



# Energy Musings

Insights into the Energy Industry



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*Energy Musings* contains articles and analyses dealing with important issues and developments within the energy industry, including historical perspective, with potentially significant implications for executives planning their companies' future.

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**August 18, 2023**

## **Offshore Wind's Whale Problem Getting More Attention**

**Thrown To The Wind**, a documentary by Michael Shellenberger highlights the issue of underwater noise from offshore wind construction activity and its potential link to the surge in whale deaths. We are killing humpback whales at twice the rate for a sustainable population!

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## **Canada's Clean Energy Moves**

Two announcements in Ontario about building new nuclear power plants may eliminate the province's long-term power projected shortfall. Our west, Eco-Refinery is planning to build a GTL plant producing clean diesel fuel that is better for the environment and diesel consumers.

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## **New England Electricity Users Rest Easier – Should They?**

New electricity demand forecasts, plus more behind-the-meter solar and delayed power plant closures are giving ISO-NE officials greater comfort that winter blackout risk is reduced.

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## Offshore Wind's Whale Problem Getting More Attention

The rising number of dead whales washing ashore along the East Coast of America is drawing greater scrutiny. Michael Shellenberger, an author, former public relations official, and investigator of the Twitter Files, who now publishes a newsletter on Substack.com called Public News, has begun writing about the dead whale issue. More importantly, an organization he started, Environmental Progress, along with his newsletter has produced a 30-minute documentary on the issue of underwater noise from offshore wind construction activity and its possible impact on whales. The movie highlights how loud underwater noise may contribute to the recent surge in whale deaths despite the government's denial of any linkage. It certainly demonstrates how uncomfortable the noise is for humans!

Starting in 2017 and up to November 2022, North American right whales have been suffering from an "unusual mortality event" with nine whales dying from entanglement with fishing gear and 20 from injuries. The National Oceanographic and Atmospheric Administration (NOAA) has noted that the recorded deaths represent only those known to the public because the carcasses washed ashore. Any whale dying offshore where the carcass sinks to the ocean floor remains unknown. We have no accurate whale death toll.

The right whale population is estimated at 350 with fewer than 100 breeding females. The recently released NOAA marine mammal stock assessment report for 2022 says the right whale population is 332 with 350 being the top estimate. Birth rates are down, which is stressing the population. While right whales are protected under the Endangered Species Act, there are numerous other whale species, most of which are also endangered and protected.

What has caught the attention of environmentalists is the sudden surge in whale deaths since December 1, 2022. Through last weekend, the death total reached 61! The latest deaths involved three whales during the four days of Thursday through Saturday. The last two deaths were humpback whales whose carcasses washed ashore at Fire Island, New York, and Long Branch, New Jersey. The increase in whale deaths has coincided with a significant uptick in offshore wind construction activity – sonar surveys to map the ocean floor where wind farms are to be built, pounding of foundation piles into the ocean floor for wind turbine generators and power substations, and the digging, laying, and burying of underwater transmission cables. These activities have increased the number of vessels working on various projects.

When queried by critics of offshore wind, officials from the Bureau of Ocean Energy Management (BOEM) and NOAA have declared no link exists between the construction activity and whale deaths. Their answers rely on the observed scars on the whale carcasses from vessel strikes. What is never acknowledged, and certainly not commented upon, is why so many whales are straying into the shipping lanes where they are struck. Are they disoriented by the high level of underwater noise, or do they become deaf so they cannot hear and avoid ships? Or could the construction noise be driving the whales' food supply into those shipping lanes and the whales follow only to be struck?

The increased offshore activity has been recognized as a potential problem. In 2021, Mark Baumgartner, a marine ecologist at the Woods Hole Oceanographic Institution commented in an interview: *"We already have a fairly industrialized ocean, with shipping traffic and fishing*



*activities. Adding these large wind farms with many, many, many turbines is certainly concerning.”* At least from a whale’s point of view.

We know from research in Europe that marine mammals can become disoriented by loud underwater sounds. There are numerous studies, both here and in Europe, of harbor construction noise disorienting harbor seals and other marine mammals. The UN has begun a broad European-based research effort with numerous studies into the offshore environment and its ecosystem and how changes to them may impact marine mammal populations and their behavior. One of the studies is aimed at understanding the impact of continuous and long-term underwater noise from operating wind turbines.

