marketplace, in part by recognizing the need for post-award flexibility in developing a substantial portfolio of large-scale renewable generators. Recent history has shown that the length of time required for these generation projects to complete interconnection and permitting processes, construction, and then enter commercial operation creates a significant risk for changes in the market and the supply chain which can substantially alter project economics, in some cases rendering projects nonviable. Recent RES solicitations have implemented contract terms providing for formulaic strike price adjustments specific to inflation that may occur between when a project is awarded and when it enters commercial operation. Similar adjusters have been introduced for other key areas of project risk such as interconnection costs in the offshore wind program. These adjusters provide a more finely tuned level of cost-containment because rather than fully pricing the risk into the strike price, they allow for the risk of increased project costs or benefit of costs saving to be partially shared with the ratepayer and mitigated through a strike price increase or decrease only to the extent that the risk or benefit materializes at the contractual time of the adjustment being employed.

This formulaic strike price adjustment approach only addresses specific known risks. Other risks may not be known or may not lend themselves to being addressed through this approach. If any such risks materialize and result in contracted projects becoming economically unviable, they could terminate their contract and rebid in a future solicitation. This occurred last year (as discussed in Section 4), and as a result timelines can increase substantially. From a ratepayer cost perspective, both an investment environment in general where project developers perceive projects risks that they are not well positioned to manage, as well as the more specific costs associated with the termination and rebid process when high-impact risks do materialize, are likely to result in increased project cost and thus ratepayer cost. Strike price adjusters, on the other hand, provide the needed flexibility to maintain project viability while minimizing potential future cost increases. However, under the current approach there is a critical limitation of the strike price adjuster concept – the area of risk must be identified at the time of the solicitation and included as a specific adjuster (e.g. inflation or interconnection cost) in the REC or OREC contract.

vii. **Option: Authorize NYSERDA and DPS Staff to offer a strike price adjustment to awarded but not yet constructed projects if unforeseen events outside the control of project developers occur.** To mitigate the risk of unknown, high impact black swan events,

outside of the project developer's control, the Commission could authorize NYSERDA and DPS Staff to offer a strike price adjustment if such an event occurs to all contracted projects affected by it. A decision that this type of event has occurred and a portfolio-wide adjustment is necessary would be jointly made by DPS Staff and NYSERDA.

As discussed in Section 4, in October of 2023 the Commission denied certain petitions for inflation adjustments made in June 2023 on the grounds that competitive bidding is a fundamental component of the CES and remains the best mechanism by which to meet its obligation to establish just and reasonable rates for renewable generation subsidies under Public Service Law and that the relief sought by the petitions was not consistent with the competitive paradigm of the CES. While the portfolio adjustment mechanism discussed above is similar to the relief sought by the denied petitions, the petitioners sought inflation adjustments that were not contemplated in the competitive procurement process and that had no basis in the REC purchase contracts established with NYSERDA. In contrast, the adjustment mechanism considered here would be part of the competitive process and therefore the risk mitigation potential of such adjustment mechanism should be included in the strike prices bid into the solicitation and ultimately codified in the REC purchase contract established with NYSERDA.

Strike Price Escalation

The CES Final Phase 1 Implementation Plan states that NYSERDA may in future solicitations include requests for generation facilities to provide bid pricing at more granular levels than a single strike price. NYSERDA has already implemented and may continue to expand the use of pre-commercial operation adjusters as a way to provide flexibility and more finely tuned cost containment for factors affecting project economics. In a similar manner, it may also make sense to allow for inflation adjustments over the contract tenor to account for unpredictable changes in operations and maintenance costs during that time period. A post-commercial operation inflation adjuster should reduce strike prices bid into the solicitation and, as with other adjusters, more closely correlate the REC purchase contract price to the actual costs incurred by the project rather than an assumed level of risk at the time the bid is prepared.

viii. **Option: Allow for adjustment in awarded strike price based on a market price index during the life of the contract.** There are a variety of ways this concept could be implemented, and further development is required. Further considerations include:

- Whether adjustments should be pre-determined at the time of proposal to the solicitation, potentially through bids that allow for individual strike prices by year;

- Alternatively, whether adjustments could be formulaic and reference an external indicator or market price index, in which case a suitable indicator (such as the Consumer Price Index) would need to be identified and a determination would need to be made on how often adjustments would take place during the contract tenor;
- Whether this type of adjuster should be employed symmetrical and increase or decrease the strike price in each adjustment period depending on inflation trends.

REC Purchase Contract Tenor

Tier 1 contracts for wind and solar generators have a maximum contract tenor of 20-years as established in the Final Phase 1 Implementation Plan in 2017.[151] The maximum 20-year Tier 1 contract tenor was established to optimize the benefit ratepayers received from such contracts, ensuring that ratepayers received REC benefits from Tier 1 projects throughout a project's assumed useful life.

For wind facilities, the application of more sophisticated engineering and economic analysis, combined with improved facility maintenance, has enabled wind facilities to have extended production years. A recent study by the Lawrence Berkeley National Laboratory on the evolving expected useful life of onshore wind facilities in the United States found that the industry's assumed useful life of such projects has increased from approximately 20 years in the early 2000s to up to 30 years currently (the average length among surveyed industry experts was 29.6 years).[152] Manufacturers have begun increasing the term of their turbine design certifications beyond 20 years, to even 40-year certifications depending on the turbine and wind regime, and indications are that project developers and sponsors are largely using 25- or a range of 25-30 years in their useful-life assumptions.

Similarly, for utility-scale solar PV, technology advancement has extended facilities' generation potential, and there is greater recognition that modules are now typically warranted for 25 or even 30 years. A second industry survey conducted by the Lawrence Berkeley National Laboratory found that the average expected lifespan of solar facilities in the United States has increased from an average of approximately 21.5 years in 2007 up to an average of nearly 33 years as of 2019,[153] while the DOE's Office of Energy

---

[151] Case 15-E-0302, Final Phase One Implementation Plan (filed March 24, 2017).

[152] Lawrence Berkeley National Laboratory, Benchmarking Anticipated Wind Project Lifetimes (September 2019), available at: https://eta-publications.lbl.gov/sites/default/files/wind_useful_life_report.pdf.

[153] Id.

Efficiency & Renewable Energy notes that the estimated operational lifespan of a PV module can be as much as 35 years.[154]

Were wind and solar developers and project sponsors to be including a useful life assumption beyond the 20-year maximum Tier 1 contract tenor, there is potentially an opportunity to leverage extended contract tenors to both ensure that ratepayers are receiving additional REC benefits as well as ensure such REC benefits are more cost effective. Offering extended contract tenors, in accordance with recognized technology and operations and maintenance improvements, and thus providing Tier 1 generation owners with extended revenue assurance, could thereby minimize risk premia incorporated into Tier 1 bids and thus lower strike prices and program REC costs.

ix. **Option: Increase maximum Tier 1 contract tenor to 25 years.** In recognition of land-based wind and utility-scale solar PV technologies advancing and maturing since the Final Phase 1 Implementation Plan in 2017, and in alignment with the contract tenor of the Tier 4 and offshore wind programs, it may be beneficial to the State and ratepayers to consider increasing the maximum Tier 1 REC contract tenor for wind and solar facilities from 20-years to up to 25-years. Recent literature and experience with large-scale solar and wind facilities indicate that such Tier 1-eligible facilities may now have greater useful life years, with the facilities capable of generating renewable energy eligible to be acquired by NYSERDA beyond the 20-year Tier 1 contract tenor.

   It is recognized that the technology maturity and progression for land-based wind and utility-scale solar PV differs, and, as such, may warrant differing approaches. Accordingly, it may be prudent to allow NYSERDA, in consultation with DPS Staff, to determine on a case-by-case basis whether to offer 25-year contracts in future Tier 1 solicitations.

COMD Deadlines and Extensions

The CES Phase 1 and Phase 3 implementation plans contain specific guidance regarding the implementation of Commercial Operation Milestone Date (COMD).[155] Based on program experience

---

[154] Department of Energy's Office of Energy Efficiency & Renewable Energy, End-of-Life Management for Solar Photovoltaics (as of June 2024), available at: https://www.energy.gov/eere/solar/end-life-management-solar-photovoltaics.

