June 9, 2021

Offshore industrial wind turbine development in the Great Lakes has no merit

PURPOSE: The current push in New York State to install industrial wind turbines in the Great Lakes brings tremendous risk to the lakes, the community, wildlife and fisheries, in the name of carbon dioxide emission reduction related to electrical energy production. Yet, many factors and unknowns exist and are seemingly being ignored, overlooked or suppressed to further an agenda, not provide more cost-effective electrical energy while reducing CO2 emissions. This document lists the risks to these invaluable and penultimate in importance natural resources – freshwater – and the jeopardy 21% of the world's surface freshwater faces in the name of "saving the planet."

BACKGROUND: The Great Lakes provide commercial and recreational pursuits which bring tremendous economic benefit to the United States and Canada, while delivering drinking water to many millions of people living in the Great Lakes Basin. Lake Erie alone provides over 11 million people with drinking water, but this water is used for so much more. Bathing, crop irrigation, food and beverage production, commercial fisheries for walleye and yellow perch, charter fishing for game fish such as walleye, smallmouth bass, rainbow trout and muskellunge, bird watching, SCUBA diving and much more. Sportfishing alone in the Great Lakes is estimated to be a $7 BILLION annual industry, supporting tens of thousands of jobs in both the US and Canada. All of this is at risk from wind turbines. The Great Lakes have spent 50 years recovering from cavalier industrial pollution which resulted in Lake Erie being declared dead in 1970. Toxins dumped into the open waters still remain on the lake bottoms to this day, but in Lake Erie, the sediment carried by currents from runoff, due to the shallow nature of the lake itself, has created a sand cap cutting these toxins off from the food chain, and finally eliminating the deadly biomagnifications of dioxins, PBCs, Murex and many other deadly contaminants. After 50 years of recovery, the Upper and Lower Niagara Rivers, fed by Lake Erie, received a RAMSAR designation (September 2019) for biodiversity, a stunning and miraculous achievement for an area that had no life around the lake, besides insects, just 50 years ago. These treasures are to be protected, and if risks to these critical resources are proposed, a significant return must be realized, risks mitigated and reduced. Industrial Wind Turbines do not deliver benefit for the risks and damage they cause. The following document illustrates the dangers, with supporting science included, while also showing via production data that the risks come with NO REWARD. This document explains clearly that offshore industrial wind turbines development in the Great Lakes has no merit. This was the conclusion 10 years ago, when the last Great Lakes Feasibility Study was conducted by NYSERDA to support the NPYA GLOW project. At the end of the day, the idea for wind development in the lakes was found to have no merit. This hasn't changed.

Offshore Wind Turbine issues:

Physical

- Displacement caused by turbines, bases and stanchions create disturbances in natural current, siltation, can create head cutting at the base of the stanchion.
- Current changes create changes in how oxygen is mixed, temperatures are dispersed and how zooplankton and phytoplankton are carried throughout the lake system.
- Lake physics and current dynamics will alter the fisheries themselves. This has been learned from many physical changes such as bridges, canals and other manmade structures creating changes in currents.
- Offshore wind factories in the English Channel and North Atlantic have dramatically altered the currents surrounding the location of wind factories with the erosion control measures now causing issues with abrading the transmission line connections, escalating costs well beyond budget.

Acoustic

- Low Frequency Noise (LFN) is generated by the wind turbines, created by the design of the turbines themselves, generated by turbine noise and noise from the blades cutting through the wind.
- LFN in aquatic environments has been well documented to cause major problems for fish, crustaceans and shellfish, mammals and other marine life.
- LFN is only mitigated by distance.
- LFN is stronger and more problematic in marine ecosystems vs. terrestrial environs, as sound travels farther, faster and stronger in water vs. through the air.
- LFN interferes with a fish's ability to "hear" their surroundings, masks the sounds of predators and prey, hamper orientation and navigation and these affects cause displacement of fish and other marine life, as to avoid the problematic areas where LFN is encountered.
- Operational Turbines create LFN that is "heard" by fish across great distance, depending on anatomical characteristics of the fish species relating to swim bladder type, and the size of the turbines themselves – the larger the turbines, the more noise is generated.
- Studies on offshore wind factories indicate that a 1.5 MW turbine will create a displacement zone of up to 3 miles from each operational turbine. Larger turbines will create a larger displacement radius.
- Fish and other marine life in close proximity to operational turbines can suffer soft tissue damage, internal bleeding and death caused by LFN.
- We have learned LFN impacts whales in oceanic environs through US Navy and the testing of low frequency active sonar systems and observed impacts on whales, which was discovered back in the early 1990's!
- Distance of displacement will impact spawning grounds even if the turbines are built in non-spawning areas. The lakes are only so big, and simply cannot sustain such industrialization due to the small size.