Since last December, of the 61 dead whales, there were 37 humpbacks. The U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment Report for 2019 states that the Potential Biological Removal for the Gulf of Maine humpback whale stock is 22 a year. This is the rate of attrition that still allows this endangered population to remain stable. The annualized 2022-2023 humpback death rate is more than twice the PBR suggesting something is going on with the population that is causing the dramatic increase in deaths. Maybe the documentary has identified the cause – loud noise from offshore sonar surveys and construction work.

#### **Exhibit 1. Thrown To The Wind Documentary Highlights Whale Deaths**



Source: Public News

**Thrown To The Wind**, the documentary [available at <https://public.substack.com/p/why-this-documentary-may-save-the-whales>], chronicles the issue of underwater noise from a sonar study for an offshore wind farm. Robert Rand, an acoustics expert, is shown deploying underwater microphones to record the noise level from the sonar survey. The developer is having the ocean floor mapped to enable it to locate where wind turbines and electric power substations should be placed. The mapping and sampling of the ocean floor will aid the developer in designing the foundation structures for anchoring the turbines and how the transmission cables will be buried.



In the documentary, you hear the normal ocean sound level. You also hear the sonar sound, which is loud, causing people to cover their ears. It is well above the underwater noise level allowed by BOEM in its approvals for “taking” applications, whereby a developer is granted permission to harm or potentially kill marine mammals during surveys and offshore construction activity. Each class of marine mammals known to live, feed, breed, or transverse the wind farm site is assigned a “take” number, which is determined by the anticipated noise level, depending on the equipment being used for the ocean bottom survey and installing the wind turbine foundations, and the size of the population, along with their hearing sensitivities. But we are seeing humpback whales dying at a rate twice what the government allows, yet it has done nothing to mitigate the problem. Neither BOEM nor NOAA officials have voiced concern about the humpback whale death rate.

Should offshore wind construction be suspended until an investigation into the high number of humpback deaths can be completed? Such a move by government bureaucrats, who have become offshore wind cheerleaders in support of the Biden administration’s single-purpose plan for solving climate change, would be shocking. It is more convenient to point to the lack of a “direct” link between offshore wind construction activity and whale deaths. Such a link is almost impossible to prove, but empirical evidence suggests a link may exist. At least it provides sufficient evidence to warrant action and investigation.

When it comes to the oil and gas industry, even the hint of its activities possibly impacting the environment where an endangered species lives justifies banning activity. Shellenberger’s promotion of this documentary should elevate the offshore wind/whale death issue in the public discourse. It will certainly become an issue in New Jersey where every member of the state’s legislature must stand for election this fall. The approval of two offshore wind farms that will be visible from coastal tourist locations, and the recent contentious vote to allow New Jersey to return to the offshore wind farm developer the state’s share of federal tax credits from the project destined for resident pocketbooks will fuel a bitter election battle. Watch the documentary for yourself and decide.

## Canada’s Clean Energy Moves

Two recent developments in neighboring Canada show that the country is beginning down a path to a cleaner energy supply. The first development was an early July announcement by Ontario Energy Minister Todd Smith that the province would begin planning the construction of a third nuclear-generating plant at the Bruce Nuclear facility in Tiverton, Ontario, on the tip of Lake Huron. This would be the first large-scale nuclear plant built in three decades, adding up to 4,800 megawatts (MW) of clean power output.



**Exhibit 2. Canada's Bruce Nuclear On Tip Of Lake Huron**

Source: [greatlakescenter.blogspot.com](http://greatlakescenter.blogspot.com)

That announcement was followed two days later by one from Ontario Power Generation of plans to build three more small modular reactors at the site of its Darlington nuclear power plant in Clarington, Ontario. The two projects would bring the total new nuclear output to 6,000 MW, eliminating the projected 5,000 MW shortfall in the mid-2030s by Ontario's Independent Electricity System Operator.

These announcements within two days of each other were stunning. They signal an emerging nuclear renaissance that could have long-term implications for Canada's power supply mix. More importantly, interest in nuclear power is growing across the globe if translated into new plants. The arrival of these new nuclear plants would occur about when the early wave of wind and solar facilities reach the end of their useful lives, making replacing them unnecessary. That could dramatically alter the fears over the need for critical minerals and land-use issues caused by the single-minded rush into wind and solar projects. This is all worthy of future analysis.

The second development in Canada is the emergence of a start-up company with plans to build a gas-to-liquids (GTL) plant in Alberta to produce clean diesel and possibly other clean transportation fuels for air and marine markets. We recently discussed Eco-Refinery's plans with its founder, president, and founder Bruce Thomson. The refinery will employ the latest version of a century-old catalytic chemical process called F-T synthesis. The process is named after its German inventors – professors Franz Fischer and Hans Tropsch – in 1920.