[155] See, Case 15-E-0302, Final Phase One Implementation Plan (filed March 24, 2017); and, Final Phase Two Implementation Plan (filed January 11, 2019).

since those implementation plans were approved, the COMD timing milestones established in those plans has not consistently aligned with observed project development timelines.[156]

x. **Option: Allow for adjustments to the nature and consequences of COMD deadlines.** It may be sensible to authorize NYSERDA to move beyond the relatively rigid approach to these matters described in those plans and for NYSERDA's solicitations and contracts to clarify in a more nuanced manner the nature of and consequences of missing COMD deadlines, particularly to appropriately distinguish between types of delays within and outside of developers' control, and to enable viable projects in development to continue to progress. Allowing for a more tailored approach to COMD deadlines and extensions could also allow NYSERDA to preferentially evaluate projects that bid to Tier 1 solicitations with development schedules that will bring projects into operation sooner than projects with longer development timelines, with contractual mechanisms that incentivize bidding with realistic schedules.

Index REC Methodology

The RES program has begun to have practical experience settling Index REC contracts. Additionally, RES program participants now have several years of experience modeling Index REC pricing to inform their bids submitted to NYSERDA solicitations.

xi. **Option: Optimize the Index REC settlement structure.** It could be sensible to authorize NYSERDA to further improve and optimize the Index REC settlement structure in certain specific ways. For example, there may be benefits to consider in moving away from a monthly average formulation if doing so can be shown to be expected to reduce costs to ratepayers without interfering in FERC-regulated NYISO markets.

6.2 Offshore Wind Program

As the State authority charged with advancing the development of renewable energy sources, NYSERDA is coordinating offshore wind opportunities to bring clean, locally produced renewable energy and clean

[156] The Lawrence Berkley National Laboratory has issued a report presenting the benchmarked observed timelines for project interconnection; see, Lawrence Berkley National Laboratory, Energy Technologies Area, Rand, Joseph, Nick Manderlink, Will Gorman, Ryan H. Wiser, Joachim Seel, Julie Mulvaney Kemp, Seongeun Jeong, and Fritz Kahrl, Queued Up: 2024 Edition, Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023 (2024), available at: https://emp.lbl.gov/queues.

economic development to the State. NYSERDA is supporting the development of 9,000 MW of offshore wind energy in New York State by 2035 in a responsible and cost-effective manner by conducting competitive solicitations for the long-term purchase of ORECs. On April 23, 2024, NYSERDA released New York's first solicitation focused exclusively on developing the offshore wind supply chain, in alignment with the State's Action Plan and based on industry feedback collected through an RFI in 2023. Through the solicitation, Offshore Wind Supportive Manufacturing and Logistics Request for Proposals (OSWSCRFP24-1), NYSERDA seeks to competitively award up to $200 million in grant funding for the construction, expansion, or renovation of port infrastructure and/or manufacturing facilities. NYSERDA plans to launch a fifth offshore wind solicitation (NY5) in the summer of 2024. Once launched, the NY5 solicitation will run in parallel to a $300 million Major Component Supply Chain solicitation.

In 2022, Governor Hochul launched the "New York State Offshore Wind Master Plan 2.0: Deep Water" (Master Plan 2.0), as part of a new phase in offshore wind planning for a rapidly evolving industry.[157] In alignment with New York's Action Plan, Master Plan 2.0 will provide a plan for the future of offshore wind development, including in deeper waters, that will allow for the expansion of the industry and ability to meet regional development goals. Initial studies to inform lease siting are expected in 2024. The Master Plan 2.0 will also encourage the Department of the Interior's Bureau of Ocean Energy Management to initiate a new offshore wind leasing process in the New York Bight.

This section presents potential program design adjustments and improvements related specifically to the Offshore Wind program. Similar to some of the concepts discussed in the Tier 1 section, comparable approaches could be adapted and tailored to the offshore wind program. Among these considerations are evolving the procurement evaluation criteria from the current 70% price-based and 30% non-price factors. Other reforms discussed in the Tier 1 section can also be considered, including the evolution of the strike price adjustment mechanisms in a matter specific to the offshore wind industry. It should also be noted that there is an ongoing PPTN process, led by the NYISO, which seeks transmission solutions to efficiently and cost-effectively integrate at least 4,770 MW of offshore wind generation into New York City. As the PPTN process progresses, it will likely develop new information that informs the CES offshore wind program and could give rise to additional policy improvement options. If such options are

[157] NYSERDA, Offshore Wind Master Plan, available at: https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/About-Offshore-Wind/Master-Plan.

identified in the future, they would serve as the basis for a new offshore wind-related petition to the Commission.

OREC Purchase Contract Tenor

Costs incurred to develop and construct offshore wind facilities are recouped over the OREC purchase contract tenor. Therefore, a longer contract tenor can reduce the per-month ratepayer burden by spreading costs over more months. Connecticut and Rhode Island recently took steps to allow longer contract tenors of up to 30 years with offshore wind projects, while Massachusetts is considering a similar measure.[158] The primary benefit of allowing 30-year contracts is the ability to reduce monthly ratepayer impacts by spreading costs out over a longer period of time. As offshore wind systems have evolved, they now offer the potential of longer useful lives and 30-years could better match anticipated future equipment lifetimes. Conversely, longer OREC purchase contracts lock-in current technology for a longer period of time, possibly missing out on cost and performance improvements that are anticipated as the technology continues to evolve.

xii. Option: Extend the maximum OREC contract tenor to 30 years. In view of the trends and considerations discussed above, it is prudent for New York to consider the merits and potential drawbacks of granting NYSERDA the option of entering into OREC purchase contracts for up to 30 years in future solicitations.

6.3 Regulated Electric Utility Role in Renewable Energy Procurement

As the NYISO acknowledges in the 2023-2032 Comprehensive Reliability Plan, "there is significant uncertainty as to the pace at which these projects will proceed and the ultimate electric demand that the [New York Control Area] will be required to serve."[159] In addition, as discussed in Section 3.7, New York may be realizing considerable large commercial and industrial load related to economic development in the coming years. The apparent divergence between the pace of renewable resource development and the State's decarbonization goals suggests that new approaches should be tested. One potential solution to

---

[158] Boston Globe, As Offshore Wind Struggles, are Longer Contracts the Answer? (May 7, 2024), available at: https://www.bostonglobe.com/2024/05/07/business/offshore-wind-massachusetts-contracts/.

[159] NYISO, 2023-2032 Comprehensive Reliability Plan (November 28, 2023), available at: https://www.nyiso.com/documents/20142/2248481/2023-2032-Comprehensive-Reliability-Plan.pdf.

consider is whether the state's investor-owned electric utilities should be permitted to develop and own small-, medium-, and large-scale renewable projects in New York, either on their own or in collaboration with other entities, similar to the authorization granted to NYPA in 2023.[160]

The basic motivation for deregulating the power sector in New York State was the concern that utility ownership of generation has anti-competitive consequences, such that consumers could be made to bear the risk of investments in generation that are not disciplined by a market mechanism.[161] Deregulation involved utilities' divestment of ownership of generation assets, and the Commission has since maintained a rebuttable presumption that utility ownership of generation carries risks of anticompetitive behavior and potentially excessive costs to consumers.[162] However, fostering the swift and efficient buildout of renewables requires addressing several challenges, and utility ownership of generation, which could enable better coordinated project planning and execution with advantageous access to capital, is one potential avenue for doing so.

The Commission and NYSERDA have returned to this issue more than once since deregulation. In 2015, when designing its renewable energy programs under the CES, for instance, the State presented an analysis showing that utility driven procurement models could reduce the cost of electricity.[163] The Commission's early evaluation in 2017-2018 of possible procurement models for offshore wind resources considered utility-owned generation as an alternative option to the REC model, offering a form of hedged procurement that would benefit from the lower cost of capital available to utilities through rate-basing investments.[164] At that time, the Commission determined that a bundled power purchase agreement with an investor-owned utility could provide a project with a strong energy hedge with a creditworthy party and thereby facilitate financing of new renewable generation and increase the likelihood that a contracted project is built.[165] This model, which the Commission did not adopt, has since been utilized with some

---

160 Chapter 58 of the Laws of 2023, part QQ.

161 Cases 94-E-0952, et al., In the Matter of Competitive Opportunities Regarding Electric Service, filed in C 93-M-0229, Opinion and Order Regarding Competitive Opportunities for Electric Service, Opinion No. 96-12 (issued May 20, 1996) p. 42 (Competitive Opportunities Order).

162 Cases 96-E-0891, et al., In the Matter of New York State Electric & Gas Corporation's Plans for Electric Rate/ Restructuring Pursuant to Opinion No. 96-12, Statement of Policy on Vertical Market Power (issued July 17, 1998), Appendix I.

163 Case 15-E-0302, Large-Scale Renewable Energy Development in New York: Options and Assessment (filed June 1, 2015) pp. 20-28.

