De-Carbonization / DER Report for NYSRC Executive Committee Meeting 4/12/2024

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The April 2024 edition of the De-Carbonization / Distributed Energy Resources (DER) Report includes the following items:

- FERC Affirms Generator Interconnection Reforms to Clear US Clean Energy Backlog
- DOE Releases Atlantic Offshore Wind Transmission Study and Action Plan
- Marinelog website: All 12 South Fork Wind Turbines Complete and Power Flowing
- NY Times Article: A New Surge in Power Use Is Threatening U.S. Climate Goals
- Snapshot of the NYISO Interconnection Queue: Storage / Solar / Wind / Co-located

FERC Affirms Generator Interconnection Reforms to Clear US Clean Energy Backlog

This Article (subscription required) appeared on March 22nd on the S&P Capital IQ - Energy and Utilities News and Analysis Webpage. It summarizes the FERC's review of Order RM22-14, 2023 in July 2023, addressing the nationwide backlog of proposed clean energy projects, with reforms that establish a new penalty regime for missed interconnection study deadlines and tougher financial requirements for developers. In the March 21 order (RM22-14, 2023-A), FERC granted a limited set of requests to modify or clarify the order on rehearing.

FERC issued the final rule, Order 2023, last summer in response to a backlog of more than 2,000 GW of proposed generation and energy storage projects — roughly equal to all existing US power generating capacity. The final rule requires transmission providers and FERC-jurisdictional regional grid operators to move to a "first-ready, first-served" cluster study approach for processing new interconnection requests. It also imposes more stringent study deposits for interconnection queue customers, who will face increasingly harsh penalties for late-stage queue withdrawals.

Transmission providers had urged FERC to reconsider eliminating a "reasonable efforts" standard for interconnection studies that identify network system upgrades triggered by proposed generation projects. Under the standard, transmission providers could grant themselves penalty-free extensions.

The transmission providers, among other things, argued that FERC failed to demonstrate that replacing the reasonable efforts standard with a first-of-its-kind penalty regime will improve queue processing times.

FERC was unconvinced by those arguments. The commission acknowledged that many factors may contribute to study delays, such as a shortage of qualified engineers to perform the studies. But FERC concluded that a "comprehensive approach," including study deadlines and penalties, "is necessary to remedy the unjust and unreasonable rates resulting from interconnection queue backlogs."

Penalties will start at $1,000/business day and increase to $2,000/business day for missed restudy deadlines. Missed deadlines for affected system studies, which identify upgrades on neighboring systems, will also incur a penalty of $2,000/business day.

In its rehearing order, FERC clarified that affected system transmission providers must respond in writing to interconnection customers within 20 business days after receiving a study request. Transmission providers can appeal penalties by demonstrating that delays occurred due to factors outside of their control, FERC noted. FERC also clarified that transmission providers will have 150 days to perform restudies after informing customers.

In addition, FERC affirmed increased financial commitment and readiness requirements for developers, as well as requirements to demonstrate site control of the land for proposed projects. Study deposits will start at $35,000 plus $1,000/MW for projects with a nameplate capacity between 20 MW and 80 MW, and increase to $250,000 for projects larger than 200 MW. Order 2023 initially required customers to pay the deposits via cash or a letter of credit. Upon rehearing, however, FERC was persuaded that developers should also be able to use surety bonds — a form of legally binding contract — or other forms of financial security "that are reasonably acceptable to the transmission provider."

FERC also granted a request from offshore wind developer Ørsted North America Inc. for clarification on a rule provision that allows developers to submit financial deposits when regulatory barriers prevent the demonstration of site control. The commission agreed with the Ørsted A/S subsidiary that any deposits received as an alternative to demonstrating site control should be refundable if a customer withdraws from the queue. But those customers will still be subject to withdrawal penalties, FERC noted.

Customers will face penalties if they withdraw from queues at any point in the interconnection process. The penalties will increase in stringency if a queue withdrawal triggers the need for restudies, with the harshest penalties applied to developers who terminate interconnection agreements before a project reaches commercial operation. In response to the New York ISO, FERC clarified that withdrawal penalties for individual developers cannot exceed the dollar amount collected from interconnection customers who have already withdrawn from the study process.