Since 1990, F-T synthesis has been developed to convert natural gas into zero sulfur and lower carbon fuels. We were involved with a proposed GTL project in Denver to use landfill gas to make clean diesel. Economics and concern over the long-term supply of gas eventually killed the project. Eco-Refinery is benefiting from access to a source of stranded natural gas and government subsidies that improve its economics.



Eco-Refinery is capitalizing on technology that allows modular construction of processing units that reduce the cost and allows the plant to grow in increments of 4,000 barrels of daily output. With sufficient land adjacent to an outlet for stranded natural gas, the plant can start with one unit and expand to ten, or a plant with 40,000 barrels of daily clean diesel. According to the company's investor presentation, combined, Alberta and British Columbia consume 325,000 barrels per day (b/d) of diesel split roughly two-thirds and one-third. A full ten modules would create a refinery with 40,000 b/d of output, or approximately 10% of the combined provinces' diesel usage.

Large GTL refineries are in operation around the world. The most notable ones are Sasol's 96,000 b/d plant in South Africa and Shell's 140,000 b/d plant in Qatar. GTL technology has continued to improve, so the latest plants will produce even better fuel.

What are the advantages of GTL diesel? It has a smaller carbon footprint and does not release sulfur emissions. It has a higher cetane rating – 70 versus 50 for conventional diesel – demonstrating the greater efficiency of the fuel. Cetane is the equivalent of octane for gasoline. A higher cetane rating means a cleaner burning fuel. It reduces engine noise, and knock/ping, and provides quicker ignition. This means longer engine life, lower maintenance, and better mileage. It means diesel engines do not need to be left running in very cold temperatures. These are real positives for diesel vehicle owners, especially in Canada where winter temperatures are often extremely cold for extended periods.

Eco-Refinery is in the process of raising the capital necessary to build its plant. It is eligible for Canada's 11 cents per liter carbon credit which boosts the estimated profitability to above a 25% internal rate of return. We will be watching Eco-Refinery's progress.

Assuming Eco-Refinery in Alberta and the two nuclear power projects in Ontario go forward, Canada will be showing routes to a cleaner energy mix. As with all energy projects, the proof only comes from building and operating the plants and having them meet expectations. We have yet to see any pushback from the Trudeau government, but we will not be surprised if it does eventually. Pay attention.

## **New England Electricity Users Rest Easier – Should They?**

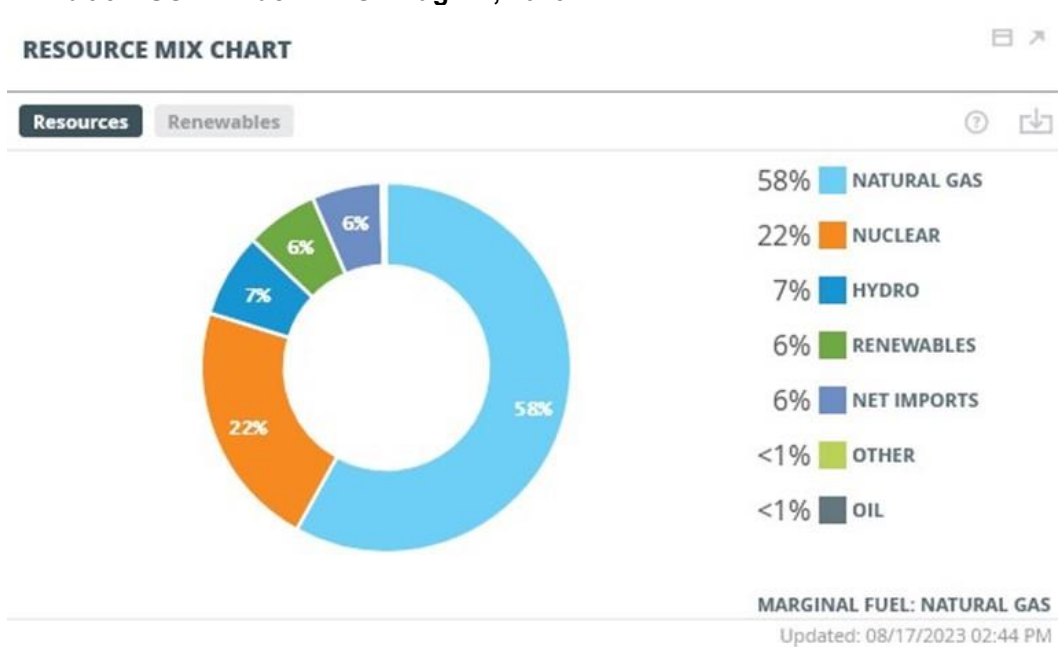
Earlier this summer, the Independent System Operator New England (ISO-NE) recently said a study it conducted shows there is less of a chance the system will suffer winter blackouts over the next five years than it has been warning about in recent years. Those blackout warnings have reflected concern about the limited supply of natural gas for electric power plants during the winter. Natural gas supply first must meet the heating needs of homeowners in the region before being available for generating electricity.