Sedimentary Displacement

- Altered currents will create erosion and re-exposure of toxins long buried on the lake bottom.
- Continued erosion will make this a persistent issue, not just a one-time re-exposure.
- 362 different chemical contaminants exist on the bottom of the Great Lakes, according to the EPA. Only one-third of those substances have been studied for health impacts on humans, fish and wildlife.
- Of the substances studied for health impacts, at least 11 contaminants are of critical concern, including endocrine inhibiting dioxins, polyfluoroalkyl and perfluoroalkyl substances (PFAS) and other known contaminants on the lake bottom.
- These contaminants have the ability to bioaccumulate and biomagnify as they work up the food chain, even if the contaminants are barely detectable in the environment, according to the EPA.
- Chemical contaminants cannot be removed from the water during normal water treatment processes.
- Human health has improved dramatically since the industrial pollutants have become cut off from the water and food chain via the sand cap that has covered the lake bottom over the past 50 years. Why risk the reversal?

Weather Threats

- Wind Turbines are susceptible to lightning strikes, which can and does cause nacelle damage and fires.
- Ice cover in winter is a powerful force not well understood in relation to standalone structures in the lake (turbine stanchions).
- Icing in wintertime will become problematic. Will the turbines be equipped with deicing capabilities? Research has show heating elements in the blades to raise surface temperature to prevent icing acts as a full parasite, using up all electrical energy generated. If aircraft deicing is used, we will see contamination of our waters from the ethyl-glycol based fluids needing to be used. What about costs to deice? Frequency? Helicopters are not cheap.
- Great Lakes gales are frequent and powerful, causing shoreline flooding, damage to breakwaters and sea walls every year, and in winter driving massive ice floes that can and do alter the shoreline and other lake features.

Material Threats

- Each wind turbine nacelle contains roughly 400 gallons of petroleum-based lubricants which leak and require periodic refilling. Since one tablespoon of oil can sour the drinking water supply on a battleship, why would we introduce scores of leaky wind turbines into freshwater?
- Each turbine contains 2 tons or more of Neodymium, a rare earth metal that is used to make the permanent magnets. French researchers have discovered operational turbines shed atomized Neodymium particles as they erode off the magnets while power is generated. Neodymium particles have been found in the hair of wildlife and people, covering plants and ground and in the water in the surrounding areas of the French wind

factories. Neodymium, along with the other rare earth metals, is considered "emerging contaminants". Health effects of Neodymium that are known include skin irritation and allergic reaction when contacting skin. In fact, wind turbine manufacturers are now under special guidelines to reduce neodymium exposure in the plants. If external skin irritation happens, what happens when internal exposure occurs?

- Turbine blades are constructed of fiberglass and/ or carbon fiber and epoxy, which contains bisphenol A, a known endocrine inhibitor, like dioxin and PFAS.
- Turbine blades for the larger 4 MW units can weigh in excess of 20 tons, 13 tons of which is epoxy (bisphenol A).
- As turbines erode due to grit in the air, in rain and from hail strikes, fibers and pure bisphenol A is shed.
- Bisphenol A is known to cause fertility issues in women, and in fish.
- In fish, bisphenol A has shown to negatively impact fertility on a generational basis, not just a singular occurrence.
- Bisphenol A also does bioaccumulate, like dioxin.
- Bisphenol A is a known lactate inhibitor, delaying lactation in new mothers that should be able to nurse their young. Studies in Mexico has confirmed the problem could cause delays in lactation of up to a couple months in the most severe exposure cases, according to NIH.
- Half life of bisphenol A in air is 0.2 days, but lasts much longer in water. Despite this short half life, bisphenol A does bioaccumulate and biomagnify, and it appears to not break down once ingested.
- Bisphenol A is also considered an "emerging contaminant", despite its use since the mid-1950's. More is coming to light and data is still being analyzed and collected, creating more questions while in pursuit of answers.