Clean energy groups had urged FERC to require transmission providers to attend scoping meetings for interconnection studies, arguing that their presence is crucial because they are most knowledgeable about their systems. But FERC declined to do so, reasoning that the new penalty regime will encourage transmission providers to give developers the information they need to efficiently navigate the study process. FERC-jurisdictional regional grid operators may also propose to require the attendance of any entities seen as necessary for providing critical information to interconnection customers, the commission noted.

FERC also affirmed a requirement for transmission providers to create publicly available "heatmaps" designed to help developers estimate their interconnection costs before entering queues. In its rehearing order, FERC reiterated that the heatmaps must be based on power flow models or base case assumptions used in the most recent cluster studies or restudies.

The WATT Coalition, a trade group working to advance the use of grid-enhancing technologies, had urged FERC to reconsider its decision to exclude dynamic line ratings from a list of alternative technologies for consideration in system impact studies. Dynamic line ratings allow existing transmission lines to operate at a higher capacity by providing operators with real-time data on factors such as wind speed and line sag. FERC rejected that request, however, noting that dynamic line ratings are weather-dependent. "The issue is not whether dynamic line ratings can provide additional transmission capacity at a specific point in time; rather, the issue is whether, as a weather-dependent technology, they can be relied upon to replace the need for a different network upgrade," FERC said.

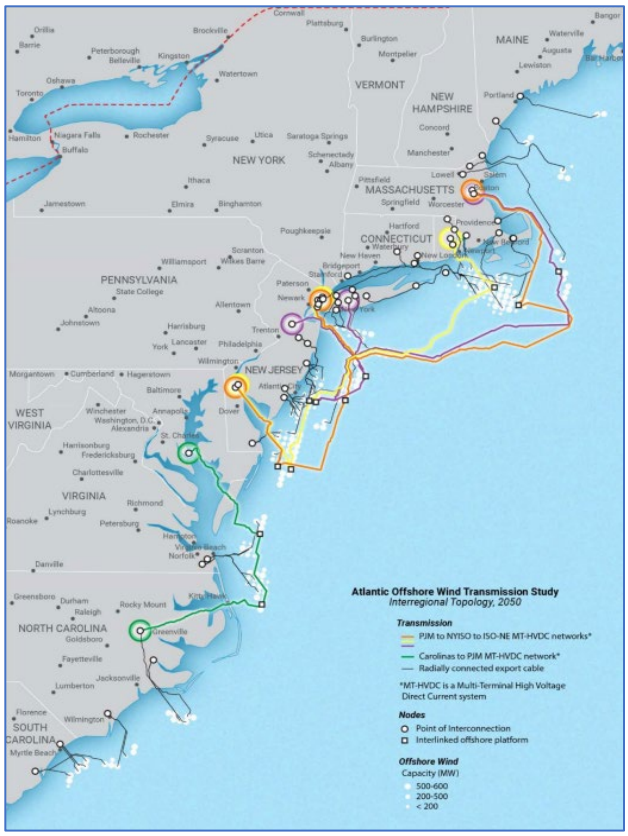
Compliance plans were initially due on April 3, but FERC extended its deadline to 30 days from the rehearing order's publication in the Federal Register. In doing so, the commission confirmed that transmission providers may propose alternative effective dates that align with future cluster studies. Order 2023 also set out a transition process for interconnection customers who have not signed interconnection agreements prior to a transmission provider's FERC-approved effective date. FERC clarified that customers subject to the new readiness requirements may withdraw from queues within the 60 days after the effective date without incurring penalties.

DOE Releases Atlantic Offshore Wind Transmission Study and Action Plan

On March 21st, the U.S. Department of Energy (DOE) Announced the release of the Atlantic Offshore Wind Transmission Study (Multiple references in: Executive Summary / Fact Sheet / Full Report), a two-year study led by National Renewable Energy Labs (NREL) and Pacific Northwest National Labs (PNNL) to evaluate transmission options to support offshore wind energy deployment along the Atlantic Coast of the United States. Offshore wind is projected to be a key part of a low-carbon future for the East Coast, and this report provides a thorough analysis of options to bring Atlantic offshore wind energy to American communities. While immediate projects will connect individually to the onshore grid, the study finds that after 2030, strategically linking some offshore wind energy projects via offshore transmission networks will help lower electricity production costs, enhance U.S. grid reliability, and reduce dependence on fossil fuels, while minimizing disruptions to oceanic ecosystems.

