De-Carbonization / DER Report for NYSRC Executive Committee Meeting 2/14/2025

Contact: Matt Koenig (koenigm@coned.com)

The February 2025 edition of the De-Carbonization / Distributed Energy Resources (DER) Report includes the following items:

- Columbia Law School Sabin Center for climate Change Law: Trump Executive Orders on Energy and Environment: A Quick Summary
- Renewable Energy World: Fire engulfs Moss Landing, one of the largest battery energy storage systems
- Canary Media: Why we don't need to worry too much about the latest grid battery fire
- Canary Media: Six charts that show how the grid is getting cleaner
- Snapshots of the NYISO Interconnection Queue and Cluster Queue: Storage / Solar / Wind / Co-located

Columbia Law School Sabin Center for Climate Change Law: Trump Executive Orders on Energy and Environment: A Quick Summary

This Blog provides a quick summary of the impacts from all of President Trump's recent executive orders impacting energy and the environment. On the evening of the second inauguration of President Trump, the White House released a flurry of executive orders on a wide range of subjects. The general thrust of the orders is to encourage the rapid development of fossil fuel resources and all associated infrastructure, and remove any regulatory obstacles; to reverse federal actions on climate change, energy efficiency, and environmental justice; and to prevent wind and solar farms from being built on federal lands and waters.

These are the orders that appear to be of greatest energy and environmental significance. Other orders may also be relevant; this blog is a quick initial review.

Link **Initial Rescissions of Harmful Executive Orders and Act**

Link **Putting America First in International Environmental Agreements**

Link **Declaring a National Energy Emergency**

Link **Unleashing American Energy**

Link **Unleashing Alaska's Extraordinary Resource Potential**

Link **Temporary Withdrawal of all Areas on the Outer Continental Shelf from Offshore Wind Leasing and Review of the Federal Government's Leasing and Permitting Practices for Wind Projects**

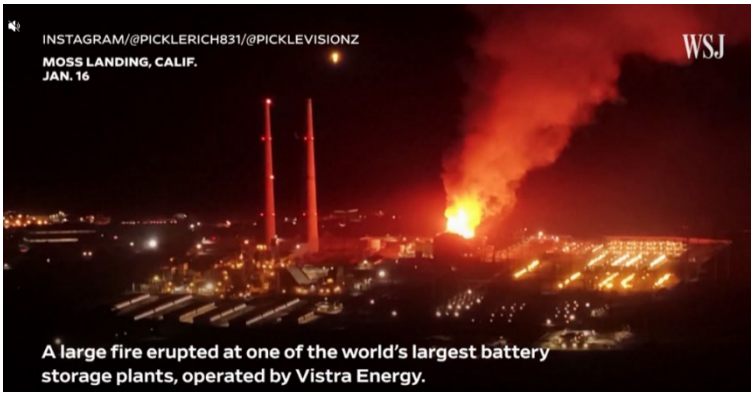
Link **Putting People Over Fish: Stopping Radical Environmentalism to Provide Water to Southern California**

Link **Delivering Emergency Price Relief for American Families and Defeating the Cost-of-Living Crisis**

Link **Ending Radical and Wasteful Government DEI Programs and Preferencing**

Renewable Energy World: Fire engulfs Moss Landing, one of the largest battery energy storage systems

This Article recounts details from the large fire at Moss Landing Energy Storage Facility about 77 miles south of San Francisco, California. The first phase of the fire at the facility, Vistra Energy's "flagship" California storage system, started Thursday afternoon, January 15th, shutting down Highway 1, evacuating more than 1,500 people, and closing local schools and businesses. The facility houses tens of thousands of lithium batteries produced by LG Energy Solution Ltd. See Video Link of facility fire.



Texas-based Vistra celebrated an expansion of the battery power plant in August 2023, which has a 15-year resource adequacy agreement with Pacific Gas & Electric (PG&E). Phase III pushed the project's total capacity to 750 MW/3,000 MWh, making it the largest battery energy storage system (BESS) in the world at the time. It is now believed to be the second-largest, trailing only the Edwards & Sanborn Solar Plus Storage Project in Kern County, CA, which reached commercial operations just under one year ago.

A call for assistance went out from Vistra personnel shortly after 3 o'clock (PT) on January 16. The property was promptly evacuated, and all employees and fire personnel have since been confirmed safe, per the County of Monterey. The Sheriff's Office instructed people living nearby to leave the area, and those indoors were told to close windows and doors and shut off air systems until further notice.

North Monterey County Fire District personnel rushed to Moss Landing, where they proceeded to do exactly what they were supposed to do- secure the scene, stand back, and watch. It's now considered best practice to let lithium battery fires exhaust themselves, which meant the plant burned well into the night. According to Monterey County spokesperson Nicholas Pasculli, by Friday morning there was "some containment" of the fire, which was still burning but had not escaped its concrete enclosure. All three phases of Vistra's project are housed in separate enclosures.

A disaster that might sound a little familiar. Thursday's fire was detected in the 300 MW Phase I of the plant, according to Vistra. That's the same spot where a software programming error caused a heat suppression system to activate and douse three 100 MW racks of batteries in September 2021. Fire crews were called, but Vistra ultimately determined there was no fire, nor did the incident cause any harm to outside systems or any personnel.

The facility uses a water-based heat suppression system that protects against thermal runaway in individual battery modules. If a battery gets too hot, or the system's Very Early Smoke Detection Apparatus (VESDA) senses smoke, water is quickly injected into the affected zone. "Due to an apparent programming error in the VESDA, these actions occurred at detected smoke levels below the specified design level at which water was intended to be released and E-Stop was intended to be initiated," concluded Vistra in a two-page report. The snafu knocked the facility out of commission for months while Vistra investigated and implemented corrective actions.