164 Case 18-E-0071, supra, Offshore Wind Policy Options Paper (filed January 29, 2018) pp. 30-31

165 Id.

success in other states, including California, Massachusetts, and Rhode Island, which have required their investor-owned utilities to issue solicitations and enter into long-term power purchase agreements.

The Commission again examined the issue of utility owned generation following enactment of the CLCPA, when it asked stakeholders to assess the Commission's implementation of the Vertical Market Power Policy and to opine on the prospects of utility ownership of renewable generation.[166] Responsive comments generally indicated that the Commission's implementation of that policy had struck a healthy balance between a robust competitive market and the allocation of project risk, although the Joint Utilities argued that utility ownership could benefit ratepayers in a variety of ways, for instance, by obviating REC payments,[167] and reducing costs for low-income customers in particular.[168]

Now, in the aftermath of the various disruptions described above, the potential for utility owned generation to accelerate renewables deployment and better coordinate planning and construction efforts deserves consideration once again. This option raises a number of questions and should not be undertaken without thorough consideration of potential trade-offs, for instance between allocating greater risk to ratepayers and winnowing down transaction costs, and procedural steps required for deployment.

xiii. **Option: Allow regulated electric utilities in New York State to develop and own renewable energy projects.** In consideration of utility-owned generation several issues would need to be explored, including but not limited to:

- The utilities' capabilities in developing and owning renewable energy projects.
- If prior utility experience with DER and with developing renewable projects outside of the New York Control Area can be applied to such a policy structure.
- The potential impacts of this model on the State's ongoing competitive CES solicitations.
- The types of procurement structures that would best suit utility participation in renewable energy development activities.

---

166 Case 22-M-0149, supra, Order on Implementation of the Climate Leadership and Community Protection Act (issued May 12, 2022) p. 23.

167 2020 CES Order, pp. 56-57.

168 Id. at 57.

- An analysis into how utility-ownership and procurement of renewable energy resources would reduce costs and deliver benefits to ratepayers, particularly low-income ratepayers.
- The concerns of vertical market power and competitive pressures.
- The role of State support and facilitation of utility development and ownership of behind-the-meter renewable generation serving large loads.

6.4 Renewable Energy Zones

One option that may offer benefits in terms of both cost and certainty of meeting milestones is the creation of Renewable Energy Zones (REZ) to align generation development and large loads associated with economic development growth with transmission expansion plans. This option would build on various efforts that overlap but are not closely coordinated. These include the CGPP, ongoing economic development initiatives, and several other power sector initiatives that aim at speeding the buildout of transmission and clean generation resources. Other jurisdictions have sought to coordinate these overlapping priorities by designating zones for the development of transmission and renewable generation resources. In Texas, for instance, the Competitive Renewable Energy Zone program involved designating transmission corridors to link wind resource areas to load centers, and then facilitating engagement with various stakeholders to enable development in a way that reconciled competing interests and addressed concerns.[169] Similar measures have been employed in Illinois, Australia, and elsewhere.[170]

xiv. **Option: Designate Renewable Energy Zones to align generation development with planned transmission expansion and economic development.** In consideration of a REZ model various issues would need to be explored, including but not limited to:

- How to designate a REZ and, depending on such designation criteria, what identifiable locations would qualify.
- If efficiencies within a REZ model can be gained by allowing entities that build transmission (utilities) to take a role in developing the generation.

---

[169] https://www.bakerinstitute.org/research/texas-crez-lines-how-stakeholders-shape-major-energy-infrastructure-projects.

[170] See, https://aemo.com.au/-/media/files/major-publications/isp/2024/2024-integrated-system-plan-isp.pdf?la=en; and, https://www.illinois.gov/news/press-release.30099.html.

- How a State entity may advance the pre-development of land acquisition and permitting in a way that is additive to the transmission pre-build work.

- Alignment between REZ identification and economic development growth.

6.5 Baseline Hydro Generation

Renewable energy resources, particularly small hydropower, that commenced operation prior to January 1, 2015 (baseline resources) play a modest but important role in contributing to our clean energy goals. However, total contributions to New York from baseline hydroelectric resources have declined 8.2% from 2017-2020.[171] These baseline resources are facing economic challenges and a need for capital to make investments in their plant.[172] In the absence of sufficient operational or capital support, baseline resources often export their energy to neighboring states.[173] In 2020, the Commission observed increasing exports and attrition of hydroelectric facilities, wherein it established the competitive Tier 2 program to retain these resources.[174] Nonetheless, the hydroelectric industry believes existing programs are not sufficient or accessible, and have therefore petitioned the Commission to take more action by allowing baseline hydroelectric resources to receive Environmental Value (E-Value) compensation under the Value of Distributed Energy Resources (VDER) tariff.[175] Because of the importance of baseline resources to meeting obligations under the CLCPA and the CES, commenters are invited to identify how best to secure the continued operation and deliverability into New York of these resources at the least cost to ratepayers. Options include:

xv. **Option: Capital Grants Program:** A number of these smaller hydro facilities (under 5 MW) have indicated to NYSERDA and/or DPS Staff the critical need for grants to undertake needed maintenance and/or repairs and efficiency upgrades. Many of them have deferred maintenance stretching back many years and as a result are in a state of disrepair, with some facilities non-operational. These hydro generator owners are typically not sophisticated and

---

171 See, Case 15-E-0302, NYSERDA Clean Energy Standard Progress Report, 2017 and 2020 Compliance Years.

172 Case 15-E-0751, In the Matter of the Value of Distributed Energy Resources, Petition of Interested Hydroelectric Parties Eligibility For Environmental Value Compensation For Pre-2015 Resources Under The Value of Distributed Energy Resource Tariff (filed May 26, 2022) (Hydro Parties Petition).

173 NYGATS, CES Baseline Bundled REC Exports Report, available at: https://nygats.ny.gov/ng/Report/getdto_view_Report_PublicRenewableCertificateExports.

174 2020 CES Order.

175 See, Hydro Parties Petition.

lack the knowledge and resources necessary to access capital markets, bank financing, or federal grants available for improved grid resiliency or efficiency (i.e., federal grants under the Department of Energy's Section 247 and Section 243 programs).

The grant program contemplated here would provide a simplified registration process while demonstrating a need for repair. Similar to the current Maintenance Tier application process, proof of financial need for the repairs, maintenance, or improvements, along with simplified income statements would be required. Specific criteria would be developed using the federal grant programs as a model.

xvi. **Option: E-value:** The E-Value was established by the Commission in 2017 as part of VDER mechanism to succeed net energy metering as the method for valuing grid injections for Distributed Energy Resources for incremental generators (those reaching commercial operation after January 1, 2015) under Tier 1 of the CES.[176] The VDER compensation method for injections into the grid are based on the Value Stack which is a set of dollar-per-kilowatt hour values based on the time, locational, and environmental value of injections. The E-Value is designed to compensate Distributed Energy Resources for the environmental benefit of the delivered electricity. Although the small hydro generators under consideration here provide similar environmental benefits as Tier 1 generators do, they do not qualify for the E-Value.

Under consideration here is to provide the E-Value to these small hydro generators to recognize the importance of their renewable generation. Currently compensation under the E-Value is valued at $31.03 per MWh. Program guidelines would be instituted to ensure that only those in need of a demonstrated increase in long term income would be compensated. Currently, the E-Value for Tier 1 resources is set at 20 years and this time frame could be modified based on various factors for these small hydro generators.

xvii. **Option: Revise Maintenance Tier program.** The Maintenance Tier under the current CES provides for three years' worth of monthly payments to baseline resources with a demonstrated financial need and in danger of ceasing operations without financial assistance. Eligible facilities include all non-state owned, run-of-river hydroelectric and wind resources

---

[176] Case 15-E-0751, supra, Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources and Related Matters (Issued March 9, 2017).

which are not under contract to sell the environmental attributes associated with the generation. The facility must have been in operation prior to January 1, 2015, and must demonstrate that its verifiable unit-specific generation will be delivered to the New York Control Area for the life of the Maintenance contract. In reviewing the Maintenance Tier program, the Commission maintained the "to-go-cost" analysis and provided a return on capital for future capital expenditures and a 5% contingency on forecasted operations and maintenance expenses.[177] Additionally, the Commission adopted a standard three-year contract with an opportunity for the facility to file a renewal application in the contract's final year, to become effective upon the expiration of the existing contract.