New England has been gas-supply-limited because, in the past, neighboring state governors – Andrew Cuomo in New York and Phil Murphy in New Jersey – blocked permits required by gas pipeline companies to build new or expand existing lines into the region. We remember growing up in Connecticut when natural gas came to the region in the 1950s. It was advertised as a cheaper and cleaner option for home heating. Natural gas displaced the demand for heating oil and coal use. Yes, a duplex home on my street had a coal-fired furnace and we watched with fascination when a truck would deliver a load of coal and dump it into the basement.



Not many people converted their existing home oil- or coal-fired furnaces until necessary, but when new homes were built, natural gas was the choice for meeting heating needs. Because of seasonal considerations, natural gas generates more than half the electricity produced in New England. The chart below shows the electricity generation resource mix for last Thursday afternoon when natural gas accounted for 58% of the output, followed by nuclear at 22%. Note that renewables provided only six percent of the power. Of that share, wind provided 21% and solar 12% (it was cloudy). On a gross resource basis, wind contributed 1.7% and solar 0.7% of power. The bulk of renewable energy and its total share contribution came from refuse (34%; 2%) and wood (28%; 1.7%).

**Exhibit 3. ISO-NE Fuel Mix On Aug. 17, 2023**



Source: ISO-NE

During cold winter periods, the electricity resource mix shifts dramatically. For example, as the ISO-NE website shows, from December 26, 2017, to January 9, 2018, natural gas provided only 24% of the power with oil at 27%, nuclear at 27%, and coal at 6%. Renewables provided 10% of the power with wind representing 4% of that share. That is because the wind blows more often and is stronger during winter months than during summer months.

Notably, in ISO-NE's 2018 State of the Grid report, nuclear power represented 14% of the region's generating capacity but accounted for 31% of the power produced. The following year, the Pilgrim Nuclear plant in Massachusetts with 677 MW of capacity, or two percent of the region's total generating capacity, was closed. ISO-NE is counting on significant growth in renewable energy resources to meet growing electricity demand and offset the closure of fossil fuel generating plants over the next decade.

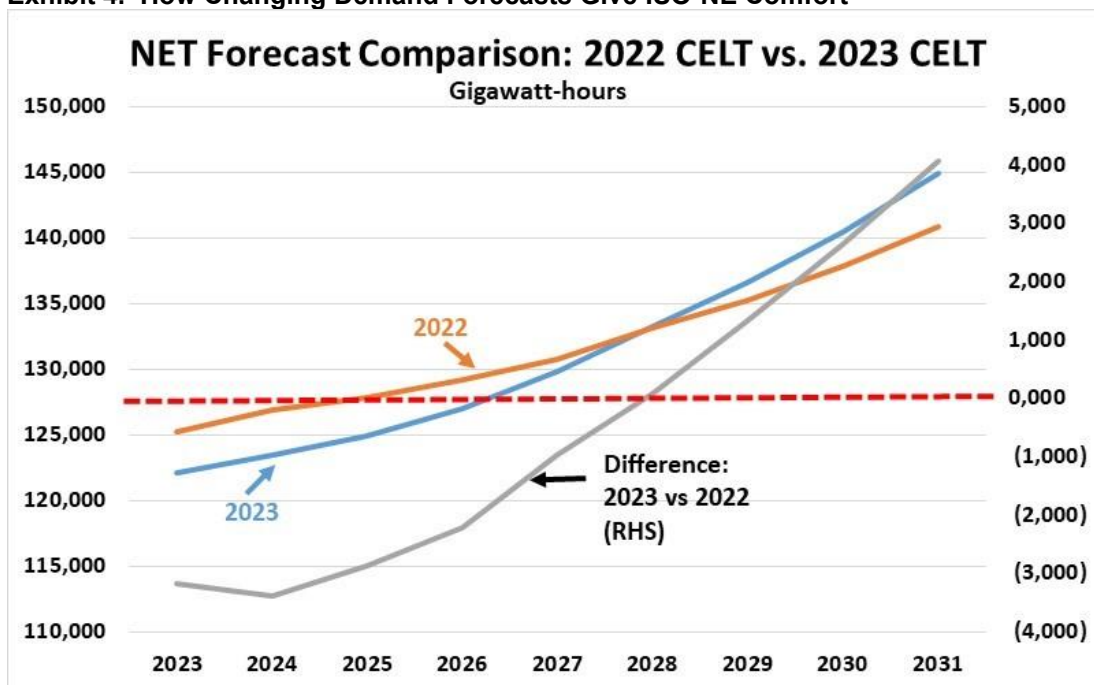
ISO-NE's latest electricity demand forecast reflects healthy demand growth driven by the move to electrify everything – heating, and transportation. The 2023 Forecast Report of Capacity, Energy, Loads and Transmission (CELT) shows net electricity consumption climbing from 122,000 gigawatt-hours (GWh) in 2023 to 150,000 GWh by 2031, a 2.32% compounded annual growth