This study informed the Atlantic Offshore Wind Transmission Action Plan, which outlines immediate actions needed to connect the first generation of Atlantic offshore wind projects to the electric grid, as well as longer-term efforts to increase transmission over the next several decades. By ensuring affordable, and timely transmission access for offshore wind, these findings support the Administration's goals of reaching 30 gigawatts of offshore wind energy by 2030 and unlocking a pathway to 110 GW or more by 2050.

"Offshore wind energy is already powering more than one hundred thousand homes along the east coast, with the potential to grow and further enhance grid reliability and reduce even more fossil fuels," said U.S. Secretary of Energy Jennifer M. Granholm. "The Atlantic Offshore Wind Transmission Study and the Action Plan show the Biden-Harris Administration's commitment to advance offshore wind along the nation's coasts will boost domestic manufacturing and support tens of thousands of jobs as we tackle the climate crisis."



The Atlantic Offshore Wind Transmission Study, conducted by researchers from DOE's National Renewable Energy Laboratory and Pacific Northwest National Laboratory, analyzed various potential scenarios for offshore transmission off the Atlantic coast of United States. It estimates the costs and benefits of each pathway, accounting for grid reliability, resilience, and potential cable routes that consider environmental and siting constraints. It fills gaps identified in prior analyses including by providing a multi-regional planning perspective.

The report shows that offshore wind energy development presents a unique opportunity to add transmission capacity to the East Coast's power system, with the highest benefit from offshore transmission connecting areas across grid regions. This would allow offshore wind transmission to provide energy to areas of high demand and reduce grid congestion, increase system reliability, lower curtailment, and flow power from lower-price regions to higher price regions, reducing costs for consumers. This could also reduce generation from fossil-fueled-powered units by 5.5–9.2 Terawatt-hours per year in 2050. Overall, the study found that connecting offshore wind platforms together to create transmission networks outweighs the costs, often by a ratio of 2 to 1 or more, when compared with each project having its own isolated transmission connections.

The report also identifies potentially feasible transmission corridors taking into consideration ocean co-use constraints such as military zones and shipping channels, as well as marine protected areas and artificial reefs. Actual potential points of interconnection should be determined by transparent processes and the locations used for the study are not intended to be precise suggestions.

The study was based on deploying 85 GW of offshore wind off the Atlantic Coast by 2050, and recommends building offshore transmission in phases to help reduce development risk. It suggests early implementation of HVDC technology standards to support new transmission and facilitate future network expansion.

The comprehensive final Atlantic Offshore Wind Transmission Action Plan confirms the initial findings released in late 2023, and details how wind resources could efficiently be captured off the Atlantic Coast of the United States and delivered to communities as clean, reliable power. Partially funded through the Inflation Reduction Act, the Action Plan underscores DOE's commitment to leveraging cutting-edge research and data to chart a sustainable, efficient path forward for offshore wind transmission. The Action Plan was also informed through a series of convening workshops with subject matter experts and decision makers, including tribal nations, state governments, and regional transmission operators held from April 2022 to March 2023. Over the mid- to long-term, increased intra-regional coordination, shared transmission lines, and an offshore network of high-voltage direct current (HVDC) interlinks can more efficiently bring critical, renewable offshore wind energy onshore.

The report details how wind resources could efficiently be captured off the Atlantic Coast and delivered to communities as clean, reliable power. It outlines immediate actions needed to connect the first generation of Atlantic offshore wind projects to the electric grid, as well as longer-term efforts to increase transmission over the next several decades. Over the mid- to long-term, increased inter-regional coordination, shared transmission lines, and an offshore network of HVDC interlinks can more efficiently bring this energy onshore.