A second, nearly identical incident involving the early detection safety system occurred in February 2022 in the 100 MW Phase II building next door. In the resulting investigation, Vistra concluded water leaked from a few bad couplings in the building's fire impression system, which caused some batteries to short and fill the facility with smoke. Vistra further determined that all battery module temperatures were recorded "within established temperature limits" when water was first released by the heat suppression system. The company's investigation also surmised the batteries "were not the initial source of smoke or a cause of the incident."

Vistra's resulting remediation efforts included pressure testing and modifying connectors in the facility's heat suppression system, repairing leaks, and installing an air supervision system to monitor for any future problems. Smoke detectors also were installed in all air handling units and gaps in the facility's upper floor were sealed.

Moss Landing became the showpiece for this new battery era, due to its strategic proximity to the Bay Area, which needs a lot of electricity. Vistra owned a legacy coastal gas plant there, which provided a location and heavy-duty transmission-grid connections. The company pledged to turn it into an enormous battery to help utility Pacific Gas & Electric supply power to Silicon Valley and San Francisco.

Vistra installed 300 megawatts/1,200 megawatt-hours at the site in 2020, the largest project of its kind at that time. PG&E also built its own storage facility next door, a cluster of Tesla Megapack enclosures called the Elkhorn project, which was not impacted by this event. Vistra later added a phase two with another 100 megawatts/400 megawatt-hours. And it subsequently expanded the facility again, in 2023, to a total of 750 megawatts/3,000 megawatt-hours. For all three phases, the company used NMC batteries manufactured by South Korea's LG Energy Solution.

The disaster also represents a setback for the method of clustering batteries in a building enclosure instead of in modular containers, a common architecture for grid batteries. Nick Warner, Principle at the Energy Safety Response Group, cautioned against tossing out the whole category of purpose-built buildings to house grid batteries. The key, he said, was to "limit that fire load to something that is manageable." That means cordoning off the batteries with physical barriers or distance, so that the total fuel available to a fire can't get out of hand. Clean energy developer REV Renewables employed this strategy at its Gateway project near San Diego, which caught fire in 2024. The design of that project helped contain the fire to one section, and firefighters were able to slow the blaze with water.

Related Article:
USA Today : Fire is Out at Site, Small Pockets of Heat at Facility Being Monitored, EPA Concludes Air Monitoring
Thursday's fire at "Moss 300," the 300 MW lithium storage facility at Vistra Energy destroyed most of the building and its contents, according to county fire officials. The fire, which was left to burn, was out as of Tuesday, according to fire officials, and small pockets of heat at the facility would continue to be monitored using drones. The U.S. Environmental Protection Agency (EPA) concluded supplemental air monitoring in the vicinity of the Vistra Energy storage facility on Jan. 20. "Results for hydrogen fluoride and particulate matter showed no risk to public health throughout the incident, and smoke from the facility has greatly diminished," EPA officials said in a statement released on Tuesday.

The EPA began monitoring for hydrogen fluoride, a highly toxic gas produced by lithium-ion battery fires, and for particulate matter on day two of the incident, according to the county's timeline, with initial hydrogen fluoride gas monitoring readings coming in at 3 p.m. on Jan. 17. The report showed levels below the threshold that is considered potentially harmful.

Related Article: Lithium Battery fires: Why are these blazes so difficult to put out?

Canary Media: Why We Don't Need to Worry Too Much About the Latest Grid Battery Fire

This Article provides background information on the root causes of the Moss Landing Energy Storage facility. The fire that ripped through what was once the world's largest standalone grid battery on January 16th left clean energy fans and foes alike wondering how it happened and what's preventing another disaster. The mid-January fire all but eradicated a building that housed 300 megawatts of battery capacity. Investigators are just beginning to sift through the smoldering remains to ascertain the cause of the fire.

Energy company Vistra built the Moss Landing energy storage facility, on the California coast south of Silicon Valley, as a shining example of the clean grid of the future. The facility stored solar power by day and delivered it in the pivotal evening hours when California's households need the most energy — an emissions-free alternative to burning fossil gas for energy.

Vistra's Moss Landing facility was one of a kind, conceived and designed before modern safety standards were adopted for large grid batteries. Battery safety standards have been updated multiple times since it was built. It may sound counterintuitive to think of a storage plant completed in 2020 as outdated. But the grid battery industry has evolved at a rapid pace since then — it's now the second-biggest source of new U.S. grid capacity, behind solar power.

In that short time, the storage industry has matured through a process of trial and error that has included several high-profile fires. None of these have killed anyone, but a pivotal battery explosion in Arizona in 2019 injured four emergency responders and forced a major reappraisal of grid storage plant design. The industry has also improved the batteries themselves since then, but those upgrades came after construction of Vistra's landmark battery behemoth.

Moss Landing's design was "unique, globally, as a facility," given its vintage and the qualities of the 1950s-era building-turned-battery-vault, battery fire safety expert Nick Warner told Canary Media.

In this case, the lack of exact copycats is very good news: It means that the design elements that allowed Moss Landing to burn so apocalyptically are not present in newer or forthcoming battery plants. The bad news is that a handful of other battery projects built around the same time as Moss Landing are slated to operate for years to come.

There are two big factors that help explain why the facility burned so spectacularly.
First off, Vistra used batteries manufactured by Korea's LG (not Tesla batteries, as some news reports incorrectly claimed; a separate Tesla battery array is next door). The LG batteries used the nickel-manganese-cobalt (NMC) chemistry, developed for electric vehicles because it packs a lot of power. That energy density can turn into a vulnerability; when defects cause these batteries to heat up, they can enter thermal runaway, a chain reaction that can quickly run out of control.