rate. The estimates are adjusted for assumed growth in behind-the-meter solar power and demand reductions from the adoption of energy efficiency measures. Those adjustments resulted in a reduction of gross electricity consumption in 2023 of 16,000 GWh and 21,000 GWh in 2031.

This forecasted electricity demand growth marks a dramatic change for the New England power market. As ISO-NE's historical consumption data confirms, demand fell 10% between 2005 and 2022. The decline was even worse if measured in 2020. That was because electricity consumption was curtailed by the stay-at-home culture and lower economic activity due to the pandemic. By 2020, electricity consumption had fallen by 15% from 2005's volume. It rebounded sharply in the following two years as the economy rebounded and life returned to normal with the pandemic winding down.

**Exhibit 4. How Changing Demand Forecasts Give ISO-NE Comfort**



Source: ISO-NE, author

ISO-NE's more sanguine view of the near-term power market, and its more alarmed view of the longer-term is because of the recent electricity demand forecast. The above chart shows how the 2023 forecast shows much lower consumption growth between 2023 and 2027, but then demand is higher in the remaining years to 2031. When this view was presented to federal regulators, officials from New England states, and energy companies, there was shock at the "180-degree turn." Officials questioned how they could explain to their constituents that the recent years of warnings about winter blackouts were to be dismissed and concern wouldn't grow until five years into the future.

While beyond the scope of this analysis, we need to examine the assumptions that went into previous forecasts and how they performed against historical use data. Such a review seems necessary given that the 2023 CELT net forecast is roughly 2.5% lower for 2023-2025 compared





to the 2022 CELT. Is that difference all due to higher behind-the-meter solar and energy efficiency measures, or is it weather and economic activity?

According to ISO-NE's President and CEO Gordon van Welie, speaking at the conference, the study is still not finished. However, the two reasons he gave for the greater comfort about the performance of the grid in upcoming winters are the growth in solar and the delay in fossil fuel power plant closures. The forecast also assumes that new offshore wind resources will compensate for the oil plants scheduled to close. Recent developments in the offshore wind market should give ISO-NE officials pause about that assumption. Maybe of greater concern is the CEO acknowledging that the organization had not created models for the early 2030s when the impact of electrifying everything and higher state clean energy mandates kick in.

*"I'm not feeling sanguine about the risks," said van Welie. "In the short run, I'm feeling a little bit more relaxed about where we are given the analysis, but in the longer run, I'm still as concerned as I've ever been. There's just too many variables out there that could break in the negative direction for us."* Those variables would include a nuclear power plant going offline or problems with the interconnections with Ontario's power for just a week. Additionally, the reliance on more solar given the recent impact from Canada's wildfire smoke, and the timing of offshore wind projects also raise potential pitfalls for the forecast.

While van Welie may be feeling more relaxed about the performance of the grid during the upcoming winters, we remain cautious. ISO-NE provides the power Rhode Island Energy supplies to our summer home. Having gotten the company to trim tree limbs that risked bringing our house wires down in a storm and having a backup generator with weeks of propane supply, we believe we are prepared to weather an ISO-NE forecast miss. We are keeping our fingers crossed that van Welie's view proves accurate.

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