Recommendations include:
Before 2025: Establish collaborative bodies that span the Atlantic Coast region; clarify some of the building blocks of transmission planning, including updating reliability standards and identifying where offshore transmission may interconnect with the onshore grid; and address costs through voluntary cost assignments. From 2025 to 2030: Convene and coordinate with states to plan for an offshore transmission network; with industry to standardize requirements for HVDC technology; and with federal agencies, tribal nations, state agencies, and stakeholders to identify and prioritize transmission paths on the outer continental shelf.

From 2030 to 2040: Establish a national HVDC testing and certification center to ensure compatibility when interconnecting multiple HVDC substations to form an offshore grid network and codify updates to transmission planning through regulated interregional joint planning, transfer capacity minimums, and market monitoring. Sustaining actions: Improve environmental review and permitting frameworks, support strong state leadership, empower permitting agencies, develop cost allocation practices, and consider utilization of national corridors.

Additional Links:

- Bureau of Ocean Management (BOEM)
- Wind Energy Technologies Office
- Grid Deployment Office

Subscription Services:

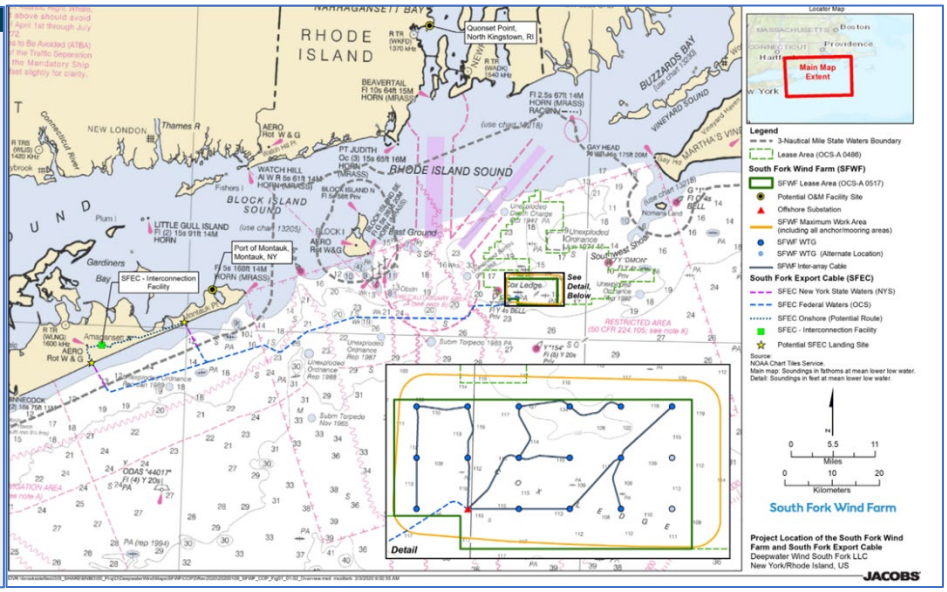
- Wind Energy News and Events
- Grid Deployment Office's Offshore Wind Listserv

All 12 South Fork Wind Turbines Complete and Power Flowing

This Article from the MarineLog website reports on Governor Hochul's March 14th Announcement regarding the completion of the landmark South Fork Wind project, with all 12 offshore wind turbines constructed and the wind farm successfully delivering power to Long Island and the Rockaways. The announcement gave New York state the bragging rights of becoming home to America's first utility-scale offshore wind farm.

This renewable energy is generated roughly 35 miles off the coast of Montauk and will eliminate up to six million tons of carbon emissions over the life of the project, the equivalent of taking 60,000 cars off the road for the next twenty years. First approved by the Long Island Power Authority (LIPA) Board of Trustees in 2017, South Fork Wind began construction in February 2022, beginning with the onshore export cable system that links the project to the Long Island electric grid. The wind farm reached "steel in the water" milestone in June 2023 with the installation of the project's first monopile foundation, and its final turbine was installed in February.