Indeed, many of the most prominent battery fires in the U.S. sprang from LG batteries in facilities built around a similar time: the Arizona 2019 explosion, the Gateway project fire of 2024, and now Moss Landing. General Motors also ripped out LG batteries in its $2 billion Chevrolet Bolt battery recall, and LG itself recalled some of its residential battery products in late 2020.

NMC was the dominant chemistry for grid storage in the industry's early days, as a sort of hand-me-down from the much bigger EV industry. Battery manufacturers have improved their technology and added safety features in the years since Moss Landing was installed. The grid storage market has also moved away from NMC in favor of lithium iron phosphate (LFP), a chemistry with better safety metrics. Major grid battery supplier Tesla, for instance, switched to LFP for its popular Megapack enclosures in 2021.

The other defining factor specific to Moss Landing was the choice to use a large, legacy building to house rows and rows of battery racks. That decision made sense at the time. California was looking for big batteries to help its shift to clean energy, and Vistra had taken over the old Moss Landing power plant in its acquisition of power producer Dynegy. In hindsight, it seems that the design choice packed too much battery fuel into one enclosed space, creating the conditions for an unstoppable, 100-foot tower of flames.

Nearly all grid batteries installed in the past several years have opted not for one overarching building but for row upon row of modular battery containers. Each box contains batteries, controls, and safety equipment. Projects are designed so that if a fire breaks out at one individual container, it won't propagate to neighboring units. This limits the amount of fuel that a fire could engulf and makes it easier for emergency responders to suppress a fire with water. Case in point: A fire broke out at the neighboring Tesla project in September 2022, but it never spread beyond one container, and responders quickly put it out.

While industry trends have moved toward safer batteries and containerized systems, fire safety codes have also evolved. Two major fire safety codes govern grid battery installations today: Most states, including California, subscribe to International Fire Code (IFC) guidance on large battery installations, while the remainder adhere to the National Fire Protection Association's standard, NFPA 855. Committees of battery experts update these codes on a three-year cycle with the best new information (and a public comment process). But those cycles kicked off only recently.

IFC first added a section on large battery storage projects in 2018. NFPA 855 came out in late 2019 for the 2020 calendar year. But it takes a couple of years for states to adopt new fire codes, Warner noted. (He serves as a principal member of the NFPA 855 committee but spoke to Canary Media in his personal capacity.) Some states even fall several cycles behind, then jump to adopting the most recent code. That has left some municipalities to figure out which battery standards to impose on developers, in the absence of a state code that says anything about battery plants.

California regulators formally approved the utility contract for Moss Landing in November 2018. Vistra started construction shortly after and brought the project into operation in December 2020. The state began enforcing the 2018 IFC update around the time construction at Moss Landing was wrapping up, so the project was grandfathered in for permitting purposes, Warner noted. Vistra brought in consultants and experts to muster the best safety practices in the industry, in lieu of an active battery fire code. The company also incorporated what it knew of the draft language being finalized in the forthcoming codes.

When Moss Landing was under development, the storage industry hadn't had the opportunity to learn from mistakes. After the battery fire erupted near Phoenix in 2019, an investigation revealed that the fire suppression techniques that had been expected to handle lithium battery fires were insufficient. Another big takeaway was that explosive gases can build up when batteries combust in a closed environment, necessitating ventilation. But that report came out in July 2020, just a few months before Moss Landing got up and running.

The upshot here is that nobody building a battery project today would do it with the particular technological generation of batteries or the fire code specs that Vistra used at Moss Landing. Now the lessons learned from Moss Landing will shape the fire codes for projects that come after.

Canary Media: Six charts that show how the grid is getting cleaner

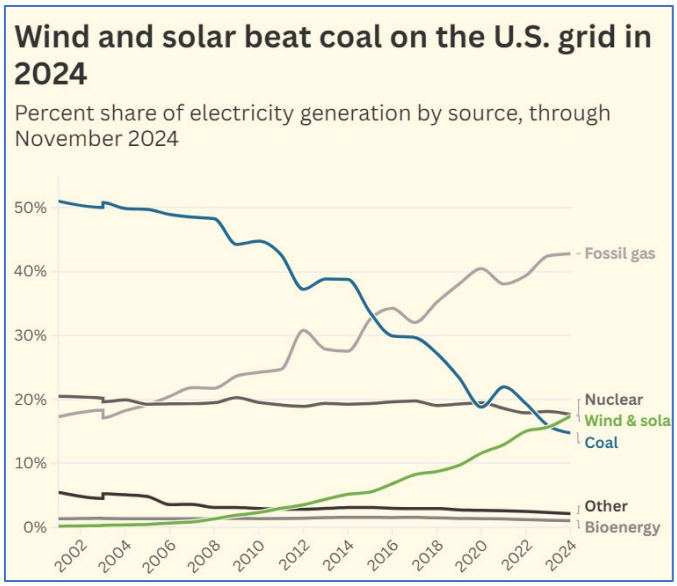
This Article summarizes the recent developments and current state of clean energy development in the United States. In 2024, clean energy deployments reached new heights in the U.S., with Texas and California proving that huge amounts of solar and batteries can drastically reduce grid problems in the face of extreme weather and soaring electricity demand.

But the energy system is wildly complex, and describing it with words can only do so much. It helps to see the energy system visualized graphically, to catch the inflection points when all the fields of solar panels and boxes of batteries start fundamentally changing the way the broader system operates.

