De-Carbonization / DER Report for NYSRC Executive Committee Meeting 5/14/2024

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

- FERC Issues new Order 1920 Covering Long Term Planning for New Transmission and Generation
- DOE releases a preliminary list of 10 potential National Interest Electric Transmission Corridors (NIETCs)
- NY Times: Giant Batteries are Transforming the Way the U.S. Uses Electricity
- NY Times: Tornado Pummels Wind Turbines in Iowa
- Snapshot of the NYISO Interconnection Queue: Storage / Solar / Wind / Co-located

FERC Issues new Order 1920 Covering Long Term Planning for New Transmission and Generation

On May 13, FERC issued new Order 1920, entitled *Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*, (News Release / Presentation / Fact Sheet / Full Order RM21-17-000) The FERC Order provides an outline for planning and payment of facilities that regions of the country will need to keep the lights on and power the American economy through the 21st Century. The rule marks the first time in more than a decade that FERC has addressed regional transmission policy, and the first time the Commission has ever squarely addressed the need for long-term transmission planning.

The final rule reflects more than 15,000 pages of comments from nearly 200 stakeholders representing all sectors of the electric power industry; environmental, consumer and other advocacy groups; and state and other government entities.

The rule requires transmission operators to conduct and periodically update long-term transmission planning over a 20-year time horizon to anticipate future needs. It also provides for cost-effective expansion of transmission that is being replaced, when needed, known as “right-sizing” transmission facilities. And it expressly provides for the states’ pivotal role throughout the process of planning, selecting, and determining how to pay for transmission lines. In addition, transmission providers must conduct this planning at least every five years and incorporate specific categories of factors that affect long-term transmission needs, including certain laws and regulations, integrated resource plans, trends in fuel costs, retirements, interconnection requests and withdrawals, and policy goals and corporate commitments.

The grid rule contains these major elements:

- Requirement to conduct and update long-term transmission planning to anticipate future needs.
- Requirement to consider a broad set of benefits when planning new facilities.
- Requirement to identify opportunities to modify in-kind replacement of existing transmission facilities to increase their transfer capability, known as “right-sizing.”
- Customers pay only for projects from which they benefit.
- Expand states’ pivotal role throughout the planning, selecting, and determination of payment process

Long-Term Regional Transmission Planning

More specifically, the rule requires each transmission operator to:

- Produce a regional transmission plan of at least 20 years to identify long-term needs and the facilities to meet them.
- Conduct this long-term planning at least once every five years using a plausible and diverse set of at least three scenarios that incorporate specific factors and use best available data.
- Include an evaluation process to identify long-term regional transmission facilities for potential selection in the regional plan.

- Apply seven specific benefits to determine whether any identified regional proposals will efficiently and cost-effectively address long-term transmission needs. These are:
    1. Avoided or deferred reliability transmission facilities and aging infrastructure replacement
    2. Either reduced loss of load probability or reduced planning reserve margin
    3. Production cost savings
    4. Reduced transmission energy losses
    5. Reduced congestion due to transmission outages
    6. Mitigation of extreme weather events and unexpected system conditions
    7. Capacity cost benefits from reduced peak energy losses.
- Include a process giving states and interconnection customers the opportunity to fund all, or a portion, of the cost of a long-term regional transmission facilities that otherwise would not meet the transmission provider's selection criteria.
- In the event of delays or cost overruns, reevaluate long-term regional transmission facilities that previously were selected in a regional transmission plan.
- Consider transmission facilities that address interconnection-related needs identified multiple times in existing generator interconnection processes, but that have not been built.
- Consider the use of Grid Enhancing Technologies such as dynamic line ratings, advanced power flow control devices, advanced conductors and transmission switching.

How to Pay for Transmission

The grid rule contains these cost-allocation provisions:

- Before applicants submit compliance filings, they must open a six-month engagement period with relevant state entities.
- Applicants must propose a default method of cost allocation to pay for selected long-term regional transmission facilities.
- Applicants may propose, a state agreement process that lasts for up to six months after a project is selected for participants to determine, and transmission providers to file, a cost allocation method for the selected facilities.