Details	
Technology:	Fixed Offshore Wind
Project Scale:	Commercial Farm
Turbine Model:	SG 11.0-200 DD
Hub Height:	100.9-143.9 m
Rotor Diameter:	150-224 m
Number of Turbines:	12
Capacity per Turbine:	6-12 MW
Installed Capacity:	132 MW
Support Structure:	Monopile
Inter-Array Cables:	34.5-66 kV
Export Cables:	AC, Buried Seafloor Cables
Export Cable Voltage:	138 kV
Number of Export Cables:	1
Cable Landfall:	Horizontal Directional Drill
Physical Site:	Shallow Water (<60m), Marine, Soft-Bottom Habitat
Water Depth:	33-41 m
Distance from Shore:	56.3 km
Country:	United States of America
State:	New York



South Fork Wind's turbines were staged and assembled by local union workers at State Pier in New London, Connecticut. The project's advanced foundation components were completed by local union workers at Ørsted and Eversource's fabrication hub at ProvPort, in Rhode Island. Its crew vessels and crew change helicopter are based out of Quonset Point, Rhode Island. South Fork Wind includes the first U.S.-built offshore wind substation, built by over 350 workers in three states, with New York union workers supporting its installation offshore.

Long Island-based contractor Haugland Energy Group LLC installed the underground duct bank system for South Fork Wind's onshore transmission line and led the construction of the project's onshore interconnection facility. LS Cable installed and jointed the onshore cables with support from Long Island's Elecnor Hawkeye. The onshore cable scope of work alone created more than 100 union jobs for Long Island skilled trades workers. Roman Stone, also on Long Island, manufactured concrete mattresses to protect the undersea cables. Ljungstrom, located in western New York, in partnership with Riggs Distler & Company, Inc., provided specialized structural steelwork.

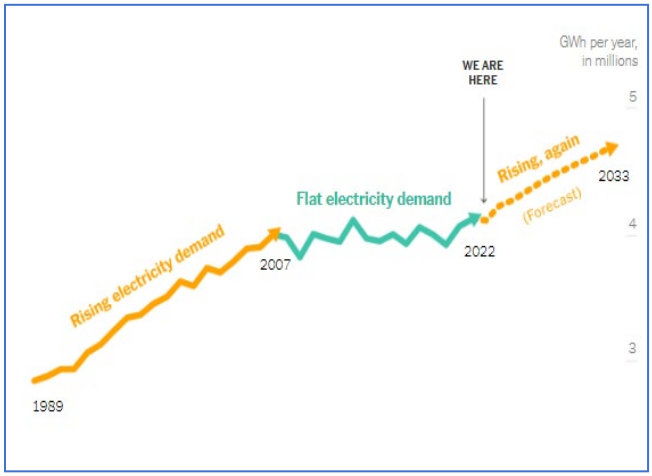
Additional information can be found at:
Tethys Database – South Fork Windfarm: Pacific Northwest National Labs (PNNL)
South Fork Wind Farm Construction and Operations Plan as submitted to BOEM

NY Times Article (March 14th): A New Surge in Power Use Is Threatening U.S. Climate Goals

This Article describes how demand for electricity, which has stayed largely flat for two decades, has begun to surge. Over the past year, electric utilities have nearly doubled their forecasts of how much additional power they'll need by 2028 as they confront an unexpected explosion in the number of data centers, an abrupt resurgence in manufacturing driven by new federal laws, and millions of electric vehicles being plugged in.

The chart shown below right shows data from NERC reflecting annual net energy for load for the United States plus small portions of Mexico and Canada.

Many power companies were already struggling to keep the lights on, especially during extreme weather, and say the strain on grids will only increase. Peak demand in the summer is projected to grow by 38,000 megawatts nationwide in the next five years, according to an analysis by the consulting firm Grid Strategies, which is like adding another California to the grid. In an ironic twist, the swelling appetite for more electricity, driven not only by electric cars but also by battery and solar factories and other aspects of the clean-energy transition, could also jeopardize the country's plans to fight climate change. At least 75 data centers have opened in Virginia since 2019. In California, electric vehicles could soon account for 10 percent of peak power demand.



To meet spiking demand, utilities in states like Georgia, North Carolina, South Carolina, Tennessee, and Virginia are proposing to build dozens of power plants over the next 15 years that would burn natural gas. In Kansas, one utility has postponed the retirement of a coal plant to help power a giant electric-car battery factory. Burning more gas and coal runs counter to President Biden's pledge to halve the nation's planet-warming greenhouse gases and to generate all of America's electricity from pollution-free sources such as wind, solar and nuclear by 2035.