Here are five charts that capture how clean energy transformed the U.S. grid this year — plus one showcasing an epochal shift across the pond.

U.S. wind and solar beat coal generation

Wind and solar notched a major win this year, generating more electricity in the U.S. than Coal.



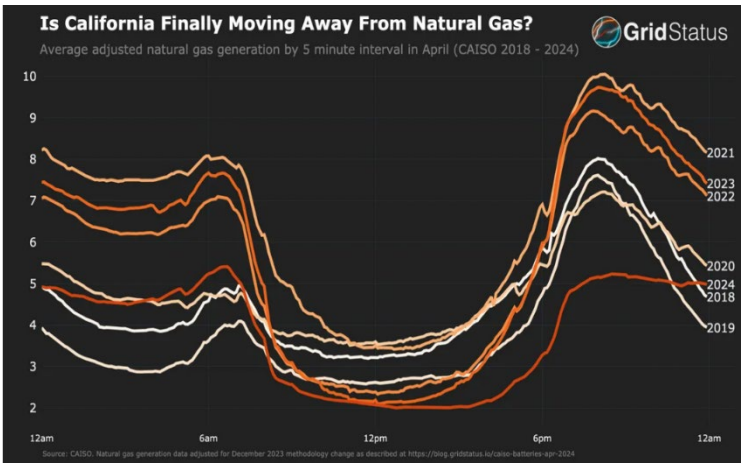
Stacking these two forms of energy against one may seem a bit lopsided. But while nuclear and hydropower have been churning out carbon-free electricity for decades, solar and wind represent the new guard, coming out of nowhere two decades ago to make a real mark on the energy mix. And unlike nuclear and hydropower, wind and solar are actually getting built at considerable scale now and will continue to be into the future.

Fossil gas is also exerting a stronger grip on the U.S. grid as coal shrinks, growing its market share in parallel with the rise of wind and solar.

And while coal is waning in the U.S., it's not elsewhere. Worldwide coal demand will set a new record this year, and is likely to remain at that peak through 2027, per a new International Energy Agency report. That makes it all the more urgent for the U.S. to show that a modern economy can survive and thrive without coal and all its air and climate pollution.

California batteries squeeze gas out of peak hours

California embarked on a nation-leading effort about a decade ago: It would effectively stop building new fossil fueled plants, and instead construct massive batteries to provide on-demand power. The state had already pushed the limits of solar generation, but that wasn't going to be enough to keep the grid running.



Years of policy support and utility pilots have culminated in a truly massive fleet of grid batteries. This year, California reached a whopping 11.2 gigawatts of installed battery capacity. That means grid batteries alone can supply about one-fifth of the CAISO system's peak demand.

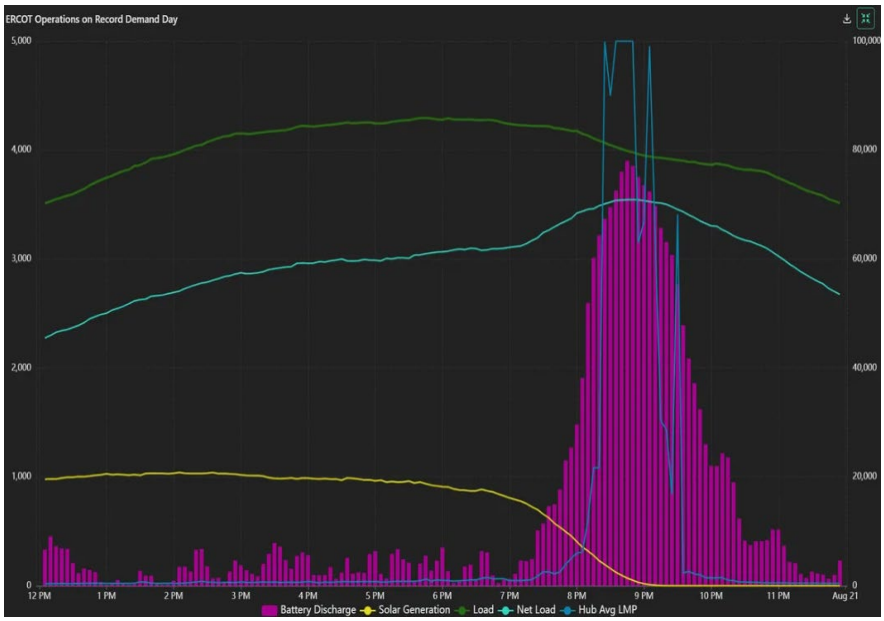
This change is altering grid operations on just about any given day, but it became especially evident in the shoulder month of April, when evening battery dispatch spiked relative to previous years, as visualized by energy data firm Grid Status. That evening battery discharge coincided with a marked decline in fossil gas dispatch to keep the lights on after sunset.

Texas solar and storage deflate a heatwave

In contrast, Texas has no qualms about building more gas plants — the self-professedly laissez-faire state even created a taxpayer-funded loan program to help private gas plant developers compete in the marketplace. That's why it's striking that Texas beat out California for wind, utility-scale solar, and battery construction in 2024.

At the start of 2020, ERCOT set a record with about 2,000 megawatts of instantaneous solar production, per data visualized by Grid Status. This year, ERCOT solar production blasted past 21,000 megawatts — that's an expansion of more than 10 times in less than four years. This also outpaced California's record for utility-scale solar production, of nearly 20,000 megawatts. Batteries, similarly, have stampeded onto the scene. They hit a record discharge level of 4,348 megawatts on October 25.