Enhanced Transparency, "Right-Sizing" and Interregional Transmission Coordination

The grid rule requires transmission providers to:

- Be transparent regarding local transmission planning information and conduct stakeholder meetings during the regional transmission planning cycle about the local process.
- Identify opportunities to modify in-kind replacement of existing transmission facilities to increase their transfer capability, known as "right-sizing," when needed.
- Give incumbent transmission owners a right of first refusal to develop these "right-sized" replacement facilities. The draft declines to adopt the NOPR proposal to establish a conditional federal right of first refusal based on joint ownership.
- Revise existing interregional transmission coordination processes to reflect the new long-term regional transmission planning reforms.

The draft final rule requires transmission providers to consider several alternative transmission technologies, including dynamic line ratings, advanced power flow control devices, advanced conductors, and transmission switching in regional transmission planning processes.

Order No. 1920 takes effect 60 days after publication in the Federal Register. Compliance filings with respect to most of the rule's requirements are due within 10 months of the effective date, while filings to comply with the interregional transmission coordination requirements are due within 12 months of the effective date.

DOE releases a preliminary list of 10 potential National Interest Electric Transmission Corridors (NIETCs)

On May 8th, The U.S. Department of Energy released a Preliminary List of 10 Potential National Interest Electric Transmission Corridors to accelerate the development of transmission projects in areas that present an urgent need for expanded transmission. The proposed corridors total more than 3,500 miles across targeted regions including the Northwest, Mid-Atlantic, New York and New England, Southwest and Northern Plains. DOE is now seeking public input on both the preliminary list of potential NIETCs and the TFF program application and evaluation process. The public comment period for NIETC will close at 5:00 pm ET on June 24, 2024.

The 10 potential NIETCs are shown on the map above. These corridors are areas where a lack of transmission capacity can drive up consumer electricity bills and where extreme weather can result in power disruptions.

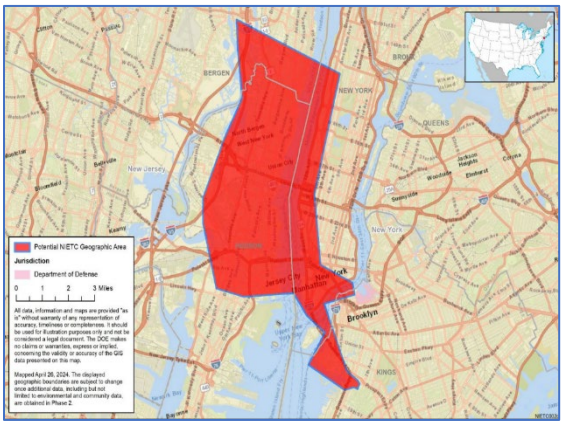
The new NIETC designation process has several advantages over DOE's past approach to NIETC designation. By focusing on narrow geographic areas, the new process concentrates attention on where new transmission is most likely to be built as a result of NIETC designation. It also enables the DOE to produce environmental documentation that is more targeted and more useful for permitting agencies, thereby eliminating or reducing the need for further review. The final Guidance Document increases flexibility by issuing nonbinding guidance that requests information from any interested parties on narrow geographic areas where one or more potential transmission projects could be located.

DOE also announced minimum eligibility criteria for direct loans under the Transmission Facility Financing (TFF) program. The TFF program can finance the development of billions of dollars of transmission projects in designated NIETCs. This page refers to the DOE's Grid and Transmission Program Conductor Program, acts as a clearinghouse for GDO's transmission and grid resilience financing programs, as well as other existing DOE transmission and grid programs. The Conductor consists of an interactive tool to find the opportunities best suited to individual projects. The website has a program summary section, as well as a link to the Conductor Guide for more comprehensive information about available funding opportunities and the application process.