Unnecessary threats to birds and bats

- Lake Erie in its entirety is a migratory route for waterfowl, butterflies, bats, raptors, sea gulls and many more water birds. This is not a land-based migratory corridor. No siting work can avoid the flight of birds, bats and butterflies, as they use the entire lake.
- Industrial wind factories are the number 2 cause of premature bat death, and have been since year 2000.
- NY has a burgeoning population of bald eagles and other threatened raptors along the Lake Erie watershed.
- Upper and Lower Niagara Rivers on the USA side has received a RAMSAR designation for biodiversity in 2019.
- Wanton destruction of life for no return is not wise, rather it is irresponsible.

Construction and Maintenance Costs

- Marinized wind factories cost at least 5 times more than a terrestrial-based wind factory, due to limiting of work due to weather, the need for heavy construction vessels and platforms to be constructed as well (NY Zoning and Practice Law, March 2010).
- New, more costly construction techniques to reduce damaging and dangerous construction noise are unproven and experimental, at best.

- Inevitable problems with the turbines will cost far more to repair, and response time will be diminished due to weather concerns, seasonal conditions, availability of appropriate vessels, etc.
- How frequent does the gear oil need changing in the nacelle?
- Trenching for transmission lines will be far more costly and prone to more problems than on land (the recent frac out in Cassadaga does not bode well).
- Trenching for transmission lines will expose large areas of contaminants.
- A collection point to concentrate electrical energy will also have to be constructed at tremendous cost.
- Upgrades to non-existent interconnections to bring power from offshore to land will run in the billions, for this junction point and interconnection capabilities alone.

Utilities Costs

- Unreliability of wind drives costs up for kWh for rate payers up to 275% higher than if wind energy is not used.
- Increased loss from transmission line distance and Ohm's Law drives up prices.
- Increased loss from parasitic turbines consuming energy to operate leaves less energy to transmit, driving prices up.
- Increased rolling black outs as inability to meet peak demand increases, making what electrical energy is generated very costly due to supply and demand (see Texas Feb 2021 near brownout, where wholesale electrical prices skyrocketed to over $9,000/ MW.

Homeland Security/ Border Protection

- Industrial Wind Factories impact RADAR detection systems, creating clutter interference and noise, obscuring objects needing to be detected, such as vessels, planes, etc.
- The Great Lakes in NY are International Boundary Waters, only monitored and protected via RADAR detection systems.
- Great Lakes Boundary waters are well known areas of smuggling of drugs, counterfeit goods, human trafficking and more. Since 9/11, heightened awareness and security concerns, especially for WNY, where the Niagara Power Project is located, and the Niagara Falls Air Base operates, males WNY a prime target for terrorists.

Secondary Impacts/ Quality of Life – Some call "NIMBY" Concerns

- The alteration of the view shed many who chose to live along the lakefront expect and love will be forever altered.
- Residential property values will decline, as is well known.
- Residential property tax revenue will decline due to loss of value.
- Loss of migratory birds diminishes the quality of life for us all (we learned already through industrialization of the past), as well as diminishing the tourism potential from bird watching.
- Loss of fish due to infrasound displacement reduces the quality of life for those who fish, or like to eat freshwater fish such as yellow perch and walleye, while leaving aquatic insect populations to explode unchecked. We have seen this before with the caddis fly swarms now under control naturally by fish predation.

- What impacts will Canadian commercial fisheries experience? We cannot impact Canada's economy by 1909 Treaty.
- Areas of the lake where turbines are installed will become no-go boating and sailing zones in order to secure the site and meet that requirement for interconnection. What will the setback be? How about safety from blade throws?
- Placement of turbines off Sturgeon Point will impact Canadian waters, as it is only 7 miles from Sturgeon Point to the Canada line, and only 12 miles from the Canadian shore!
- Impacts to the Canadian quality of life exists as well, they have a view shed too.
- Minimum setbacks for offshore wind were set at 20 miles, and nowhere in ANY Great Lake does NY have 20 miles from shore opportunities. The lakes are too small.