Some utilities say they need additional fossil fuel capacity because cleaner alternatives like wind or solar power aren't growing fast enough and can be bogged down by delayed permits and snarled supply chains. While a data center can be built in just one year, it can take five years or longer to connect renewable energy projects to the grid and a decade to build some of the long-distance power lines they require. Utilities also note that data centers and factories need power 24 hours a day, something wind and solar can't do alone. Yet many regulated utilities also have financial incentives to build new gas plants, since they can recover their costs to build plants, wires and other equipment from ratepayers and pocket an additional percentage as profit. As a result, critics say, utilities often overlook, or even block, ways to make existing power systems more efficient or to integrate more renewable energy into the grid. If more power isn't brought online relatively soon, large portions of the country could risk blackouts, according to a recent report by the North American Electric Reliability Corporation.

By 2030, electricity demand at U.S. data centers could triple, using as much power as 40 million homes. In Northern Virginia, one of the nation's largest data center hubs, at least 75 facilities have opened since 2019 and Dominion Energy, the local utility, says data center capacity could double in just five years. At the same time, investment in American manufacturing is hitting a 50-year high, fueled by new federal tax breaks to lift microchip and clean-tech production. Since 2021, companies have announced plans to spend at least $525 billion on factories for semiconductors, batteries, solar panels and more.

In Georgia, where dozens of electric vehicle companies and suppliers are setting up shop, the state's largest utility now expects 16 times as much growth in electricity demand this decade as it did two years ago. Millions of Americans are also buying plug-in vehicles and electric heat pumps for their homes, spurred by recent federal incentives. In California, one-fifth of new cars sold are electric, and officials estimate that E.V.s could account for 10 percent of power use during peak hours by 2035. On top of that, record heat fueled by global warming is spurring people to crank up air-conditioning, causing summer demand in Arizona and Texas to rise faster than forecast. Many worry the grid won't keep up. PJM Interconnection, which oversees the nation's largest regional grid, stretching from Illinois to New Jersey, is now expecting an additional 10,000 megawatts of demand by 2030 that wasn't forecast last year. That's akin to adding another New York City to the system.

PJM's process for connecting renewable energy projects to the grid has been afflicted by delays. Utilities in PJM have been preparing to retire roughly 40,000 megawatts of mostly coal, gas, and oil-burning power plants this decade as states seek to transition away from fossil fuels. PJM has already approved an additional 40,000 megawatts of mostly wind, solar and batteries as partial replacements. But many of those projects have been stalled by local opposition or trouble getting vital equipment like transformers.

Nationwide, just 251 miles of high-voltage transmission lines were completed last year, a number that has been declining for a decade. So far, one state that has kept pace with explosive demand is Texas, where electricity use has risen 29 percent over the past decade, partly driven by things like bitcoin mining, liquefied natural gas terminals and the electrification of oil fields. Texas's streamlined permitting process allows wind, solar and battery projects to get built and connected faster than almost anywhere else, and the state zoomed past California last year to lead the nation in large-scale solar power.

In North Carolina, regulators had ordered Duke Energy, the state's biggest utility, to slash its planet-warming carbon dioxide emissions by 70 percent by 2030. But in January, Duke warned it could miss that target by at least five years under a new plan to build up to five large gas-burning power plants and five smaller versions by 2033, more than previously proposed. Even though Duke is planning a major expansion of solar and offshore wind power, the company says it needs additional gas plants because demand from industrial customers is rising faster than expected. In Virginia, Dominion Energy has proposed to meet rising demand for data centers with a mix of renewables and gas generation in a plan that could increase its overall emissions. Georgia Power has asked permission to build three new gas- and oil-burning turbines and is evaluating whether to postpone the planned retirement of two older coal plants.

The Southern Environmental Law Center has identified at least 33,000 megawatts worth of gas projects being proposed by utilities across the Southeast, plants that could stick around burning fossil fuels for decades. In interviews, utility executives say gas is needed to back up wind and solar power, which don't run all the time. Gas plants can sometimes be easier to build than renewables since they may not require new long-distance transmission lines. Eventually, alternative sources of clean power may emerge (both Duke and Dominion want to build smaller nuclear reactors) but those are years away.