Information regarding two areas of impact for New York State include:

The New York-Mid-Atlantic potential NIETC

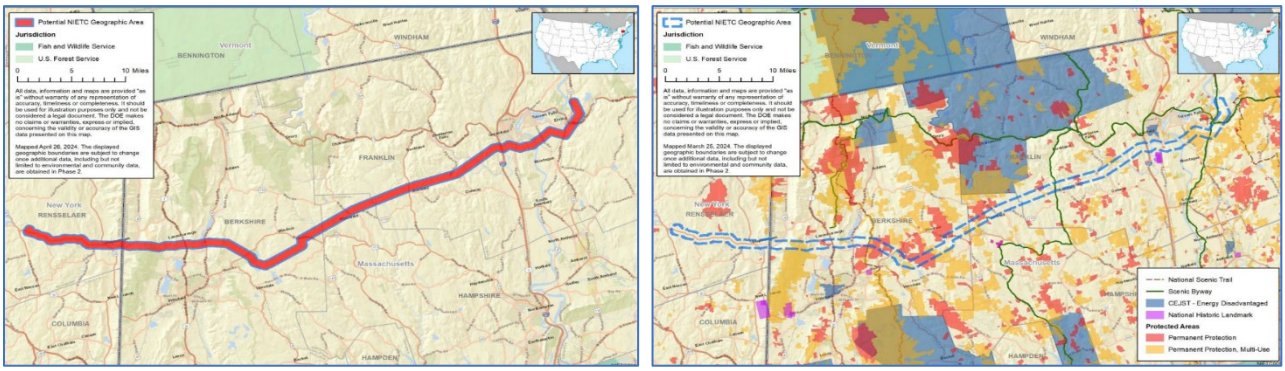
The 2023 Needs Study identifies a significant present and anticipated future need for additional interregional transfer capacity between the New York and Mid-Atlantic regions. Needs Study findings demonstrate the NYISO system is anticipated to become increasingly stressed during winter cold snaps by mid-2030 as electrification efforts cause the system to transition to winter peaking. Consequently, NYISO finds reliance on neighboring systems will continue to be essential over the next decade as the New York system will not have adequate resources if not for emergency assistance. Such system conditions are expected to have acute impacts in the



New York City area as NYISO has identified a near-term reliability need as soon as summer 2025.
The Needs Study also assessed historic wholesale market price differences between regions, which signal areas of congestion on the transmission system that could be alleviated with additional transmission capacity. Additionally, the New York City area has experienced persistently high wholesale market prices in the last four to five years, indicating the need to deliver cost-effective generation to meet demand and reduce wholesale prices, which could ultimately reduce consumer costs. The Needs Study finds there is also significant need for increased interregional transfer capacity between the New York and Mid-Atlantic regions to meet future generation and demand growth under all scenarios of future load and clean energy growth.

The final Action Plan for Offshore Wind Transmission Development in the U.S. Atlantic Region recommends further exploration of interregional offshore high-voltage direct current networks designed to maximize production cost savings while minimizing overall cable distances. The potential identified interlinks that would connect ISO-NE, NYISO, and PJM include multiple points of interconnection that may be located within this potential NIETC. This may not only alleviate onshore transmission capacity constraints or congestion between NYISO and PJM but may facilitate onshore upgrades needed for integration of offshore wind generation.

New York-New England: This 60-mile corridor in Massachusetts and New York includes sections of existing state highway and high-voltage transmission right-of-way. Development in the proposed corridor could help address potential electricity shortfalls that can occur during extreme weather.



Based on preliminary findings, transmission development in New York-New England potential NIETC could:

- Maintain and improve reliability and resilience. Potential electricity shortfalls leave the area vulnerable to extreme weather events. Electricity demand growth due to increased electrification and increased variable energy resource integration are anticipated to pose challenges to maintaining reliability.
- Alleviate congestion and reduce consumer costs. Congestion between the New York and New England regions prevents cost-effective generation from being delivered to where and when it is needed.
- Meet future generation and demand growth. There is significant need for additional transfer capacity between New York and New England under various future power sector scenarios. Analysis finds a 255% increase is needed by 2035 under moderate load and high clean energy growth scenarios.
- Increase clean energy integration. Increased access to more diverse, clean energy resources is necessary to lower greenhouse gas emissions.