Unknowns exist, as well as knowing exactly the extent of impacts this project will have. What about electromagnetic frequency (EMF) interference and impacts to crustaceans that make up part of the forage base for fish? EMF pollution is well known in the oceans along the transmission lines. What will happen to life in freshwater, where the ecosystem is much smaller, and far less options exist in terms of spatial escape. Fifty turbines brings 50 transmission lines. The more turbines the more transmission lines will pollute the lake. That level of environmental damage alone should terminate this project. With no environmental impact studies (EIS) being conducted, and a myriad of areas being impacted demanding detailed and exhaustive EIS before moving forward, we must question the wisdom and intelligence of those pushing this folly.

And above all, after all the costs and all the issues and threats, when the wind doesn't blow, or is blowing too strong, no electrical energy will be generated.

The positive for wind energy is supposedly emission-free electrical energy. Yet, we have more effective alternatives, such as hydro power and nuclear power, both deliver emission-free electrical energy, but also deliver power 24/7/365, and it is controllable, predictable, forecast-able, plan-able, and meets the triad for electrical energy power plants; delivering base load, providing power to meet base demand, and can respond to peak demand periods as well. Wind energy cannot, due to the variability and unreliability of the wind itself.

Based on production data, the following can be shown concerning wind and its effectiveness as a fuel:

Wind Energy in NY
Production Analysis, 2018-2020

SUMMARY: Since December of 2015, New York Independent Systems Operators (NYISO) has tracked NY's electrical Energy Output by fuel type to provide insight into electrical energy generation and distribution in NY. Methodology of the production data provides snapshots of electrical energy output updated every 5 minutes of every hour of every day.

According to NYSERDA, New York officially has 1,987 MW of installed capacity for wind energy, yet production data indicates that wind energy cannot deliver even an average of 30% of nameplate capacity output to the grid itself. In fact, oftentimes wind energy is generating virtually no electrical energy at all, an undesirable condition which disqualifies a power plant from receiving an interconnection to the grid.

Production Audit – 3 years

Calendar Year 2018 Production – WIND

- Hours of 0 MW production – 30.4 hours of no energy at all
- Hours of <10 MW Production (includes 0) – 191.4 hours of < 10 MW produced, or 7.98 days
- Hours of <25 MW Production – 463.2 hours of < 25 MW of production, or 19.3 days
- Hours of <100 MW Production – 1660.1 hours of < 100 MW production, or 69.2 days
- Hours <596 MW of production or under 30% of NPC – 6089.2 hours of < 596 MW production, or 253.7 days, or 69.5% of the year, wind energy missed the 30% threshold

In 2018, wind factories in NY performed like a power plant, delivering at least 60% of NPC to the grid for 461.6 hours, or 19.23 days, or 5.3% of the year.

Calendar Year 2019 Production – WIND

- Hours of 0 MW production – 21.1 hours of no energy at all
- Hours of <10 MW Production (includes 0) – 176.6 hours of < 10 MW produced, or 7.36 days
- Hours of <25 MW Production – 442.9 hours of < 25 MW of production, or 18.5 days
- Hours of <100 MW Production – 1472.25 hours of < 100 MW production, or 61.3 days
- Hours <596 MW of production or under 30% of NPC – 5696 hours of < 596 MW production, or 237.3 days, or 65% of the year, wind energy missed the 30% threshold

In 2019, wind factories in NY performed like a power plant, delivering at least 60% of NPC to the grid for 862.4 hours, or 35.93 days, or 9.8% of the year.

Calendar Year 2020 Production - WIND

- Hours of 0 MW production – 26.5 hours of no energy at all
- Hours of <10 MW Production (includes 0) – 185.7 hours of < 10 MW, or 7.74 days
- Hours of <25 MW Production (minimum threshold for large scale projects is 25 MW) – 426.4 hours of <25 MW of production (17.8 days)
- Hours of <100 MW Production – 1635 hours of <100 MW of production, or over 68 days
- Hours of <596 MW production (under 30% of NPC) – 5700 hours, or 237.5 days, or 65.1% of the year, wind energy missed the 30% threshold

In 2020, wind factories in NY performed like a power plant, delivering at least 60% of NPC to the grid for 848.9 hours, or 35.4 days, or 9.7% of the year

By comparison, Hydro-Electric power in NY, which has an installed capacity of **5386.6 MW**, shows the following performance over the past 3 years:

Calendar Year 2018 Production - HYDRO

- Hours of 0 MW production – 0 hours of no energy at all
- Hours of <10 MW Production (includes 0) – 0 hours of < 10 MW
- Hours of <25 MW Production (minimum threshold for large scale projects is 25 MW) – 0 hours of <25 MW of production
- Hours of <100 MW Production – 0 hours of <100 MW of production
- Hours of <1615.98 MW production (under 30% of NPC) – 45.8 hours, which means demand was low and hydro dialed back (potential planned maintenance on turbines also possible)
- Hours of <3231.96 MW production (under 60% of NPC) – 3662.7 hours, or 152.6 days of under 60% of NPC delivered to the grid
- **Hours of >3231.96 MW of production (over 60% of NPC) – 5153.25 hours, or 214.7 days of OVER 60% of NPC delivered to the grid**

Calendar Year 2019 Production – HYDRO

- Hours of 0 MW production – 0 hours of no energy at all
- Hours of <10 MW Production (includes 0) – 0 hours of < 10 MW
- Hours of <25 MW Production (minimum threshold for large scale projects is 25 MW) – 0 hours of <25 MW of production
- Hours of <100 MW Production – 0 hours of <100 MW of production
- Hours of <1615.98 MW production (under 30% of NPC) – 7.25 hours, which means demand was low and hydro dialed back
- Hours of <3231.96 MW production (under 60% of NPC) – 3262.75 hours, or 134 days of under 60% of NPC delivered to the grid
- **Hours of >3231.96 MW of production (over 60% of NPC) – 5580.75 hours, or 232.5 days of OVER 60% of NPC delivered to the grid**

Calendar Year 2020 Production – HYDRO

- Hours of 0 MW Production – 0 hours found of no production. Hydro produces output 24/7/365
- Hours of <10 MW Production (includes 0) – 0 hours of < 10 MW
- Hours of <25 MW Production (minimum threshold for large scale projects is 25 MW) – 0 hours of <25 MW of Production
- Hours of <100 MW Production – 0 hours of <100 MW of Production
- Hours of <1615.98 MW Production (under 30% of NPC) – 17.25 hours, which means demand was low and hydro was dialed back
- Hours of <3231.96 MW Production (under 60% of NPC) – 3826.2 hours, or 159 days of under 60% of NPC delivered to the grid
- **Hours of >3231.96 MW of Production (over 60% of NPC) – 5076.9 hours, or 211.5 days of OVER 60% of NPC delivered to the grid**

Observations: We can see from the three year review that 2018 proved to be a "less windy year" than 2019 or 2020. However, wind energy seems to consistently fail to deliver the reliability standard of providing 30% of nameplate capacity to the grid all the time. In fact, all three years reviewed proved wind energy missed the reliability threshold at least 65% of the year, with 2018 showing failures near the 70% of the time level.

Additionally, the lack of energy production at all is alarming, as these periods of no energy, or very low energy output is spread out and not in a uniform singular event, which compounds the complexity of grid operations and management.

For less than 10% of the hours operating wind production shows as effective as traditional power plants, with 2018 showing to be far worse, as less than 6% of the year did wind exhibit positive power plant output, similar to the performance of the coal and nuclear plants these facilities seem to be replacing in NY.

The issues become stark and clear when comparing performance of wind energy against capacity to hydroelectric power against capacity. Wind energy becomes even less attractive when compared to power plants that work as the grid demands.

Conclusions: Based on production data and the self-evident unreliability wind has proven through production data, this fuel source for an industrial grid-integrated power source should be abandoned by NY Energy Policy and Pursuits. Fiscal and natural resources should rather be focused to upgrading the industrial grid infrastructure and expanding hydro and nuclear energy for base load needs, while using a combination of natural gas/ dual fuel and hydro to easily meet peak demand periods. Pursuit of wind is costly and proven ineffective. Efforts are better served in pursuit of improved efficiency of fuel use, efficiency in electrical energy consumption, and development of power plants that work. This means expansion of hydroelectric power – Niagara Falls Power Project can handle an additional two large turbines, and NY has 7,000 unpowered dams across the state already built. These smaller scale potential hydro plants deliver grid-friendly power, and can be developed out at a fraction of the cost of wind.

In the context of the Great Lakes, the production data itself proves the risks to the lakes, the life in the lakes, and the health of the communities in and around the lakes are too great and the benefits non-existent. The idea of Great Lakes offshore wind has no merit by virtue of the production and performance itself. This only becomes stronger when factoring in all the risks for the lack of performance.

