

**De-Carbonization / DER Report for NYSRC Executive Committee Meeting 12/8/2023**

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The December 2023 edition of the De-Carbonization / Distributed Energy Resources (DER) Report includes the following items:

- NPCC Report: Recommendations for Incorporating Provisions of IEEE-2800-2022 and IBR Performance Requirements into the Applicable NPCC Criteria
- New York Times: In Biden’s Climate Law, a Boon for Green Energy, and Wall Street
- Politico: Biden administration approves sixth commercial-scale offshore wind project
- NYSERDA Announcement: First Offshore Wind Turbine Installed at South Fork
- NYISO Identifies Solution to Solve New York City Reliability Need
- Snapshot of the NYISO Interconnection Queue: Storage / Solar / Wind / Co-located

**NPCC Report: Recommendations for Incorporating Provisions of IEEE-2800-2022 and IBR Performance Requirements into the Applicable NPCC Criteria**

This [Report](#) identifies the implications of Inverter Based Resource (IBR) penetration on Bulk Power System (BPS) reliability in general and addresses in detail the impact on the specific functional reliability related areas of Protection, Operations (Reserve and Restoration) and Planning (Modelling/Validation), within the NPCC Criteria.

The report refers to the process specified in the [NPCC Directory Development and Revision Manual](#), stating that NPCC Full Members have an obligation to keep the NPCC Criteria consistent with the evolving ERO Standards and responsive to the rapidly changing nature of the NPCC BPS. Accordingly, the technical guidance within IEEE-2800 should be considered by each NPCC Task Force and added to Criteria where applicable.

The report identifies the implications of Inverter Based Resource (IBR) penetration on Bulk Power System (BPS) reliability in general and addresses in detail the impact on the specific functional reliability related areas of Protection, Operations (Reserve and Restoration) and Planning (Modelling/Validation), within the NPCC Criteria.

Risks to power system reliability that have been identified through the NERC Major Disturbance Reports include:

- Unacceptable voltage and frequency ride-through performance of IBRs
- Unacceptable active power control after routine system disturbances
- Unacceptable reactive power control after routine system disturbances
- Unacceptable dynamic active power support under abnormal frequency conditions
- Inadequate dynamic voltage support under abnormal voltage conditions
- Unacceptable negative sequence current injection
- Inadequate coordination between IBR control functions and existing power system protection systems and remedial action schemes.

The report recommends that the Criteria within five NPCC Directories be considered for revisions by the respective NPCC Task Force(s) having authority over the documents, some of which are highlighted below:

**Directory #1 Design and Operation of the Bulk Power System:**

- Directory 1.3 – Objective  
The objective of Directory #1 should be reviewed and modified to address this (IBR) development and the list of contingencies, beyond traditional transmission contingencies, should be reviewed. Expansion of the list should include common mode resource loss of non-compliant IBR depending on the Area’s magnitude of such facilities in comparison to the total resources in the Area.

For new, yet undiscovered common mode failure of IBRs there is a risk that the industry may experience new contingencies that are not planned and operated to, which result in an unexpected loss of IBRs in large enough quantities and total magnitudes of MW loss that result in the reliability risk.

- R4 – Resource Adequacy: NPCC stakeholders should consider whether the language of R4 is adequate to address the intermittent nature of IBR performance (wind and solar). The portions of R4.1 that address deratings, and forced outages may require revision. The portions of R4.1 that address deratings, and forced outages may require revision
- R10 – Transmission Planning  
As the penetration of IBR technology increases, the available fault current and inertia of the system declines. In a future low fault current, low inertia system, a thorough examination of the interaction of IBR control systems with existing system protection design should be considered.
- Table 1: NPCC stakeholders should consider whether the Table#1 Category 1 - Single Event performance requirements should be expanded to include common mode failure of non-IEEE-2800 compliant IBRs. Similar consideration for the recovery from IBR losses after a first Element loss in Category II should also be reviewed. Also, in Category II, Extreme System conditions, IBR resource adequacy (loss of sun / wind) should be added to the performance requirements list.
- Directory #4 - System Protection Criteria
  - NERC has advocated the use of Electromagnetic Transient Analysis (EMT) studies to address the interactions of IBR control systems with existing protective functions in stability studies. Reference to these NERC guidelines should be reviewed and considered for inclusion in Directory #4 Appendix A.
  - NPCC stakeholders should consider amending section #2.6 to address the latency of IBR control systems and the demonstrated tendency of these systems to delay the return to service of the facility as demonstrated in NERC Disturbance reports.
- Directory #5 - Reserve: Criteria did not consider the extensive presence of IBR technology nor the intermittent nature of IBR power production. Recent NERC disturbance reports identified “near miss” events where the total loss of IBR technology resources approached the most severe level of generating reserves at the time of the event. From a resource adequacy perspective, operating reserve policies may need to be redesigned to consider the need for an all hours-based reserve paradigm in the future.
- Directory #8 - System Restoration: Consider the future availability of Grid Forming inverters for black start and restoration, and these facilities should be compliant with the provisions of IEEE-2800.
- Directory #11 - Disturbance Monitoring Equipment Criteria: Where large penetration of non-compliant IEEE-2800 IBRs exist, Directory #11 should be reviewed to determine whether additional and specific Disturbance Monitoring criteria associated with IBR’s is required.