Supporting links include:

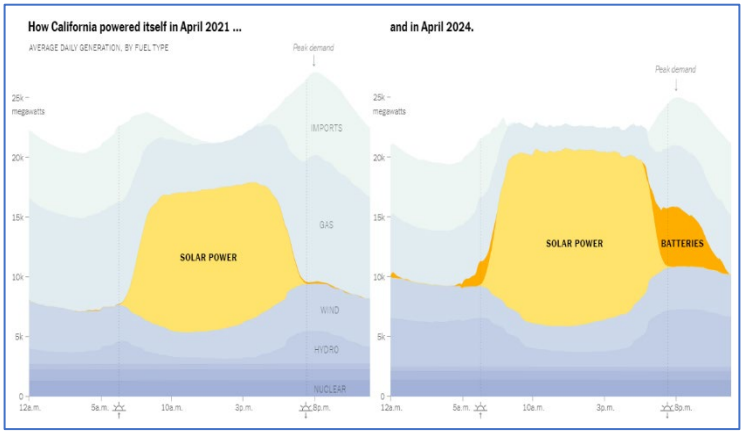
- Grid Deployment Office: Landing Page
- National Interest Electric Transmission Corridor Designation Process
- National Transmission Needs Study - Oct 30th, 2023
- Video: Webinar presented on Nov 8th, 2023 / Slides
- NIETC Final Guidance Document
- NIETC Guidance Document Fact Sheet
- NIETC Designation Process Graphic
- Related Article: American Public Power Association
- Related Article: Utility Dive Brief

NY Times: Giant Batteries are Transforming the Way the U.S. Uses Electricity

This Article from the New York Times on May 7th describes the latest efforts and results associated with development of energy storage in the United States, with a focus on activities in California and Texas.

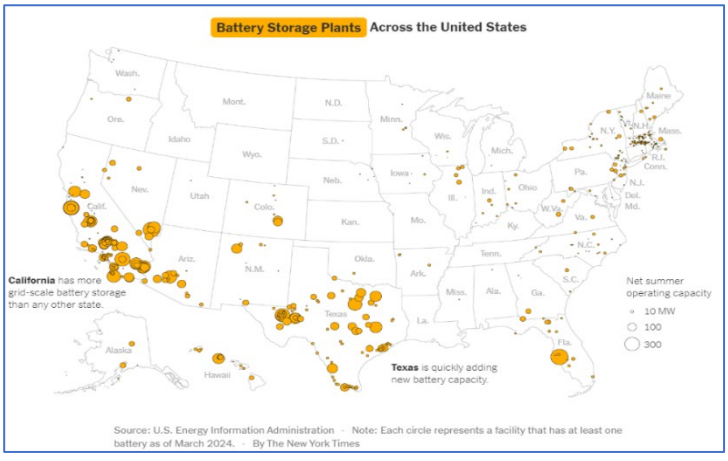
California draws more electricity from the sun than any other state. It also has a timing problem: Solar power is plentiful during the day but disappears by evening, just as people get home from work and electricity demand spikes. To fill the gap, power companies typically burn more fossil fuels like natural gas. That's now changing. Since 2020, California has installed more giant batteries than anywhere in the world apart from China. They can soak up excess solar power during the day and store it for use when it gets dark. Those batteries play a pivotal role in California's electric grid, partially replacing fossil fuels in the evening. On April 30th between 7 pm and 10 pm, batteries supplied more than one-fifth of California's electricity and, for a few minutes, pumped out 7,046 megawatts of electricity, akin to the output from seven large nuclear reactors.