Many of the approved Maintenance Tier contracts involve pending repair or maintenance work that is necessary to keep the hydro units operating to generate income. This is an important factor in New York State given that over 100 small generating stations went into commercial operation prior to 1975. This work can include repair or replacement of the hydraulic turbines, penstocks, control gates, or other station infrastructure. Under consideration is an extension of the duration of Maintenance Tier contracts to at least ten years to accommodate additional and extraordinary repair and maintenance capital costs to continue operation and derive income from the generation. Included in these expenses are those associated with hydro facilities obtaining their FERC license which is required every 50 years.

[177] Case 15-E-0302, Order Adopting Measures for the Retention of Existing Renewable Baseline Resources (issued March 16, 2018).

Appendix A: Operational and Contracted Renewables

This Appendix provides further data on renewable generation projects, in addition to the information provided in Sections 2 and 4 of this Report. This supplementary detail is derived from the Open NY database.[178]

The data in this Appendix covers NYSERDA's operational and awarded projects in the Tier 1 (land-based large-scale renewables), offshore wind, and Maintenance Tier programs under the CES, with the exception of the Tier 1 RESRFP23-1 awards, for which details have not been announced as of the date of this Report. Projects that terminated their contracts or for which contracts have been completed are not included. This Appendix does not provide information for projects awarded under the RPS, distributed solar generation, baseline hydroelectric generation without NYSERDA contract, or any other Tier 1 eligible generator that did not receive an award from NYSERDA. Open NY includes a full list of NYSERDA large-scale renewable contracts including those predating the CES. The NYISO Gold Book includes a list of all generators participating in the NYISO market including those renewable projects without a NYSERDA contract.[179]

Nuclear generation under the Tier 3 ZEC program is not addressed in this Appendix. In addition to the data provided in Section 2, a list of ZEC-contracted nuclear generators is available in the 2016 CES Order.[180]

Tier 4 projects combine transmission and generation. This comprises the CPNY and CHPE projects, which have a combined transmission line capacity of 2,550 MW and are expected to transport 18,273 GWh per year of hydroelectric, land-based wind, and solar generation into New York City. Generation under these projects is reflected in this Appendix to the extent the generating installations are or will be located in New York and are currently operational or hold Tier 1 contracts.

---

178 New York State Open NY, Large-Scale Renewable Projects Reported by NYSERDA: Beginning 2004, available at: https://data.ny.gov/Energy-Environment/Large-scale-Renewable-Projects-Reported-by-NYSERDA/dprp-55ye.

179 NYISO, 2023 Load & Capacity Data Report (Gold Book) (April 2023), available at: www.nyiso.com/documents/20142/2226333/2023-Gold-Book-Public.pdf.

180 See, 2016 CES Order.

For operational projects, this Appendix also provides the most recent data on annual program expenditure through 2023. Forward-looking cost estimates for the CES and other costs associated with pursuit of the CLCPA goals are provided separately in the DPS Annual CLCPA Report.[181]

A.1 CES

As of June 1, 2024, 56 large-scale renewable energy projects awarded by NYSERDA under the CES are expected to provide renewable capacity of 5,142 MW and annual generation of 15,103 GWh. This excludes the awards from the RESRFP23-1 solicitation for which, as noted, details have not yet been released. Of these projects, based on capacity, 80% are under development and 20% are operational.

- The 30 operational projects have a total new renewable capacity of 1,034 MW and annual bid quantity of 2,735 GWh.
- The 26 projects under development total 4,108 MW of new renewable capacity and expected annual generation of 12,368 GWh.

The following tables provide data by program, NYISO load zone, county, size, and technology and include the designations of "operational" (i.e., generating power), or "under development" (i.e., not yet delivering power to a load zone).

Table 10 summarizes the awarded new renewable capacity and generation by program.

[181] The most recent such report was filed on July 20, 2023. Case 22-M-0149, supra, New York State Department of Public Service First Annual Informational Report on Overall Implementation of the Climate Leadership and Community Protection Act (filed July 20, 2023). The next report is expected to be filed later in 2024.

Table 10. Total active project awards as of June 1, 2024 by program

Program	Active Awards	New Renewable Capacity[182] (MW)	Generation[183] (GWh)	Number of Projects
Land Based Renewables – Tier 1	Operational	1,032.7	2,731.3	28
	Under Development	2,373.6	4,821.0	23
Tier 2 Maintenance[184]	Operational	1.1	3.5	2
	Under Development	0.3	8.0	1
Offshore Wind (OREC)	Under Development	1,734.0	7,539.0	2
Total		**5,141.7**	**15,102.8**	**56**

The NYISO control area is divided into eleven load zones designated A through K, as shown in Figure 5.

[182] For repowering projects, this reflects only incremental capacity and generation.

[183] For operational projects, this is the commitment of the bid facility at the time of Commercial Operation. For projects under development, generation is conditioned on the as-build project configuration and may change.

[184] For Maintenance agreements, there is no incremental capacity resulting from these agreements and instead refers to nameplate capacity.

Figure 5. NYISO Load Zone Map[185]

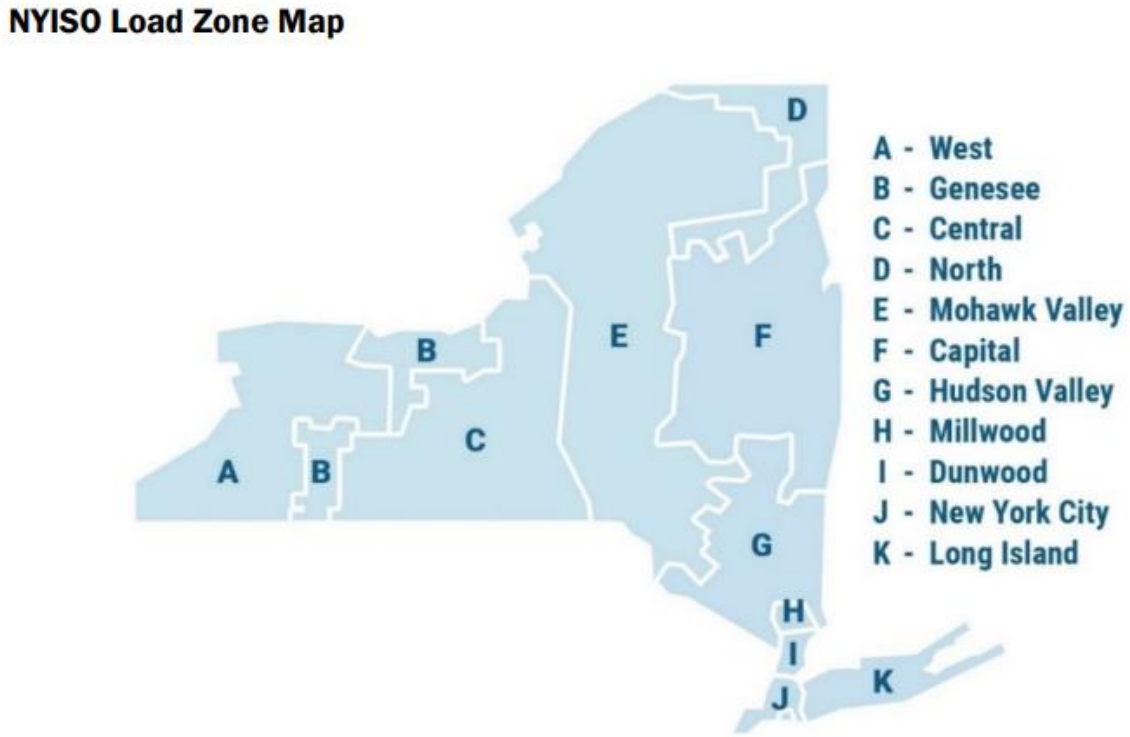


Table 11 summarizes the project capacity in operation and under development for each NYISO load zone for which there are active NYSERDA awarded projects.

[185] NYISO, 2021 – 2040 System and Resource Outlook (September 22, 2022), available at: https://www.nyiso.com/documents/20142/33384099/2021-2040-Outlook-Report.pdf.