This rich clean energy medley has started reshaping the competitive ERCOT markets in ways that are immediately helpful to customers. Take the late August heat wave. ERCOT set an all-time demand record of nearly 86 gigawatts on August 20, at 4:45 p.m. But something strange happened — or didn't happen — at the same time: The unprecedented demand failed to produce any material spike in energy prices that afternoon (dark blue line in the following chart).



Hours after ERCOT demand peaked on August 20, prices spiked (in dollars-per-megawatt-hour, on the left-hand scale). Batteries rushed in to help (in megawatts, on the left-hand scale). The other variables are plotted on the right-hand scale, in megawatts.

That new bastion of 20 gigawatts of Texas solar power cranked throughout the sunny hours (yellow line), negating the record demand that otherwise might have strained the system. When the sun went down, the new battery fleet jumped into the breach (magenta bars).

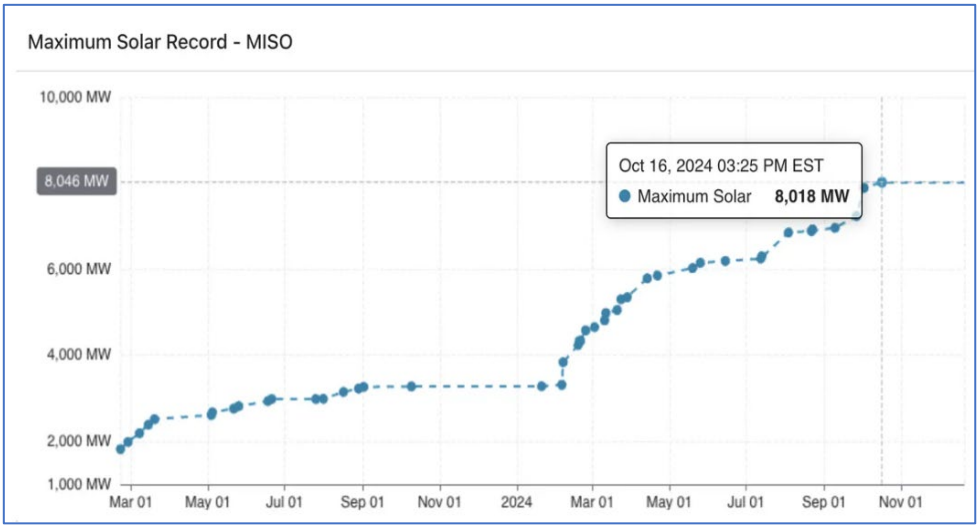
Power prices ultimately started spiking around 8 p.m., three hours after the peak demand moment. Average hub prices briefly hit the market's $5,000 per megawatt-hour cap. By that point, the batteries were pushing nearly 4 gigawatts of instant power onto the wires. Batteries have a finite tank of energy, but by the time the fleet tapered off, after 9 p.m., average prices were sinking back to bargain basement territory.

In short, this record day for Texas power consumption went out with a whimper instead of rolling blackouts or bulging energy bills, thanks to the tour-de-force pairing of Texas solar and batteries. This harbinger of a new era

raises a host of questions for the future of the market. How long can the battery boom last before the grid gets saturated? What happens to the many fossil fueled plants out there that used to survive on the same ERCOT price spikes that solar and batteries now effectively neutralize?

MISO solar growth

Sometimes it can feel like Texas and California are the only shows in town for clean energy construction. For a healthy reminder that things are moving along elsewhere in the country, too, take a look at this chart of record solar generation in the grid managed by the Midwest Independent System Operator (MISO), which spans 15 states from the upper Midwest down to the Gulf Coast.



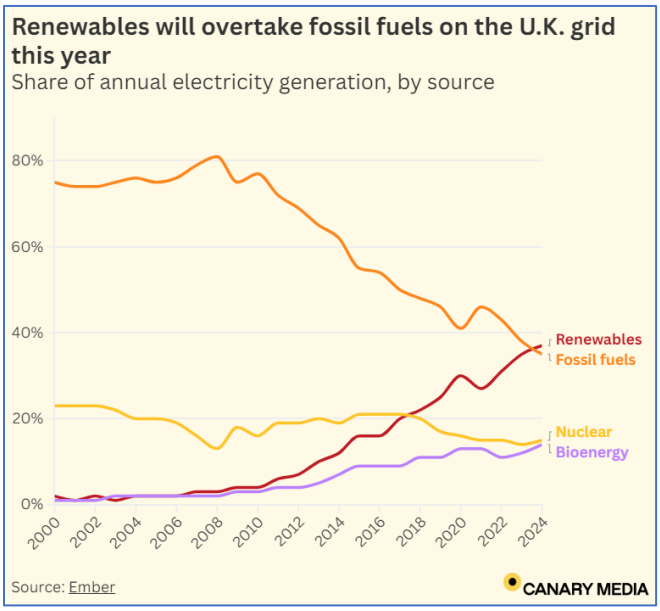
This region became an early leader in wind power, but never did much with solar development. That's now starting to change. The best solar production MISO had achieved in early 2023 was just 1,817 megawatts. In January 2024, it hit nearly 3,300 megawatts. By October 2024, MISO set a record of more than 8,000 megawatts, meaning peak solar output more than quadrupled in less than two years.

That's still a much smaller solar fleet than California or Texas, even though MISO spans much more territory. But the key metric to understand has never been absolute capacity (so miniscule for so long) but rather the rate of growth. MISO's peak solar production grew considerably faster than ERCOT's over the last two years, heralding its entrance to the solar big leagues.