Across the country, power companies are increasingly using giant batteries the size of shipping containers to address renewable energy's biggest weakness: the fact that the wind and sun aren't always available. "What's happening in California is a glimpse of what could happen to other grids in the future," said Helen Kou, head of U.S. power analysis at Bloomberg NEF, a research firm. "Batteries are quickly moving from these niche applications to shifting large amounts of renewable energy toward peak demand periods."



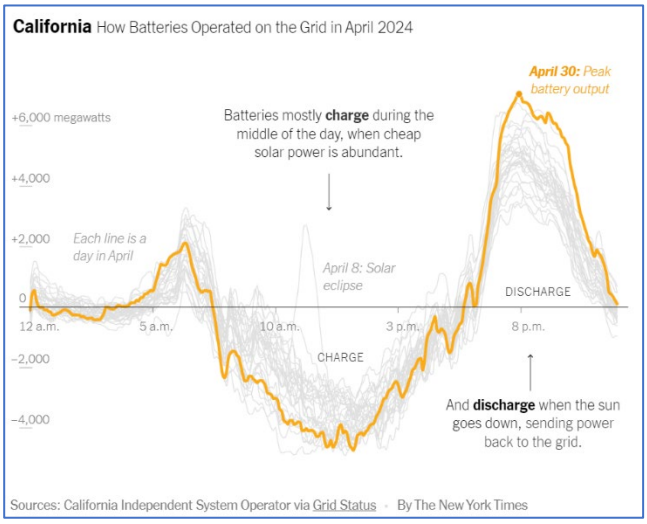
Over the past three years, battery storage capacity on the nation's grids has grown tenfold, to 16,000 MW. This year, it is expected to nearly double again, with the biggest growth in Texas, California, and Arizona.

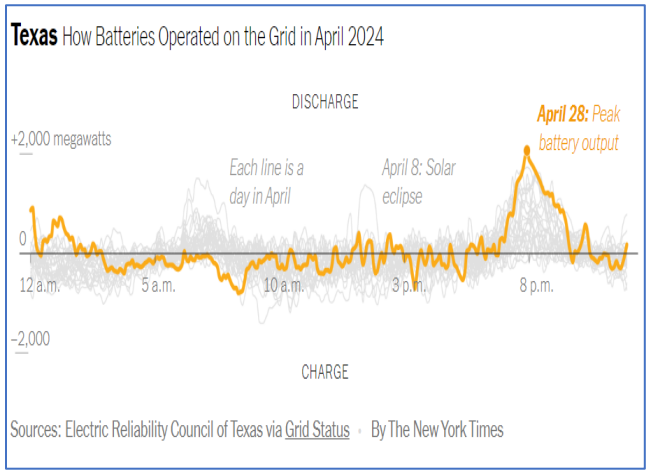
Most grid batteries use lithium-ion technology, similar to batteries in smartphones or electric cars. As the electric vehicle industry has expanded over the past decade, battery costs have fallen by 80 percent, making them competitive for large-scale power storage. Federal subsidies have also spurred growth. As batteries have proliferated, power companies are using them in novel ways, such as handling big swings in electricity generation from solar and wind farms, reducing congestion on transmission lines and helping to prevent blackouts during scorching heat waves.



In California, which has set ambitious goals for fighting climate change, policymakers hope grid batteries can help the state get 100 percent of its electricity from carbon-free sources by 2045. While the state remains heavily dependent on natural gas, a significant contributor to global warming, batteries are starting to eat into the market for fossil fuels. State regulators plan to nearly triple battery capacity by 2035.

In California, power prices often crash around midday, when the state produces more solar power than it needs, especially in the spring when air-conditioning use is low. Prices then soar in the evening when solar disappears and grid operators have to increase output from gas plants or hydroelectric dams to compensate. California now has 10,000 megawatts of battery power capacity on the grid, enough to power 10 million homes for a few hours. Those batteries are "able to very effectively manage that evening ramp where solar is going down and customer demand is increasing," said John Phipps, executive director of grid operations for the California Independent System Operator, which oversees the state's grid. Batteries can also help California's grid handle stresses from heat waves and wildfires.