Table 11. Total active project awards as of June 1, 2024 by NYISO Load Zone

NYISO Load Zone	Active Awards	New Renewable Capacity (MW)	Awarded Generation (GWh)	Number of Projects
A-West	Operational	196.1	521.8	4
	Under Development	245.5	521.9	3
B-Genesee	Operational	-	-	0
	Under Development	335.0	657.4	2
C-Central	Operational	311.4	845.3	7
	Under Development	872.6	1,693.8	6
D-North	Operational	79.9	214.1	3
	Under Development	385.5	921.0	4
E-Mohawk Valley	Operational	304.2	889.0	8
	Under Development	245.3	492.7	3
F-Capital	Operational	140.0	259.8	7
	Under Development	160.0	313.6	3
G-Hudson Valley	Operational	2.2	4.8	1
	Under Development	130.0	228.5	3
J-New York City	Operational	-	-	0
	Under Development	810.0	3,522.0	1
K-Long Island	Operational	-	-	0
	Under Development	924.0	4,017.0	1
Total	**Operational**	**1,033.8**	**2,734.8**	**30**
	Under Development	**4,107.9**	**12,368.0**	**26**

NYSERDA's awarded projects span renewable technologies including solar, land-based wind, offshore wind, and hydroelectric. Solar and wind (land-based and offshore) technologies are a majority of NYSERDA's portfolio for both operational and under development designations. Table 12 summarizes

operational and under development project capacity and awarded generation by size category and for each renewable energy technology.

Table 12. Total active project awards as of June 1, 2024 by renewable energy technology and size

Technology	Active Awards	New Renewable Capacity (MW)	Awarded Generation (GWh)	Number of Projects
Hydroelectric	Operational: 0-50 MW	13.4	62.0	10
	Operational: 51-100 MW	--	--	--
	Operational: Over 100 MW	--	--	--
	Under Development: 0-50 MW	0.3	8.0	1
	Under Development: 51-100 MW	--	--	--
	Under Development: Over 100 MW	--	--	--
Land-Based Wind	Operational: 0-50 MW	47.3	119.2	3
	Operational: 51-100 MW	235.8	665.5	3
	Operational: Over 100 MW	556.2	1,559.2	5
	Under Development: 0-50 MW	--	--	--
	Under Development: 51-100 MW	178.5	434.5	2
	Under Development: Over 100 MW	433.5	1,082.5	4
Offshore Wind	Under Development: 0-50 MW	--	--	--
	Under Development: 51-100 MW	--	--	--
	Under Development: Over 100 MW	1,734.0	7,539.0	2
Solar	Operational: 0-50 MW	180.0	328.9	9
	Operational: 51-100 MW	--	--	--
	Operational: Over 100 MW	--	--	--
	Under Development: 0-50 MW	110.0	208.1	6
	Under Development: 51-100 MW	340.0	652.7	4
	Under Development: Over 100 MW	1,312.0	2,443.3	7
Total	**Operational**	**1,033.8**	**2,734.8**	**30**
	Under Development	**4,107.9**	**12,368.0**	**26**

Figure 6 shows the location of operational projects contracted to NYSERDA under the CES by NYISO load zone.

Figure 6. NYSERDA contracted operating projects

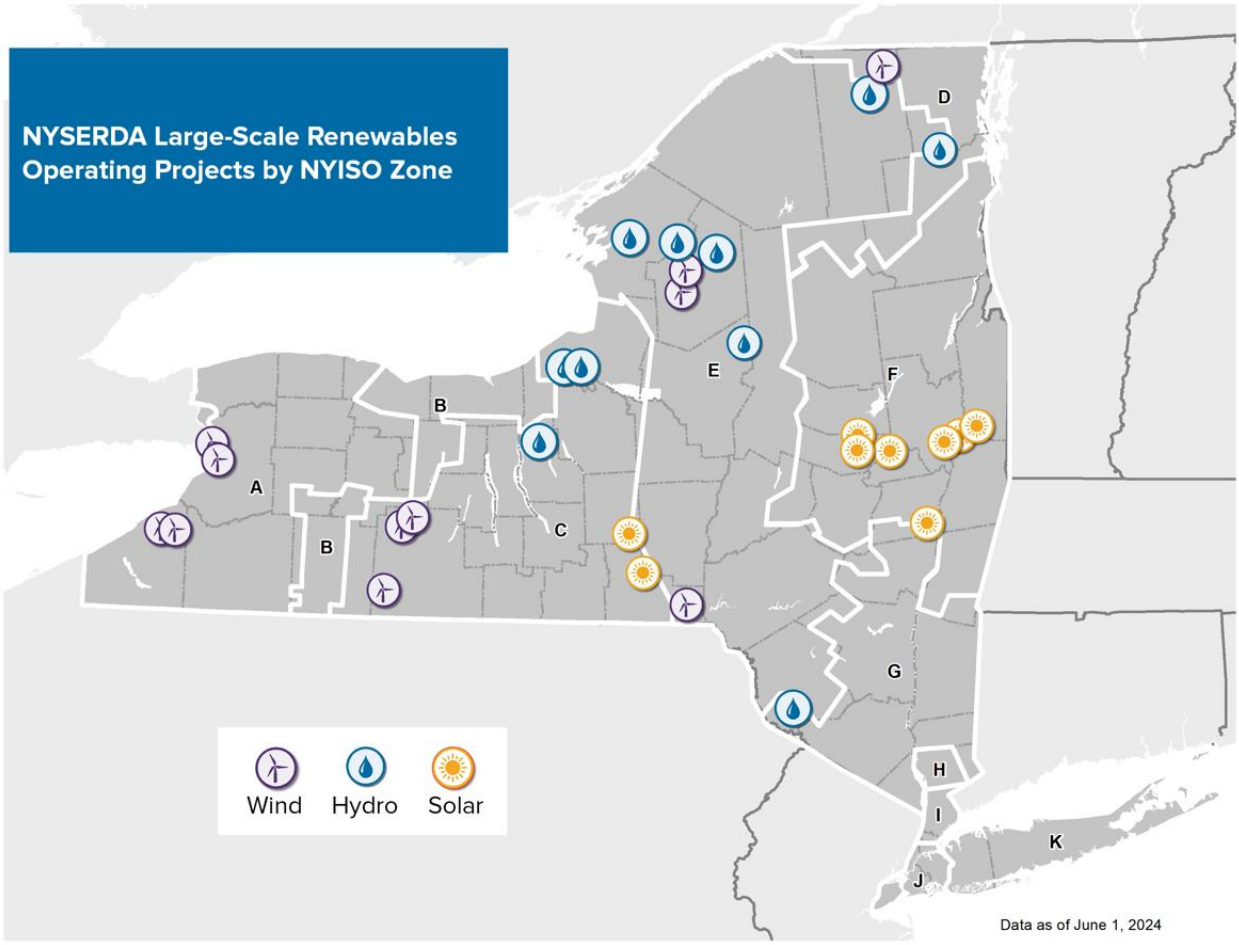
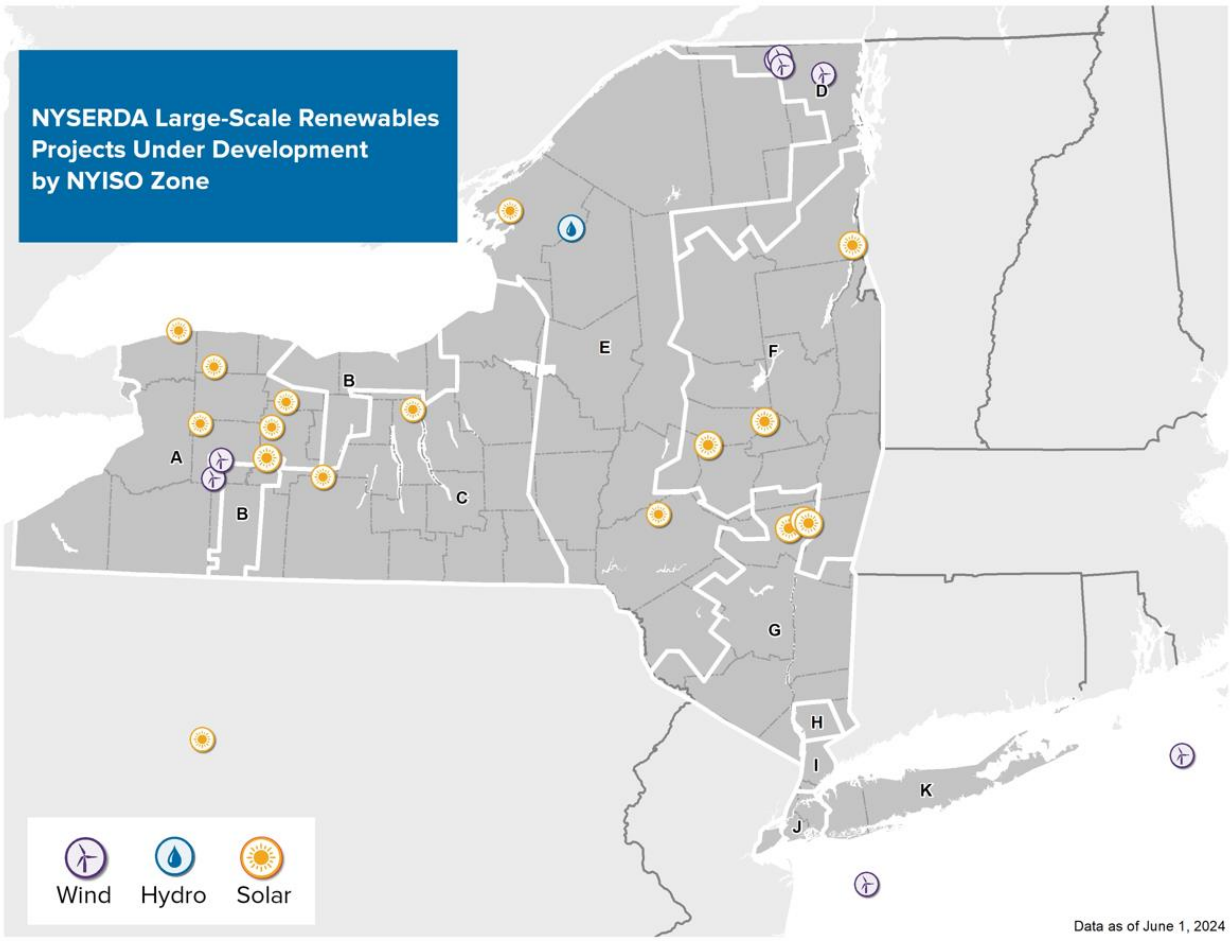