Recommended next steps for NPCC Full Members are as follows:

- The RSC and RCC to review this report and provide comments regarding whether the report provides the necessary guidance to the responsible NPCC Task Forces on the implications of incorporating the provisions of IEEE-2800 into the applicable Criteria when reviewing each Directory.
- After consideration of comments, a final report will be posted on the NPCC website and made available to each of the NPCC Task Forces having authority over the respective Directories.

Additional links include:

- [IEEE-2800 – 2023 - Standard for Interconnection and Interoperability of Inverter-Based Resources \(IBRs\)](#)
- [NPCC Directories](#)
- [NERC Major Event Analysis Reports dated: 8/2016, 10/2017, 4-5/2018, 5-6/2021, 6/2022, 4/2023](#)

### **New York Times: In Biden’s Climate Law, a Boon for Green Energy, and Wall Street**

This [New York Times article from November 11<sup>th</sup>](#), illustrates how the 2022 climate law has accelerated investments in clean-energy projects across the United States. It has also delivered financial windfalls for big banks, lawyers, insurance companies and start-up financial firms by creating an expansive new market in green tax credits. The law, signed by President Biden, effectively created a financial trading marketplace that helps smaller companies gain access to funding, with Wall Street taking a cut. Analysts said it could soon facilitate as much as \$80 billion a year in transactions that drive investments in technologies meant to reduce fossil fuel emissions and fight climate change.

The law created a wide range of tax incentives to encourage companies to produce and install solar, wind and other low-emission energy technologies. But the Democrats who drafted it knew those incentives, including tax credits, wouldn’t help companies that were too small — or not profitable enough — to owe enough in taxes to benefit. So, lawmakers have invented a workaround that has rarely been employed in federal tax policy: They have allowed the companies making clean-energy investments to sell their tax credits to companies that do have a big tax liability.

That market is already supporting large and small transactions. Clean-energy companies are receiving cash to invest in their projects, but they are getting less than the value of the tax credits for which they qualify, after various financial partners take a slice of the deal. Clean-energy and financial analysts and major players in the marketplace say big corporations with significant tax liability are currently paying between 75 and 95 cents on the dollar to reduce their federal tax bills. For example, a buyer in the middle of that range might spend \$850,000 to purchase a credit that would knock \$1 million off its federal taxes.

The cost of those tax credits depends on several factors, including risk and size. Larger projects command a higher percentage. The seller of a tax credit will see its value diluted further by fees for lawyers, banks and other financial intermediaries that help broker the sale. Buyers are also increasingly insisting that sellers buy insurance in case the project does not work out and fails to deliver its promised tax benefits to the buyer.

The prospect of a booming market and the chance to snag a piece of those transaction costs have raised excitement for the Inflation Reduction Act, or I.R.A., in finance circles. A new cottage industry of online start-up platforms that seeks to link buyers and sellers of the tax credits has quickly blossomed.

Tax professionals and clean-energy groups say the marketplace has widely expanded financing abilities for companies working on emissions-reducing technologies and added private-sector scrutiny to climate investments. But those transactions are also enriching players in an industry that Mr. Biden has at times criticized, while allowing big companies to reduce their tax bills in a way that runs counter to his promise to make corporate America pay more.

Biden administration officials say many clean-tech companies will save money by selling their tax credits to raise capital, instead of borrowing at high interest rates. “The alternative for many of these companies was to take a loan, and taking that loan was going to be far more costly” than using the credit marketplace, Wally Adeyemo, the deputy Treasury secretary, said in an interview. Some backers of the climate law wanted an even more direct alternative for those companies: government checks equivalent to the tax benefits their projects would have qualified for if they had enough tax liability to make the credits usable. It was rejected by Senator Joe Manchin III of West Virginia, a moderate Democrat who was the swing vote on the law.

A modest federal marketplace of certain tax credits, like those for affordable housing, existed before the climate law passed. But acquiring those credits was complicated and indirect, so annual transactions were less than \$20 billion — and large banks dominated the space. The climate law expanded the market and attracted new players by making it much easier for a company with tax liability to buy another company's tax credit.