There are other ways to meet rising demand that require burning fewer fossil fuels, some experts say. Utilities could get more creative about helping customers use less electricity during peak hours or make better use of batteries, reducing strains on the grid. Advanced sensors and other technologies could push more renewable energy through existing transmission lines.

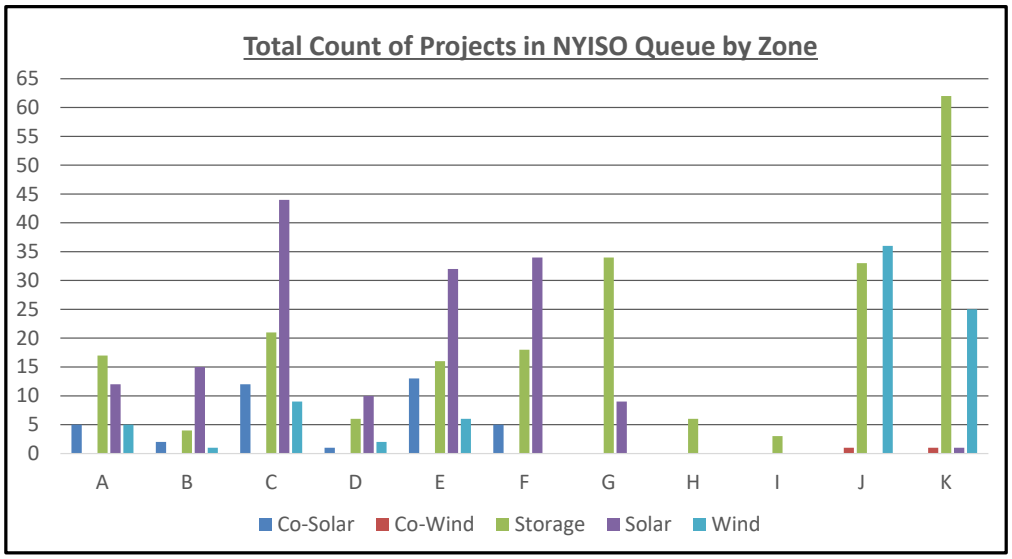
Interconnection Queue: Monthly Snapshot – Storage / Solar / Wind / CSRs (Co-located Storage)

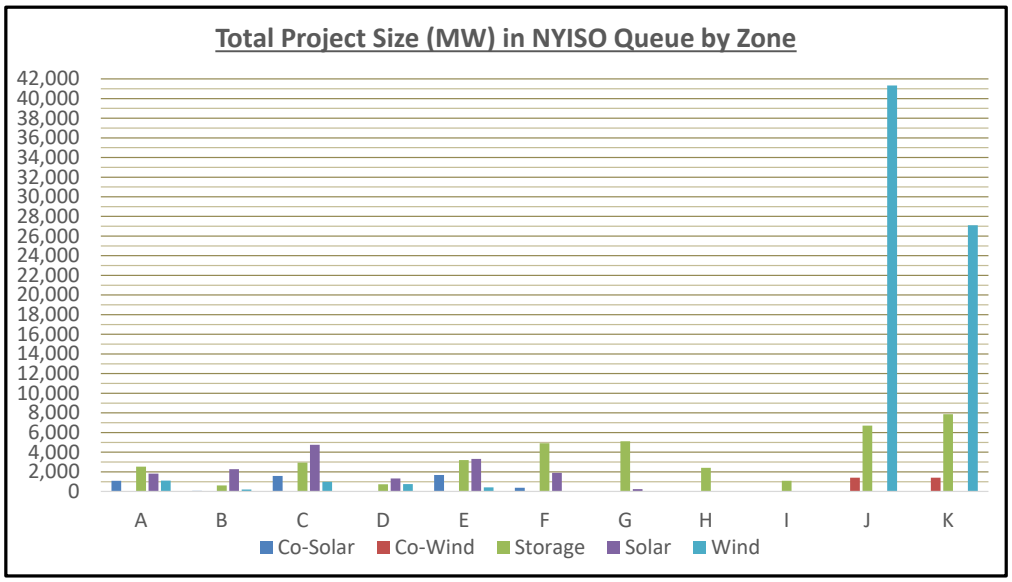
The intent is to track the growth of Energy Storage, Wind, Solar and Co-Located Storage (Solar and Wind) projects in the NYISO Interconnection Queue, looking to identify trends and patterns by zone and in total for the state. The information was obtained from the NYISO Interconnection Website, based on information published on March 20th, and representing the Interconnection Queue as of February 29th. Note that 7 projects were added, and 8 were withdrawn during the month of February.