Figure 7 shows the locations of large-scale renewable projects under development contracted to NYSERDA by NYISO load zone.

Figure 7. NYSERDA large-scale renewable projects under development



A.2 Program Funding Commitments and Expenditures

The Commission designated NYSERDA as the administrator of all CES programs. Pursuant to Ordering Clause 5 of the Commission's Order Approving Phase 2 Implementation Plan, NYSERDA files Annual Clean Energy Standard Financial Status Reports.[186] The most recent is available for calendar year 2023 and shown in Table 13. Table 14 shows data for calendar year 2022 and Table 15 shows data for calendar

[186] Case 15-E-0302, Order Approving Phase 2 Implementation Plan (issued November 17, 2017).

year 2021. Further details are available in quarterly itemized reports that NYSERDA files on costs associated with the administration and the development of the CES programs.[187]

Table 13. CES Financial Status Report for Calendar Year 2023 (In Thousands)

CES Financial Status Report for calendar year 2023
(In Thousands)

	ZEC	Tier 1	Tier 2	Tier 4	OREC	Total
Revenues/Sources of Funds						
Zero-Emission Credit Assessments (Includes Administrative Adder)	$ 531,946	-	-	-	-	531,946
Renewable Energy Credit Proceeds	-	18,558	-	-	-	18,558
Tier 2 Energy Credit Proceeds	-	-	342	-	-	342
Alternative Compliance Payments	-	42,371	-	-	-	42,371
Voluntary Compliance Payments		3,092	-	-	-	3,092
Intra-Fund Transfer for Operating Costs [1]	-	(15,231)	989	1,410	12,832	-
Contract Security forfeitures, Bid Fees	-	3,696	-	-	6,450	10,146
Investment Income	2,118	4,971	-	16	599	7,704
Electric Distribution Company Backstop Collections (EDC)	-	-	-	-	-	-
Total	534,064	57,458	1,331	1,426	19,881	614,159
Expenses/Use of Funds						
Program Administration	532	5,755	405	483	3,659	10,834
Program Support	35	6	78	221	5,833	6,174
System Development Costs	576	2,075	10	-	-	2,661
ZEC Payments & Accrued Expense to Nuclear Generating Facilities	523,923	-	-	-	-	523,923
REC Payments & Accrued Expense to Generating Facilities	-	50,388	208	-	-	50,596
Clean Energy Fund Resources (Returned)	-	-	-	-	6,450 [2]	6,450
NYS Cost Recovery Fee	4,994	520	7	7	89	5,617
Uncollectable Load Amount [3]	239	-	-	-	-	239
Total	530,299	58,744	708	710	16,032	606,493
Surplus/(Deficit)	3,765	(1,286) [4]	623	716	3,849	7,666
Cumulative Surplus/(Deficit) [5]	(26,329)	62,097	1,189	2,039	17,469	56,464
Ordered Backstop Collection	33,296					
Cash Balances [6]	$ 39,708	73,899	1,215	2,039	17,557	134,418

[1] Pursuant to the December 15, 2022 Order approving, with modification the 2023 Clean Energy Standard administrative budgets, NYSERDA is authorized to use previously collected revenues including bid fees, forfeited contract security funds, Alternative Compliance Payments received, and interest income to fund the 2023 Clean Energy Standard compliance period of the Renewable Energy Standard.

[2] Per CASE 18-E-0071 – In the Matter of Offshore Wind Energy, transfer of OREC bid fees to RPS to partially offset previous transfers of RPS uncommitted funds to OREC for administrative funding.

[3] Uncollectible amounts as a result of LSE's going out of business, leaving the New York market, bankruptcy discharges, or similar.

[4] The Tier 1 deficit for 2023 is funded through previously collected revenues including bid fees, forfeited contract security funds, Alternative Compliance Payments received, and interest income from previous years.

[5] The Zero Emission Credit program shows a cumulative deficit, which results from unpaid ZEC assessments associated with certain electric load of the New York Power Authority (NYPA) and unpaid ZEC assessments from certain other Load Serving Entities that have ceased operations, offset in part by program revenues, and administrative expenses which were less than funded. See footnote "a" to Table #6 in The Clean Energy Standard Annual Progress Report: 2022 Compliance Year for a discussion of NYPA's approach with respect to the CES Order. The October 15, 2020 Order Adopting Modifications to the Clean Energy Standard directed NYSERDA and DPS staff to exclude any future NYPA "uncollectible" portion of load when determining the various LSE obligations. The cumulative program deficits incurred to date through the compliance year ending March 31, 2022, plus any future program compliance year deficits, would ultimately require funding through the Electric Distribution Company (EDC) backstop charge or other funding authorization by the Public Service Commission to provide funding to cure these deficits. NYSERDA will temporarily use available Clean Energy Funds through the "Bill-As-You-Go" funding mechanism to satisfy cash flow needs and to continue to make ZEC payments when due. NYSERDA will monitor cumulative program deficits and will utilize the investor-owned utility backstop mechanism as approved in the October 15, 2020 Order for the purpose of collecting the amounts necessary to cure the ZEC deficit. Pursuant to the June, 23, 2023 Order NYSERDA is approved to collect from the EDCs the accumulated ZEC Deficit of $33,295,904 through year five of the ZEC program ending March 31, 2022. Commencing December 15, 2023, NYSERDA shall invoice the EDCs quarterly, in four equal amounts equal in the aggregate to the cumulative deficit amount of $33,295,904.

[6] Excludes cash balances for refundable deposits.

[187] See, Case 15-E-0302, Quarterly Reports are filed in May (Q1), August (Q2), November (Q3), and February (Q4) each program year.

Table 14 CES Financial Status Report for Calendar Year 2022 (In Thousands)

CES Financial Status Report for calendar year 2022
(In Thousands)

	ZEC	REC (Tier 1)	Tier 2	Tier 4	OREC	Total
Revenues/Sources of Funds						
Zero-Emission Credit Assessments (Includes Administrative Adder)	$ 583,432	-	-	-	-	$ 583,432
Renewable Energy Credit Proceeds	-	12,431	-	-	-	12,431
Tier 2 Energy Credit Proceeds	-	-	312	-	-	312
Alternative Compliance Payments	-	12,831	-	-	-	12,831
Voluntary Compliance Payments		4,468	-	-	-	4,468
Intra-Fund Transfer for Operating Costs [1]	-	(12,280)	627	-	11,653	-
Contract Security, Bid Deposits, Bid Fees	-	2,038	-	-	-	2,038
Investment Income	985	1,204	-	29	94	2,312
Electric Distribution Company Backstop Collections (EDC)	-	-	-	-	-	-
Total	$ 584,417	$ 20,693	$ 939	$ 29	$ 11,747	$ 617,825
Expenses/Use of Funds						
Program Administration	$ 434	$ 3,831	$ 238	$ 253	$ 2,212	$ 6,968
Program Support	100	-	90	793	5,271	6,253
System Development Costs	583	1,502	51	-	-	2,136
ZEC Subsidy Payments to Nuclear Generating Facilities	575,080	-	-	-	-	575,080
REC Payments to Generating Facilities	-	11,473	525	-	-	11,998
Clean Energy Fund Resources (Returned)	-	-	-	-	1,901 [2]	1,901
NYS Cost Recovery Fee	5,896	193	9	11	76	6,185
Uncollectable Load Amount [3]	3,823	469	-	-	-	4,292
Total	585,916	17,468	912	1,056	9,460	614,812
Surplus/(Deficit)	(1,499)	3,225	27	(1,028) [4]	2,287	3,012
Cumulative Surplus/(Deficit) [5]	$ (30,094)	$ 63,383	$ 601	$ 1,323	$ 13,420	$ 48,633
Cash Balances [6]	$ 77,009	$ 59,051	$ 566	$ 1,323	$ 13,620	$ 151,568

[1] Pursuant to the December 16, 2022 Order approving, with modification the 2022 Clean Energy Standard administrative budgets, NYSERDA is authorized to fund administration of the RES sub-programs through a combination of surplus funds received in previous years.