Financial advisers say they have had interest from corporate buyers as varied as retailers, oil and gas companies, and others that see an opportunity to reduce their tax bills while making good on public promises to help the environment. experts say large banks are still dominating the biggest transactions, where projects are larger and tax credits are more expensive to buy. For the rest of the market, entrepreneurs are working to create online exchanges, which effectively work as a Match.com for tax credits. Companies lay out the specification of their projects and tax credits, including whether they are likely to qualify for bonus tax breaks based on location, what wages they will pay and how much of their content is made in America. Buyers bid for credits. In order to sell tax benefits under the law, companies have to register their credits with the Treasury Department, which created a pilot registry website for those projects this month. The online platforms to connect buyers and sellers of the credits are not regulated by the government.

### **Politico: Biden administration approves sixth commercial-scale offshore wind project**

This [Politico article](#) announced that The Interior Department on Tuesday approved the construction and operation of the Empire Wind project located off shore New York, renewing support for a U.S. industry hammered by economic challenges. The approval marks the administration's sixth for a commercial-scale offshore wind project.

The U.S. offshore wind industry has been battered by high inflation rates and other economic challenges that has stalled progress in recent weeks. Danish energy company Orsted said late last month that it was killing plans to build a pair of wind farms in New Jersey, which has amplified efforts in New York to save or replace its own at-risk offshore wind projects.

The record of decision for the Equinor and BP project comprises two offshore wind facilities, known as Empire Wind 1 and Empire Wind 2, and located off the coasts of Long Island, N.Y., and Long Branch, N.J. It approves the construction of 147 wind turbines within the lease area with a total capacity of 2,076 megawatts. The project will support roughly 830 jobs annually during construction, and about 300 jobs annually during operations.

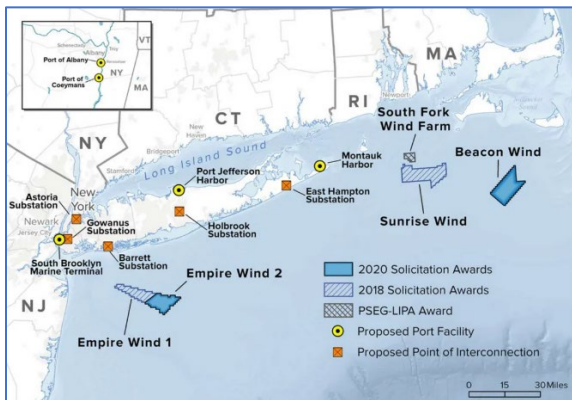
The decision includes a commitment from Empire Wind to establish fishery mitigation funds to compensate commercial and recreational fishers for losses directly linked to the project, according to Interior. It also seeks to balance the orderly development of offshore renewable energy with the prevention of interference with other uses of the Outer Continental Shelf and the protection of the human, marine and coastal environments. The approval is the final step in the federal review process for Empire Wind's Construction and Operations Plan. With the BOEM's final approval scheduled for Feb. 21.

While Equinor currently has contracts with New York's energy agency to buy power from the Empire Wind projects, it has sought higher prices due to inflationary pressures. The company is likely to rebid in an upcoming New York solicitation aimed at salvaging at-risk, early offshore wind projects. The solicitation will be released Nov. 30. The Biden administration for its part has set a goal of reaching 30 gigawatts of offshore wind energy capacity by 2030. Last month, it announced approval for the Coastal Virginia Offshore Wind project, the fifth approval of a commercial-scale offshore wind project under President Joe Biden and the largest ever in the United States.

## **NYSERDA / Governor's Office Announcement: First Offshore Wind Turbine Installed at South Fork**

On November 20<sup>th</sup>, [Governor Hochul announced the installation of the first offshore wind turbine for South Fork Wind](#), a historic milestone that will be the first completed utility-scale wind farm in the United States in federal waters. All 12 turbines are expected to be installed by the end of 2023 or early 2024. Once completed, the 130-megawatt offshore wind farm eliminate up to six million tons of carbon emissions, or the equivalent of taking 60,000 cars off the road annually over a 25-year period. Today's announcement supports progress towards the State's CLCPA goal to install nine gigawatts of offshore wind by 2035.

The first of South Fork Wind's 12 Siemens Gamesa wind turbine generators was hoisted into place by the offshore construction team at the project site 35 miles off Montauk, N.Y. Hundreds of U.S. workers and three Northeast ports have supported South Fork Wind's construction, helping to stand up the foundations of a new domestic supply chain that's creating local union jobs across the Northeast.



First approved by the 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 local energy grid, which was completed early this year. The wind farm reached its "[steel in the water](#)" milestone in June 2023 with the installation of the project's first monopile foundation.