In Texas, batteries are still largely used to provide ancillary services, stabilizing the grid against unexpected disruptions. Texas is also more reliant than California on wind energy, which fluctuates in less predictable patterns. But Texas is quickly catching up to California in solar power, and batteries increasingly help with evening peaks. On April 28, the sun was setting just as wind power was unexpectedly low and many coal and gas plants were offline for repairs. Batteries jumped in, supplying 4 percent of Texas' electricity at one point, enough to power a million homes. Last summer, batteries helped avert evening blackouts by providing additional power during record heat.

The two states built their battery fleets in distinct ways. In California, regulatory mandates were a key impetus: In 2019, officials worried that too many older gas plants were closing, risking blackouts, and ordered utilities to quickly install thousands of megawatts of storage. In Texas, market forces dominate. The state's deregulated electricity system allows prices to fluctuate sharply, rising as high as $5,000 per megawatt-hour during acute shortages. That makes it lucrative for battery developers to take advantage of spikes, such as in locations where power lines periodically get clogged.

The industry still faces obstacles, however. Lithium-ion batteries are flammable, and while operators have taken steps to reduce fire risk, some communities oppose projects in their backyards. Most batteries still come from China, making them vulnerable to trade disputes. In Texas, a state fund to subsidize gas plants could undercut the battery boom. In other states, complex regulations sometimes prevent utilities from adding energy storage.

Grid batteries could be a useful tool to slash planet-warming emissions, experts say, though they still need further advances in terms of costs, technologies and how they are used. In Texas, many batteries today are actually increasing carbon-dioxide emissions, according to one analysis. That's because operators focus on maximizing revenue and sometimes charge with coal or gas power. In California, by contrast, batteries appear to be cutting emissions from fossil fuels. The state's gas use in April fell to a seven-year low. "We have reached the

conclusion that batteries are displacing natural gas when solar generation is ramping up and down each day," said Max Kanter, chief executive of Grid Status, an electricity data tracking firm.

Yet California still gets roughly 40 percent of its electricity from natural gas, and it could be difficult for current battery technology to replace all of that. One analysis from Bloomberg NEF found that solar and batteries can be a cost-effective alternative to smaller gas Peaker plants that only switch on when demand spikes. But batteries remain too costly to replace many larger gas-burning plants that provide steady power day and night.

Today's lithium-ion batteries typically only deliver power for two to four hours before needing to recharge. If costs keep falling, battery companies might be able to extend that to eight or ten hours. That means additional long-duration storage technologies could be needed. If California wants to rely largely on renewable energy, it will have to handle weeklong periods where there's no wind and little sun. No battery today can store electricity for months to manage those seasonal disparities.

Some companies are exploring solutions. In Sacramento, a start-up called ESS is building "flow" batteries that store energy in liquid electrolytes and can last 12 hours or longer. Another start-up, Form Energy, is building a 100-hour iron-air battery. These ideas will have to compete against alternatives like nuclear power, advanced geothermal or even using green hydrogen to store electricity. California's regulators say they may need five times as much storage capacity by midcentury, even if it's unclear which technologies will prevail.

NY Times: Tornado Pummels Wind Turbines in Iowa

This Article from the NY Times (May 22nd) recounts the damage to 3 wind turbines from a recent tornado event. The damage was unusual, experts say, because turbines are built to withstand extreme weather. Iowa is a wind powerhouse, with thousands of turbines. The footage from southwest Iowa is shocking: In the trail of a tornado, a wind turbine is bent in half like a cheap straw, its hub engulfed in flames and thick black smoke, its blades on the ground.

Turbines are now built to withstand events like tornadoes, **hurricanes,** and typhoons because of advances in technology since the early designs of the 1990s. They have built-in mechanisms to lock and feather the blades, changing their angles, when winds reach 55 miles per hour. That reduces the surface area of the blades pointed toward the wind.