[2] Per CASE 18-E-0071 – In the Matter of Offshore Wind Energy, transfer of OREC bid fees to RPS to partially offset previous transfers of RPS uncommitted funds to OREC for administrative funding.

[3] Uncollectible amounts as a result of LSE's going out of business, leaving the New York market, bankruptcy discharges, or similar.

[4] The Tier 4 deficit for 2022 is funded through the use of Tier 4 bid deposits and investment income received in previous years.

[5] The Zero Emission Credit program shows a cumulative deficit, which results from unpaid ZEC assessments associated with certain electric load of the New York Power Authority (NYPA) and unpaid ZEC assessments from certain other Load Serving Entities that have ceased operations, offset in part by program revenues, and administrative expenses which were less than funded. See footnote "**" to Table #6 in The Clean Energy Standard Annual Progress Report: 2021 Compliance Year for a discussion of NYPA's approach with respect to the CES Order. The October 15, 2020 Order Adopting Modifications to the Clean Energy Standard directed NYSERDA and DPS staff to exclude any future NYPA "uncollectible" portion of load when determining the various LSE obligations. The cumulative program deficits incurred to date through the compliance year ending March 31, 2022, plus any future program compliance year deficits, will ultimately require funding through the Electric Distribution Company (EDC) backstop charge or other funding authorization by the Public Service Commission to provide funding to cure these deficits. NYSERDA will temporarily use available Clean Energy Funds through the "Bill-As-You-Go" funding mechanism to satisfy cash flow needs and to continue to make ZEC payments when due. NYSERDA will monitor cumulative program deficits and will utilize the investor owned utility backstop mechanism as approved in the October 15, 2020 Order for the purpose of collecting the amounts necessary to cure the ZEC deficit. No additional EDC backstop collections are planned at this time.

[6] Excludes cash balances for refundable RFP bid deposits.

Table 15. CES Financial Status Report for Calendar Year 2021 (In Thousands)

CES Financial Status Report for calendar year 2021
(In thousands)

	ZEC	REC (Tier 1)	Tier 2	Tier 4	OREC	Total
Revenues/sources of funds						
Zero-emission credit assessments (includes administrative adder)	$ 597,122	-	-	-	-	597,122
Renewable energy credit proceeds	-	10,450	-	-	-	10,450
Tier 2 energy credit proceeds	-	-	1,159	-	-	1,159
Alternative compliance payments [1]	-	43,652	-	-	-	43,652
Funding for Ordered Maintenance Tier projects (from uncommitted)	-	(5)	-	-	-	(5)
PSC approved funding for operating costs (from uncommitted funds)	-	-	-	1,626	-	1,626
Clean energy fund resources (temporarily used)	-	-	-	-	-	-
Management/Bid fees	-	4,140	-	2,800	-	6,940
Contract security and bid deposits	-	-	-	-	-	-
Investment income	11	18	-	1	5	35
Electric Distribution Company backstop collections (EDC)	-	-	-	-	-	-
Total	597,133	58,254	1,159	4,427	5	660,978
Expenses/use of funds						
Program administration	106	3,881	212	132	2,280	6,612
Program support	75	-	-	1,923	3,487	5,484
System development costs	413	1,336	167	-	14	1,930
ZEC subsidy payments to nuclear generating facilities	589,317	-	-	-	-	589,317
REC payments to generating facilities	-	12,474	200	-	-	12,674
Clean energy fund resources (returned)	-	-	-	-	-	-
NYS cost recovery fee	6,323	190	6	21	61	6,601
Total	596,234	17,881	584	2,076	5,842	622,617
Surplus/(deficit)	899	40,374	574	2,350	(5,837) [2]	38,360
Cumulative surplus/(deficit) [3]	$ (28,596)	$ 60,158	$ 574	$ 2,350	$ 11,133	45,620
Cash balances [4]	$ 78,154	60,020	386	2,350	11,471	152,381

[1] $496,000 in ACP funding has been ordered to be used for Maintenance Tier projects.

[2] 2021 OREC revenue/PSC approved funding was allocated in Q4 2020 and therefore reflected in the 2020 CES Financial Status Report. Although the revenue was reflected in the 2020 report, expenses occurred in 2021 resulting in the appearance of a deficit.

[3] The Zero Emission Credit program shows a cumulative deficit, which results from unpaid ZEC assessments associated with certain electric load of the New York Power Authority (NYPA) and unpaid ZEC assessments from certain other Load Serving Entities that have ceased operations, offset in part by program revenues, and administrative expenses which were less than funded. See footnote b to Table #5 in the Clean Energy Standard Annual Progress Report for a discussion of NYPA's approach with respect to the CES Order. The October 15, 2020 Order Adopting Modifications to the Clean Energy Standard directed NYSERDA and DPS staff to exclude any future NYPA "uncollectible" portion of load when determining the various LSE obligations. The cumulative program deficits incurred to date through the compliance year ending March 31, 2021, plus any future program compliance year deficits, will ultimately require funding through the Electric Distribution Company (EDC) backstop charge or other funding authorization by the Public Service Commission to provide funding to cure these deficits. NYSERDA will temporarily use available Clean Energy Funds through the "Bill-As-You-Go" funding mechanism to satisfy cash flow needs and to continue to make ZEC payments when due. NYSERDA will monitor cumulative program deficits and will utilize the investor owned utility backstop mechanism as approved in the October 15, 2020 Order for the purpose of collecting the amounts necessary to cure the ZEC deficit. No additional EDC backstop collections are planned at this time.

[4] Excludes cash balances for refundable RFP bid deposits.

Appendix B: Analysis

This Appendix offers an updated assessment of the total onshore renewable energy resource potential in New York and likely feasible amounts of annual resource procurement for upcoming Tier 1 solicitations, as well as additional detail on the updated assessment of the path to the 70% goal set out in Section 5.

DPS Staff and NYSERDA acknowledge the contribution of Power Advisory LLC and DNV Energy Insights USA Inc. for their role in the analysis of renewable energy resource potential.

B.1 Resource Potential

Building on the analysis carried out for the 2020 CES White Paper, an updated assessment of onshore large-scale renewable energy resource potential in New York was conducted to support understanding of renewables procurement needs (as discussed in Section 5 of this Report) within the wider context of total available resource potential.[188] As in the 2020 analysis, resource potential was assessed using geospatial (GIS) analysis. Starting from the sites identified during the 2020 analysis, additional GIS screening and filtering of these sites was carried out, using both new GIS data sets (e.g., land use, permanent easements) as well as the latest versions of several datasets that contained new protected areas that should no longer be considered available for development. This updated screening reduced the final sites that could be considered for development in both the number and size.

Table 16 summarizes the renewable resource potential available in New York in addition to projects already operational or contracted.

Table 16: Statewide Resource Potential

Resource	GWh
Land-based wind	30,066
Utility-scale solar	121,623
Total	**151,689**

[188] Case 15-E-0302, 2020 CES White Paper, Appendix A – Cost Analysis.

Table 19 below illustrates a total amount of 11,760 GWh in 2030, rising to 23,520 GWh by 2033 as the amount of further onshore large-scale renewables deployment needed, above projects already operational or contracted, in order to meet the 70% goal. The above updated quantification confirms that remaining resource potential, even after additional screening, continues to far exceed State needs to meet the goal.

The analysis for this Report does not include resource potential analysis for offshore wind since no change in targeted offshore wind deployment amounts is considered.