Van Oord's offshore installation vessel, the Aeolus, is installing the turbines. Turbine installation involves using a crane to place the steel turbine tower onto the foundation. The nacelle and rotor are then installed on top of the tower. Lastly, the blades are lifted and installed one by one by bolting them to the rotor. [Click here to learn more about how offshore wind farms are constructed.](#)

Once in operation, South Fork Wind will be supported by U.S.-built crew transfer vessels and eventually by [America's first offshore wind Service Operations Vessel](#).

### **NYISO Press Release: Announcement of Solution to Solve New York City Reliability Need**

On November 20<sup>th</sup>, the NYISO [announced](#) the release of its [Short-Term Reliability Process Report](#), which finds that peaker plants scheduled for retirement in May of 2025 must remain in service temporarily to keep the grid reliable in New York City. Peaker plants are relied upon as a last resort when consumer demand is highest.

NYISO's second quarter Short Term Assessment of Reliability, issued on July 14, 2023, found that reliability margins in New York City would be deficient by as much as 446 megawatts starting in May of 2025. The reliability deficiency is being driven by increased demand for electricity, economic activity, and recent generator retirements per emissions requirements set forth by the New York State Department of Environmental Conservation (DEC). Overall, the deficiency improves if the Champlain Hudson Power Express (CHPE) project from Hydro Quebec to New York City enters service in the spring of 2026.

As of May 1, 2023, 1,027 MW of peaker plants have deactivated or limited operation in New York City. An additional 590 MW of Peakers are expected to become unavailable beginning May 1, 2025, per DEC emissions requirements, known as the "peaker rule." With the additional Peakers unavailable, the bulk power transmission system will not be able to serve the forecasted demand securely and reliably under normal weather conditions. Extreme weather, which is often accompanied by increased demand for electricity, raises the risk of outages.

"The NYISO is committed to a reliable transition of the electric grid to emission free resources," said Emilie Nelson, NYISO's Executive Vice President and Chief Operating Officer. "The electric system supports the health and safety for all New Yorkers and the state's economy. We must also be cognizant of the impacts peaker plants have on surrounding communities. This means running these units only when conditions require and closing them when no longer necessary for reliability."

On August 4, 2023, following the identification of New York City's reliability need, NYISO initiated a process which called for solutions to address the deficiency. Proposed solutions were due to the NYISO on October 3. Throughout the process the NYISO explained that, absent viable or sufficient proposals, a potential outcome could include retaining peaker plants on a temporary basis otherwise scheduled for retirement while permanent solutions are developed. The NYISO received no solutions that could be installed by May 2025, or were sufficient to address the 446-Megawatt deficiency.

The NYISO has identified generators on the Gowanus 2 & 3 and Narrows 1 & 2 barges as the temporary solution for New York City's reliability need. Those generators will remain available for two years beyond the original deactivation date of May 1, 2025, per the DEC's peaker rule. The DEC's peaker rule allows the NYISO to temporarily retain Peakers as a last resort if no other solutions are viable or sufficient by the time the reliability need is expected.

"The NYISO is working very closely with the DEC, the Public Service Commission and NYSERDA as we address the reliability need in New York City and a reliable transition to renewable resources for the state," said Nelson.

Through the organization's quarterly STAR studies, the NYISO will continue to evaluate the reliability of the electric system and monitor the progress of the Champlain Hudson Power Express transmission project – which is expected to enter service in spring 2026, providing 1,250 megawatts of hydropower from Quebec to the New York City area.

The NYISO's Short-Term Reliability Process Report can be found [here](#).

**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 November 20<sup>th</sup>, and representing the Interconnection Queue as of October 31<sup>st</sup>. Note that 10 projects were added, and 20 were withdrawn during the month of October.

Total Count of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	5		13	14	3
B	3		4	14	1
C	12		19	42	9
D	1		2	8	2
E	13		16	36	7
F	4		14	37	
G			33	8	
H			6		
I			2		
J		1	33		31
K		1	62	1	24
State	39	2	204	160	77

Total Project Size (MW) in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	1,092		1,651	1,908	514
B	187		621	2,125	200
C	1,591		2,326	4,572	1,001
D	20		360	1,202	747
E	1,492		2,184	3,606	541
F	360		4,127	1,781	
G			5,108	230	
H			2,416		
I			900		
J		1,400	6,705		34,731
K		1,400	7,825	36	24,614
State	4,948	2,800	34,223	15,459	62,348

Average Size (MW) of Projects in NYISO Queue by Zone					
Zone	Co-Solar	Co-Wind	Storage	Solar	Wind
A	218		127	136	171
B	62		155	152	200
C	133		122	109	111
D	20		180	150	374
E	115		136	100	77
F	90		295	48	
G			155	29	
H			403		
I			450		
J		1,400	203		1,120
K		1,400	126	36	1,026
State	127	1,400	168	97	810