U.K. renewables beat fossil fuels

This year, for the first time ever, the U.K. generated more electricity from renewables than from fossil fuels. That renewables category includes wind (the biggest contributor by far), solar, and hydropower, and has been climbing steadily in market share for a decade. It reached nearly 40 percent in 2024. Fossil fuels, comprising coal and fossil gas, have tanked from above 60 percent a decade ago. Britain closed its last remaining coal plant, the Ratcliffe-on-Soar Power Station, in late September.

The U.K. also generated about 15 percent of its electricity from nuclear. All told, the energy mix is now more than 50 percent carbon-free, and that percentage is rising. Britain may have taught the world to burn fossil fuels for industry and transportation, but it's moving past that era now.



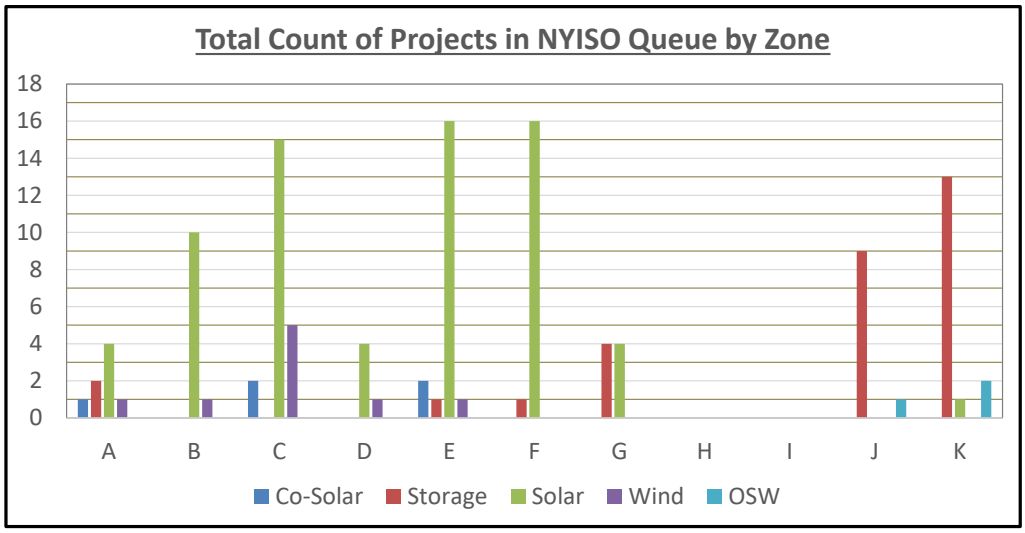
Interconnection Queue: Monthly Snapshot – Storage / Solar / Wind / CSRs (Co-located Storage)

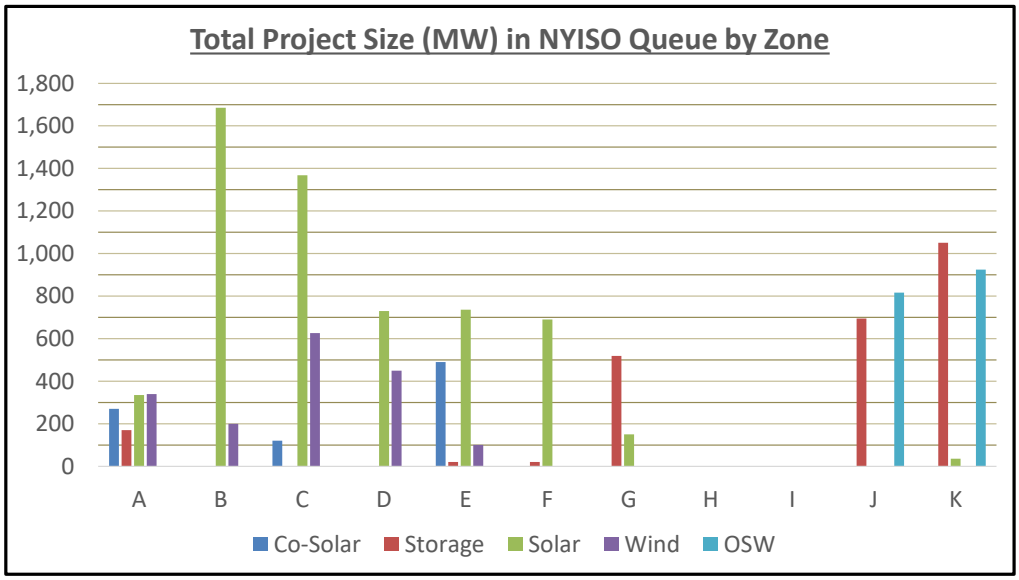
The intent is to track the growth of Co-Located Solar / Storage, Energy Storage, Solar, Wind, and Offshore Wind (OSW) projects in the NYISO Interconnection Queue, looking to identify trends and patterns by zone and in total for the state. The information was obtained from the NYISO Interconnection Website, based on information published on January 20th, and representing the Interconnection Queue as of December 31st. Note that only 2 projects were added, and 41 were withdrawn during the month of November.