B.2 Feasible Annual Onshore Procurement Amounts

Following the conclusion that there is sufficient total statewide resource potential, further consideration was given to the quantity of large-scale onshore renewables resources that can feasibly be procured on an annual basis, taking into account constraints both as regards the number of projects that project developers can identify and develop each year to a level where projects are ready to participate in Tier 1 solicitations, and the capacity of supply chain providers to support the timely construction of such projects.

Given recent uncertainties in particular with regard to supply chain related factors, the analysis in this respect primarily considers past data on amounts of renewables project development in New York rather than offering a modeled forecast. Table 17 summarizes annual amounts of renewable energy projects entered into the NYISO interconnection queue over the past twelve years as a key indicator of renewables project development activity in New York.

Table 17: New renewable energy projects under development by year of NYISO Interconnection Request (GWh)[189]

Year	Land Based Wind	Utility Scale Solar	Tier 1 Total
2012	1,426	19	1,445
2013	642	-	642
2014	1,174	438	1,612
2015	4,353	164	4,517
Average 2012-2015	***1,899***	***155***	***2,054***
2016	2,729	716	3,445
2017	874	1,943	2,817
2018	308	3,666	3,975
2019	2,727	5,910	8,637
Average 2016-2019	***1,659***	***3,059***	***4,719***
2020	297	4,721	5,017
2021	1,134	5,910	7,044
2022	1,206	5,569	6,775
2023	2,100	4,113	6,214
Average 2020-2023	***1,184***	***5,078***	***6,263***

As can be observed, total project development levels have increased markedly over the period shown, with a strong indication of a correlation with the introduction of the CES in 2016 and its revision in 2020. Based on a conservative view of the continuation of annual levels of project development at the most recent average rate, annual Tier 1 procurement amounts up to a maximum of around 6,000 GWh per year appear feasible, with an assumption that renewables project developers will again, as previously, respond to the increase in Tier 1 annual procurement quantity considered in Section 5 of this Report with a

[189] NYISO, Interconnection Process, available at: https://www.nyiso.com/interconnections.

corresponding increase in renewable energy development activity, an annual development amount of around 7,000 GWh (before attrition) may reasonably be expected in the near term.

This range of around 6,000 GWh to 7,000 GWh per year accords with NYSERDA's understanding and assessment of current market dynamics as the feasible range of annual project generation amounts that may be bid into near-term Tier 1 solicitations. It should also be noted that while the analysis conducted here refers to feasible levels of Tier 1 procurement, this could also include renewables development that may come forward through other initiatives that may or may not involve Tier 1, for instance through voluntary REC purchases, or further development of repowering of hydro resources (discussed in Section 6.5).

Expectations of increasing levels of project development are further strengthened when considering NYPA's future role in this respect. The 2023-2024 State Budget Enactment significantly expanded NYPA's role in the renewable energy sector. It gives NYPA new authority to plan, design, develop, finance, construct, own, operate, maintain, and improve renewable energy generation projects to support New York State's renewable energy goals established in the CLCPA in support of an adequate and reliable supply of electric power, and energy in the state and support the Renewable Energy Access and Community Help program. NYPA is authorized to partner with other entities to develop new renewable generation projects, paving the way for public-private partnerships on projects. NYPA will publish its first biennial strategic plan for renewable energy development in January 2025. On March 12, 2024, NYPA issued a Request for Qualifications to pre-qualify renewable development companies and investors that meet requirements to collaborate with NYPA on the development of renewable energy generating projects and storage systems, including solar PV, wind, battery storage, green hydrogen, geothermal, and renewable-related transmission.

B.3 Tier 1 and Offshore Wind Procurement and Deployment Quantity

As discussed in Section 5 of this Report, base case analysis indicates the 70% goal may be achievable in 2033. Table 18 summarizes the contribution of each type of generation or program to achieve a total of 120,707 GWh of renewable generation by 2033, equating approximately to 70% of statewide load under the base case load forecast at that time.

Table 18: Achievement of 70% in 2033

GWh	2033	%
Baseline operational and imports	35,447	21%
Operational through June 2024	2,245	1%
Contracted onshore	17,417	10%
Contracted offshore wind (NY4)	7,539	4%
NY Sun 10 GW target by 2030	10,644	6%
Offshore wind beyond NY4	18,753	11%
Incremental distributed generation beyond 10 GW	5,142	3%
Tier 1 RfPs 2024-2029	23,520	14%
Total	**120,707**	**70%**

For the purpose of this analysis, the procurement and deployment quantities and timeline of Tier 1 and offshore wind resources are assumed as follows:

- For already-contracted Tier 1 and offshore wind resources, the quantity and time of deployment reflects contractual arrangements and the latest NYSERDA expectations by project.
- Table 19 below shows the annual deployment schedule for Tier 1 and offshore wind generation projects from future procurements.
- For Tier 1 this reflects the annual procurement amount of 5,600 GWh per year for solicitations in 2024-2029 as discussed in Section 5 of this Report, equating to a deployed amount of 3,920 GWh per year after assumed 30% attrition.
- The remaining offshore wind amount (beyond offshore wind already operational or contracted) needed to achieve the 2035 9 GW goal is assumed to be procured over two upcoming solicitations (NY5 and NY6), with deployment from these procurements assumed to occur in equal quantities across the five years of 2031-2035 (see, Table 20).[190]

[190] Generation equating to the 9 GW goal is the bid amount generation for currently operational and contracted projects, plus generation of the remaining offshore wind capacity calculated based on a capacity factor of 50%.

Table 19: Tier 1 deployment from upcoming solicitations

Procurement Year	2024	2025	2026	2027	2028	2029
Deployment Year	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Cumulative Tier 1 Generation GWh/yr	3,920	7,840	11,760	15,680	19,600	23,520

Table 20: Offshore wind deployment from upcoming solicitations

Deployment Year	2031	2032	2033	2034	2035
Cumulative Generation GWh/yr	6,251	12,502	18,753	25,004	31,255

B.4 Path to 70% Goal under High Load Forecast

The above deployment quantities are consistent with meeting the 70% goal by 2033 under the base case statewide electric load forecast or lower load forecasts. If load does not increase at the rate assumed for the base case, it may be possible to reach the 70% goal earlier, or could offer opportunities to adjust procurement amounts to avoid over-procurement as appropriate. However, this Report also considers the possibility that future statewide electric load may rise above the base case load forecast, as discussed in Section 5 of this Report.

Analysis of this high load scenario indicates that achievement of the 70% goal could be further delayed until 2035, with both the 70% goal level and renewables deployment reaching approximately 152,500 GWh at that time. In this case, opportunities to adjust procurement may be more limited given the indications of likely maximum feasible annual procurement amounts reflected in Section B.2. It should be emphasized that all deployment and goal achievement scenarios presented here are based on conservative assumptions on attrition and delay of renewables deployment. To the extent attrition or delay are less significant than assumed for this analysis, earlier achievement of the 70% goal may be feasible even under the high statewide electric load scenario.

Table 21. Estimated Path to 70% Goal under High Load Forecast

GWh, cumulative		2030	2031	2032	2033
Statewide load forecast	Base	164,910	167,130	169,630	172,390
	Low	154,880	157,100	159,600	162,360
	High	174,876	183,360	191,930	200,610
70% goal	Base	115,437	116,991	118,741	120,673
	Low	108,416	109,970	111,720	113,652
	High	**122,413**	**128,352**	**134,351**	**140,427**
Currently operational and contracted, incl 10 GW DG		73,292	73,292	73,292	73,292
Offshore wind beyond NY4		0	6,251	12,502	18,753
Distributed generation beyond 10 GW goal		1,512	2,722	3,932	5,142
Tier 1 for 6 RfPs 2024-2029 @ GWh/y		11,760	15,680	19,600	23,520
Total Renewables		86,565	97,946	109,327	120,707
Gap to 70% (base load forecast)		**35,849**	**30,406**	**25,024**	**19,720**

Specifically, this high load forecast scenario assumes:

- Full deployment of the 9 GW offshore wind goal by 2035, consistent with the offshore wind goal date;
- A further increase in distributed generation efforts to 12 GW by 2030 and 1.5 GW per year subsequently;
- At the next Biennial Review (in 2026), annual Tier 1 procurement amounts would be increased further to 6,500 GWh per year for subsequent Tier 1 solicitations as part of the action taken at that time to respond to the observation of statewide load following the high load forecast as assumed in this scenario;
- Continued deployment of both distributed generation and Tier 1 in accordance with the above annual levels also beyond 2033;
- A reduction in attrition from the conservative assumption of 30% made in this analysis for Tier 1 deployment occurring after 2033, reflecting an expectation that some of the challenges currently affecting deployment as discussed in this Report will at least have eased by then (if not sooner).