When it comes to extreme weather and renewable energy, the larger problem is the vulnerability of solar panels to hailstorms. To reduce costs, panels have become larger over time, and the glass has become thinner, making it more likely to crack when hail strikes. The standard way to protect solar panels from hailstones is to change their angle, tipping them so that their surface is less exposed to direct hits. But that creates a new problem: those panels can act like sails, catching the winds that often accompany hail, increasing the risk of blowing away.

Hail made up 54 percent of incurred costs from insurance claims for the solar sector over the past five years, according to a report from GCube last year, despite accounting for just 1.4 percent of claims. Growing losses from hail have made it harder to get insurance for solar projects. Still, renewable power isn't the only part of the electricity generation industry to face threats from extreme weather. Natural gas facilities can be shut down during extreme cold spells, and droughts can put limits on nuclear plants that need cooling water.

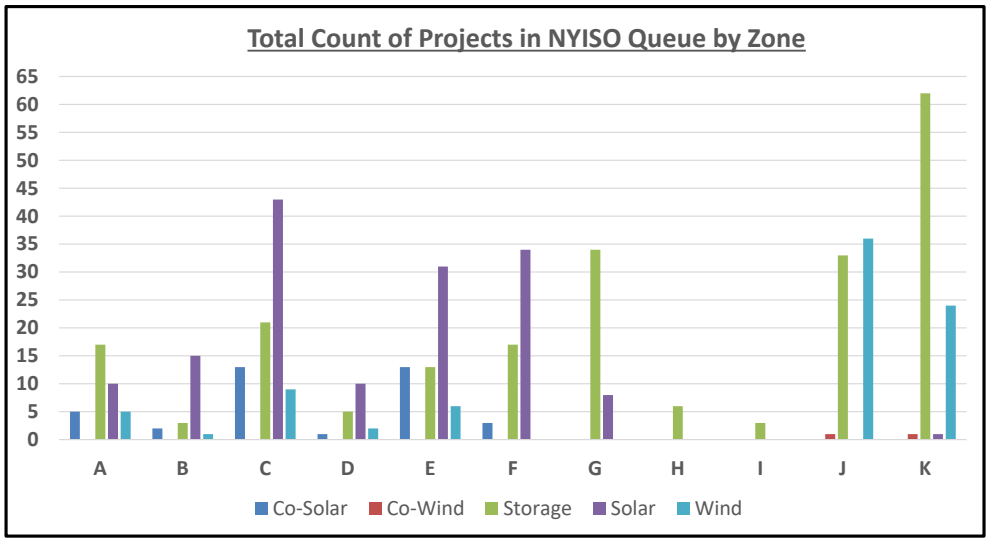
Interconnection Queue: Monthly Snapshot – Storage / Solar / Wind / CSRs (Co-located Storage)

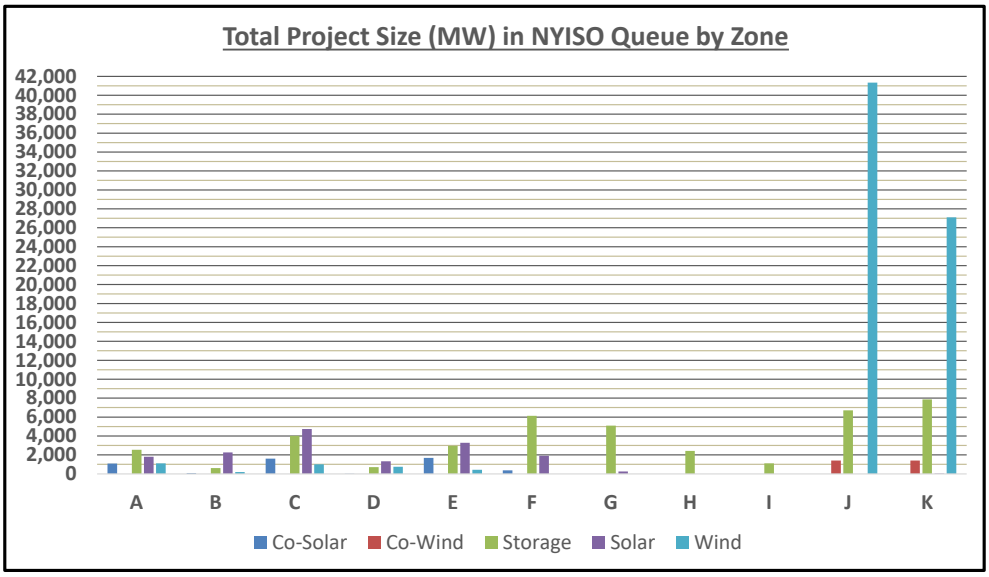
The intent is to track the growth of Energy Storage, Wind, Solar and Co-Located Storage (Solar and Wind) projects in the NYISO Interconnection Queue, looking to identify trends and patterns by zone and in total for the state. The information was obtained from the NYISO Interconnection Website, based on information published on May 20th, and representing the Interconnection Queue as of April 30th. Note that 3 projects were added, and 10 were withdrawn during the month of April.