Sources and Methodology:
Source of Data – NYISO Production by fuel type archives, 2018-2020
Methodology – data is filtered to examine WIND as fuel type, and is interrogated as follows with the criteria below:

> Time periods that reflect 0 MW production, < 10 MW production, < 25 MW production, < 100 MW production and < 596 MW of production, which is 30% of reported installed capacity statewide of 1,987 MW, for the period of 1/1-12/31 of each calendar year. Row counts of these instances calculated and multiplied by 5, as each line entry represents a 5 minute interval. Resulting calculation is then divided by 60 to determine the hourly value, and that value is divided by 24 to secure the # of days.

- 25 MW is the minimum threshold of a "large-scale" power project, according to Article 10 in NYS law.
- 596 MW, or 30% of nameplate capacity is the minimum threshold that renewable power plants must deliver to the industrial grid 24/7/365, according to NERC standards
- Capacity for hydro is reported as 5386.6 MW total across NYS and 30% and 60% of NPC is reflected in the comparative analysis of Hydro

Examinations of wind energy production seeking data that shows production as greater than 1192.2 MW, or 60% of nameplate capacity was also examined, as 60% of nameplate capacity is the minimum threshold from NERC for traditional power plants, such as hydro or coal, nuclear or natural gas. Comparisons to hydro performance are easily gleaned.

With better, more effective alternatives available, which will cost less due to actually being able to sell electricity to recover costs invested, the idea of Great Lakes Offshore Wind Energy, indeed, has no merit. Compounding the issues will be loss of economic opportunity for boating, due to no boating zones needing to be created to secure the offshore power plant, loss of fishing – both recreational and commercial – due to fish displacement caused by LFN pollution. Economic impacts will also be negatively impacted for bird-watching, as no one wants to watch bald eagles being killed by wind turbines. Community health will suffer with the re-exposure of long-buried toxins, negatively impacting the drinking water for NYer's, Canadians, and all others that depend upon Lake Erie (and any other of the Great Lakes) for drinking water. Approximately 11 million people depend upon Lake Erie for drinking water, with 40 million living in the Great Lakes basin in Canada ALONE! Displacement of fish will create an imbalance in insect life, especially the caddis fly, which is a known health problem for people due to the histamines produced by the female caddis. Chemical contamination of fish shall resume with the exposure of long-buried contaminants. The additional contaminants ADDED to the ecosystem via magnet erosion and epoxy shedding is unacceptable. Contamination of the

waters via petroleum leaks is unacceptable. And in the face of a myriad of better alternatives that are cost-effective and actually work, the idea of offshore wind factories in our Great Lakes HAS NO MERIT.

All of this has been confirmed 10 years ago in the last feasibility study conducted by NYSERDA for NYPA. Some never learn, yet try to pretend the work never was done. This is deceptive and disingenuous. The Great Lakes Offshore Wind idea HAS NO MERIT.

Rich Davenport
Tonawanda, NY
Recording Secretary – Erie County Federation of Sportsmen's Clubs
Secretary – WNY Environmental Federation
NYSCC Region 9 Director

Sources:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1253773/
https://response.restoration.noaa.gov/about/media/chemical-pollution-great-lakes.html
http://michiganintheworld.history.lsa.umich.edu/environmentalism/exhibits/show/main_exhibit/pollution_politics/great-lakes-pollution
https://www.wind-watch.org/documents/low-frequency-noise-and-infrasound/
https://americanhistory.si.edu/onthewater/exhibition/3_1.html
https://tethys.pnnl.gov/sites/default/files/publications/Effects_of_offshore_wind_farm_noise_on_marine-mammals_and_fish-1-.pdf
https://www.ahukini.net/
https://pubmed.ncbi.nlm.nih.gov/26515307/
https://pubmed.ncbi.nlm.nih.gov/15739094/
https://bergensia.com/bisphenol-a-in-wind-turbines-damages-human-fertility/
https://pubmed.ncbi.nlm.nih.gov/23994667/
https://greatlakeswindtruth.org/newsworthy/february-24-2021-na-paw-media-release-fatal-attraction/
https://www.epa.gov/pfas/basic-information-pfas
http://mis.nyiso.com/public/P-63list.htm