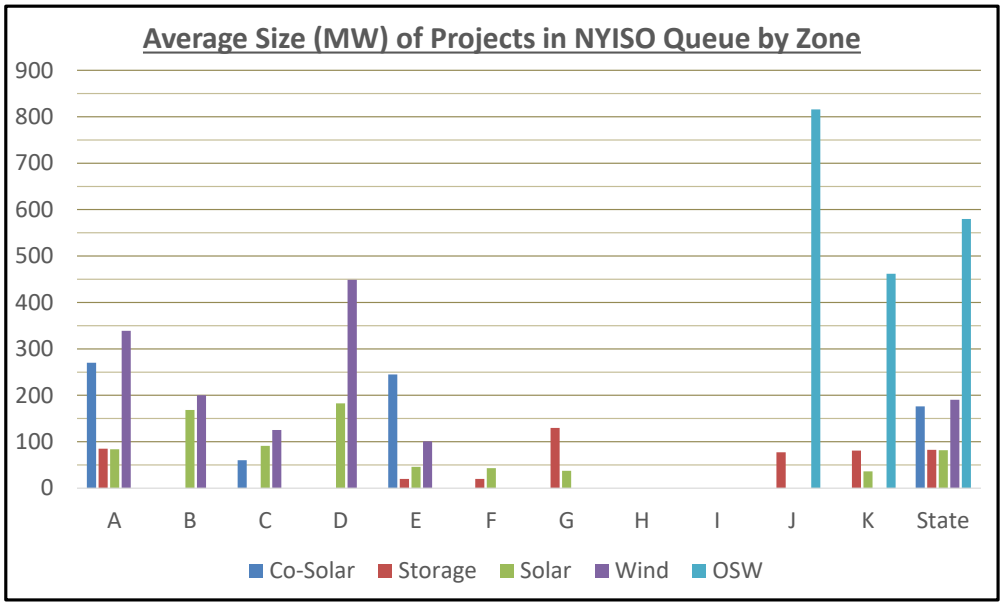
Total Count of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Storage	Solar	Wind	OSW
A	1	2	4	1	
B			10	1	
C	2		15	5	
D			4	1	
E	2	1	16	1	
F		1	16		
G		4	4		
H					
I					
J		9			1
K		13	1		2
State	5	30	70	9	3

Total Project Size (MW) in NYISO Queue by Zone					
Zone	Co-Solar	Storage	Solar	Wind	OSW
A	270	170	335	339	
B			1,685	200	
C	120		1,368	626	
D			730	449	
E	490	20	736	101	
F		20	691		
G		519	150		
H					
I					
J		695			816
K		1,051	36		924
State	880	2,475	5,731	1,715	1,740

Average Size (MW) of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Storage	Solar	Wind	OSW
A	270	85	84	339	
B			169	200	
C	60		91	125	
D			183	449	
E	245	20	46	101	
F		20	43		
G		130	38		
H					
I					
J		77			816
K		81	36		462
State	176	82	82	191	580


Total Count of Projects in NYISO Queue by Zone
18
16
14
12
10
8
6
4
2
0
A
B
C
D
E
F
G
H
I
J
K
Co-Solar
Storage
Solar
Wind
OSW


Total Project Size (MW) in NYISO Queue by Zone
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
A
B
C
D
E
F
G
H
I
J
K
Co-Solar
Storage
Solar
Wind
OSW


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

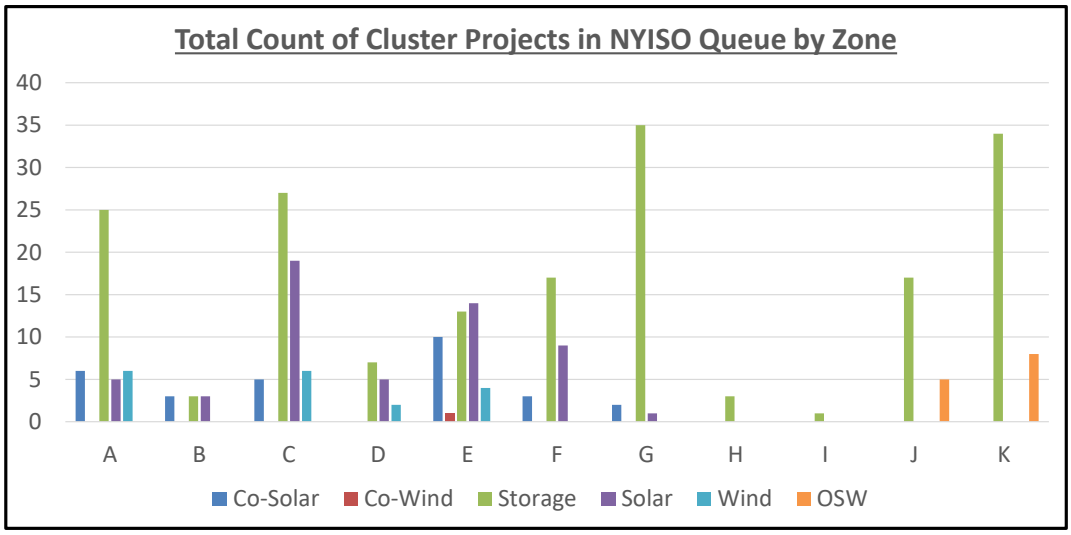
Cluster Interconnection Queue: Monthly Snapshot – Storage / Solar / Wind / CSRs (Co-located Storage)