Total Count of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	5		17	12	5
B	2		4	15	1
C	12		21	44	9
D	1		6	10	2
E	13		16	32	6
F	5		18	34	
G			34	9	
H			6		
I			3		
J		1	33		36
K		1	62	1	25
State	38	2	220	157	84

Total Project Size (MW) in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	1,092		2,536	1,813	1,114
B	67		620	2,275	200
C	1,591		2,936	4,746	1,001
D	20		730	1,322	747
E	1,690		3,209	3,311	430
F	380		4,906	1,906	
G			5,104	250	
H			2,416		
I			1,100		
J		1,400	6,705		41,336
K		1,400	7,865	36	27,096
State	4,840	2,800	38,127	15,658	71,922

Average Size (MW) of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	218		149	151	223
B	34		155	152	200
C	133		140	108	111
D	20		122	132	374
E	130		201	103	72
F	76		273	56	
G			150	28	
H			403		
I			367		
J		1,400	203		1,148
K		1,400	127	36	1,084
State	127	1,400	173	100	856


Total Count of Projects in NYISO Queue by Zone
65
60
55
50
45
40
35
30
25
20
15
10
5
0
A
B
C
D
E
F
G
H
I
J
K
Co-Solar
Co-Wind
Storage
Solar
Wind


Total Project Size (MW) in NYISO Queue by Zone
42,000
40,000
38,000
36,000
34,000
32,000
30,000
28,000
26,000
24,000
22,000
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
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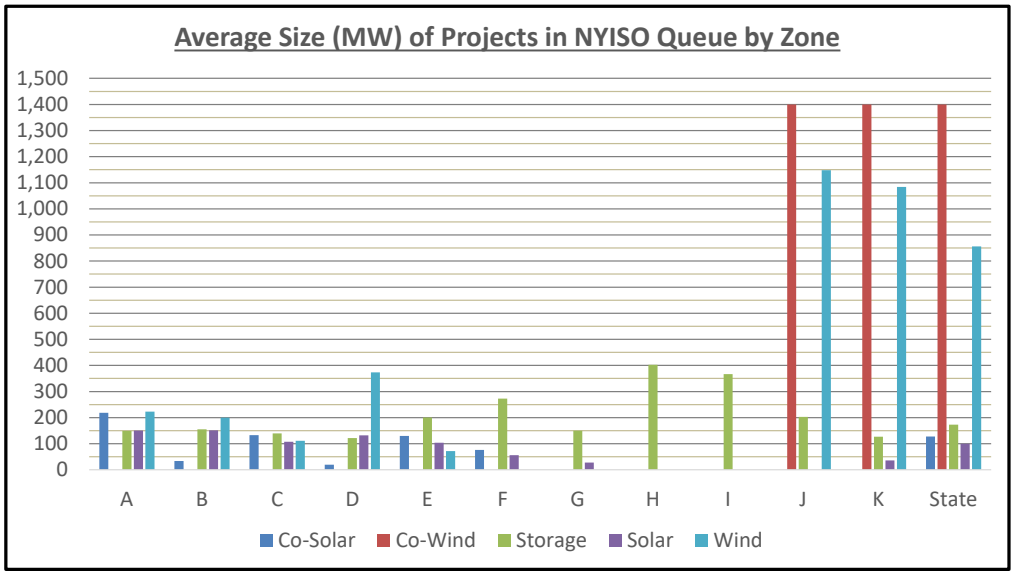
I
J
K
Co-Solar
Co-Wind
Storage
Solar
Wind


Average Size (MW) of Projects in NYISO Queue by Zone
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
A
B
C
D
E
F
G
H
I
J
K
State
Co-Solar
Co-Wind
Storage
Solar
Wind