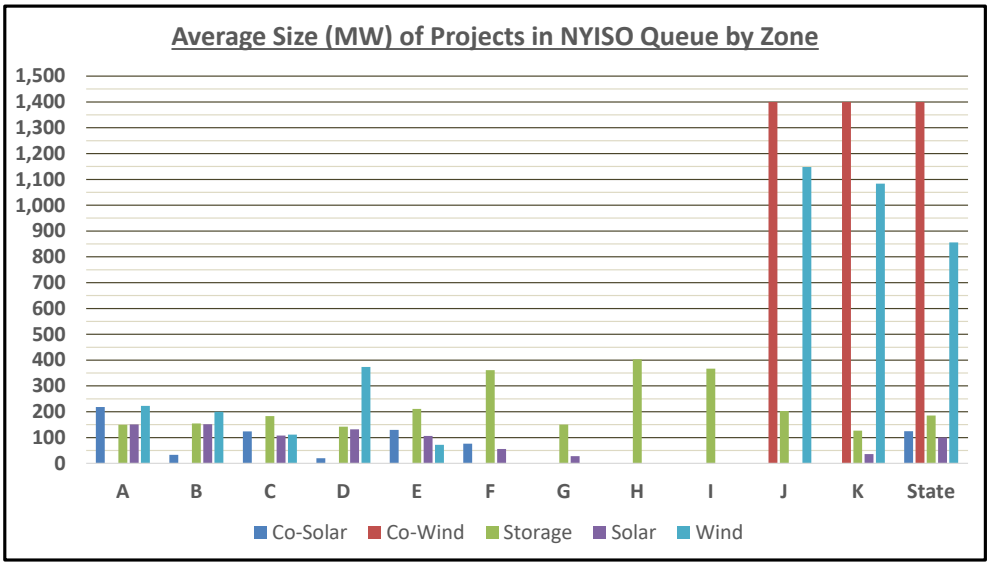
Total Count of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	5		17	10	5
B	2		3	15	1
C	13		21	43	9
D	1		5	10	2
E	13		13	31	6
F	3		17	34	
G			34	8	
H			6		
I			3		
J		1	33		36
K		1	62	1	24
State	37	2	214	152	83

Total Project Size (MW) in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	1,092		2,536	1,773	1,114
B	67		600	2,275	200
C	1,611		4,042	4,724	1,001
D	20		710	1,322	747
E	1,690		2,804	3,291	430
F	340		6,136	1,906	
G			5,104	230	
H			2,416		
I			1,100		
J		1,400	6,705		41,336
K		1,400	7,865	36	25,836
State	4,820	2,800	40,018	15,556	70,662

Average Size (MW) of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	218		149	177	223
B	34		200	152	200
C	124		192	110	111
D	20		142	132	374
E	130		216	106	72
F	113		361	56	
G			150	29	
H			403		
I			367		
J		1,400	203		1,148
K		1,400	127	36	1,076
State	130	1,400	187	102	851


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
2,000
0
A
B
C
D
E
F
G
H
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