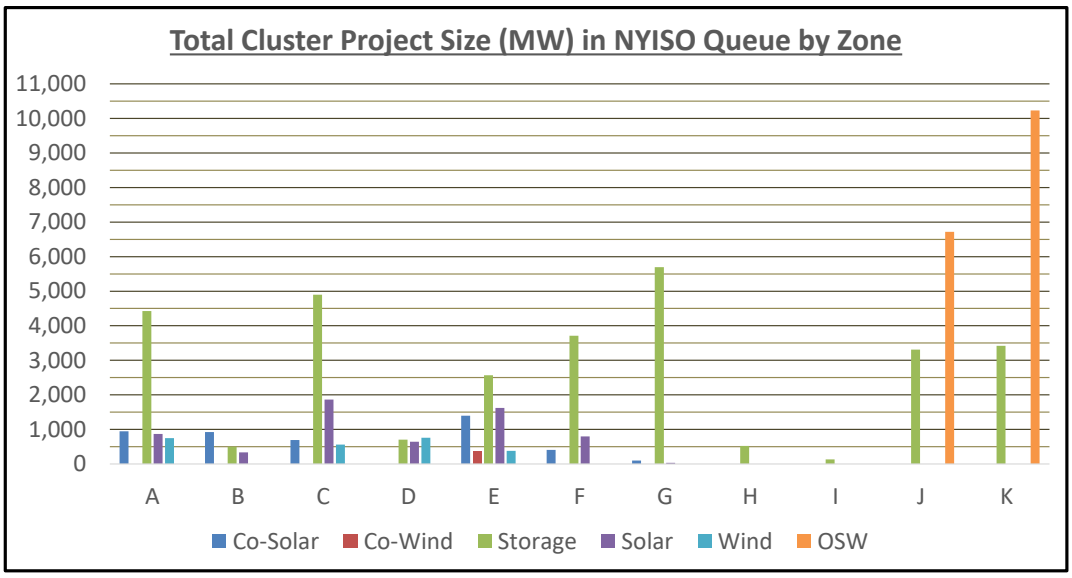
The intent is to track the growth of the Cluster-based projects, including Co-Located Solar and Wind / Storage, Energy Storage, Solar, Wind, and Offshore Wind (OSW) projects in the NYISO Interconnection Queue, looking to identify trends and patterns by zone and in total for the state. The information was obtained from the NYISO Interconnection Website, based on information published on January 20th, and representing the Interconnection Queue as of December 31st. There are currently 302 projects in the Cluster Queue, totaling 61,530 MW. A total of 74 projects totaling 15,400 MW are listed as having withdrawn.

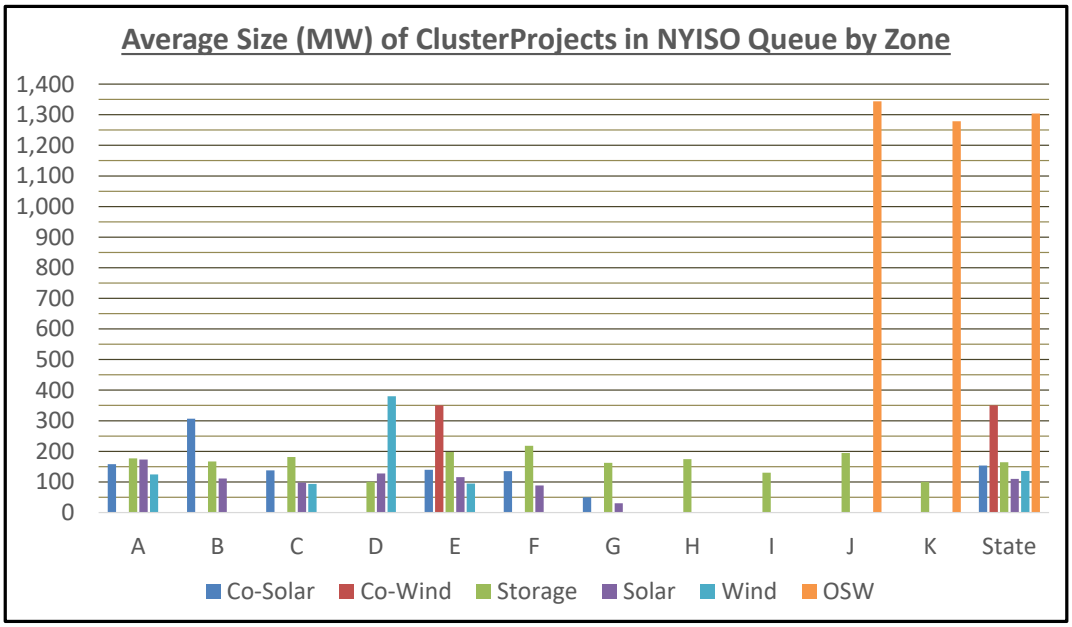
Total Count of Projects in NYISO Cluster Queue by Zone						
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind	OSW
A	6		25	5	6	
B	3		3	3		
C	5		27	19	6	
D			7	5	2	
E	10	1	13	14	4	
F	3		17	9		
G	2		35	1		
H			3			
I			1			
J			17			5
K			34			8
State	29	1	182	56	18	13

Total Project Size (MW) in NYISO Cluster Queue by Zone						
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind	OSW
A	947		4,428	865	746	
B	920		500	333		
C	690		4,897	1,861	561	
D			705	640	760	
E	1,398	350	2,569	1,623	380	
F	405		3,709	797		
G	99		5,695	30		
H			524			
I			130			
J			3,309			6,720
K			3,417			10,230
State	4,458	350	29,882	6,148	2,447	16,950

Average Size (MW) of Projects in NYISO Cluster Queue by Zone						
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind	OSW
A	158		177	173	124	
B	307		167	111		
C	138		181	98	93	
D			101	128	380	
E	140	350	198	116	95	
F	135		218	89		
G	50		163	30		
H			175			
I			130			
J			195			1,344
K			101			1,279
State	154	350	164	110	136	1,304


Total Count of Cluster Projects in NYISO Queue by Zone
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
OSW


Total Cluster Project Size (MW) in NYISO Queue by Zone
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
A
B
C
D
E
F
G
H
I
J
K
Co-Solar
Co-Wind
Storage
Solar
Wind
OSW


Average Size (MW) of ClusterProjects in NYISO Queue by Zone
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
OSW