DIRECTION

THE FUTURE OF WIND

Xcel Energy, with a total of 4.38 GW of operational capacity installed in the United States, has exceptional performance with 96 percent of their fleet operating at or above a P50 energy yield ranking. (Courtesy: Xcel Energy)

Xcel Energy is top performing wind-energy asset owner in the U.S.

Using audited data from the Energy Information Administration (EIA), which is a part of the Department of Energy (DoE) in the United States of America, IntelStor has now completed the most detailed analysis of the efficiency of wind power ever in the country.

Including decommissioned turbines and wind parks, the U.S. has a total pool of more than 85,500 onshore and offshore wind turbines, and more than 151.7 GW worth of onshore and offshore wind power installed capacity which can be analyzed.

The analysis shows the U.S. has a 34.84 percent combined lifetime average net capacity factor (NCF) for the entire installed base of more than 85,500 wind turbines.

The evolution of lifetime average net capacity factor over time shows a marked increase in average performance from 20-plus years ago. For assets installed around the year 2000, the U.S. had an average net capacity factor of just 26.45 percent. By 2003, that fleetwide average figure exceeded 30 percent for the first time. It took another 10 years from that point until 2014 before lifetime average fleetwide performance was above a 40 percent net capacity factor.

South Dakota, with an average of 42.78 percent across all wind parks, edges out Nebraska and Kansas to lead the U.S. in lifetime average net capacity factor of assets that are still operational, as well as those that have been decommissioned.

BlackRock (average 45.62 percent NCF), Ørsted (average 43.35 percent NCF,) and Xcel Energy (average 43.05 percent NCF) have the highest fleetwide capacity factors based on asset ownership, which is concentrated in Texas, North Dakota, South Dakota, New Mexico, Nebraska, Colorado, and Minnesota.

The three largest asset owners in the U.S., NextEra Energy Resources (average 36.78 percent NCF); Berkshire Hathaway Energy (BHE), including MidAmerican Energy Company and PacifiCorp (average 37.10 percent NCF); and Iberdrola's Avangrid Renewables (average 31.23 percent NCF) have an older and more geographically diversified fleet, which has dragged their performance down relative to others.

Since lifetime average net capacity factor (NCF) is highly dependent on the specific site conditions of a wind park, variations in average wind speed from state-to-state or even site-to-site within a state, can create a bias to the benchmarking analysis that is solely based on NCF. Therefore, it is also important to look at asset performance benchmarking based on energy yield analysis as well.

In the U.S., more than 51.76 percent of all operational onshore wind-energy assets show they meet or exceed their P50 performance quotation. Approximately 34.25 percent of operational assets meet or exceed a P75, but not their P50, while 12.69 percent meet or exceed a P90, but not their P75 energy yield. Only 1.3 percent of the wind turbines installed in the U.S. fall below their P90 performance quote based upon their lifetime average AEP and capacity factor analysis.

Xcel Energy, with a total of 4.38 GW of operational capacity installed in the United States, has truly exceptional performance with 96 percent of their fleet operating at or above a P50 energy yield ranking.

Some of the largest asset owners in the U.S. have a performance ranking probably as expected, with NextEra Energy Resources seeing more than 66.7 percent of their operational capacity in the P50 range. Similarly, Berkshire Hathaway Energy (BHE) has just a fraction below 78 percent of their installed fleet operating at or above a P50 energy yield.

However, Iberdrola's Avangrid Renewables, Energias de Portugal Renewables (EDPR) North America, and RWE as the next three in line for total installed capacity all show significantly lower performance amongst their fleet. Iberdrola's dependence on legacy Gamesa turbines globally has certainly dragged down their performance in the U.S., along with their current lack of repowering prowess when compared to the other large asset owners.

Engie, American Electric Power (AEP), Southern Company, and Alliant Energy are the most noteworthy among the top 25 asset owners by installed capacity in the U.S. aside from Xcel Energy. This is due to respective fleets with no assets which perform below a P75 energy yield rank.

GE Renewable Energy has the largest installed base in the U.S. with 60.8 GW operational, but also the largest portion of their operational fleet performing at or above a P50 energy yield, a total of 61.59 percent. Vestas is in the No. 2 spot with a total of 61.1 percent of its 38.2 GW operating at or above a P50 energy yield, and Siemens Gamesa rounds out the top three with 23.3 GW installed, but only 36.75 percent operating at a P50 energy yield.

Age-related performance degradation of wind turbines can have profound impacts on asset profitability through the unrecovered loss of lifetime average performance in the later years of the asset life.

In the U.S., dating back to the earliest installations in the 1980s, IntelStor can currently estimate a total of 114.4 TW/h of wind-energy production were lost due to curtailments and underperformance issues, underscoring the importance of proper fleet care and management.

The U.S. has a capacity weighted average asset performance drop-off of more than 10 percent in average annual AEP after approximately 11 years for the entire onshore wind installed base, including both operational and decommissioned capacity. The asset age since the commissioning date that shows the highest frequency of performance drop-off is 10 years, with

a standard distribution curve around that time frame.

The major asset owners in the U.S., who tend to self-perform their maintenance, actually have a relatively longer period of asset operations prior to the age-related performance drop-off. However, it is also noteworthy that they still show a comparable frequency of performance drop-off vs. OEM maintenance or maintenance services from an independent service provider.

Now, with more than 47 GW of assets in the U.S. that are at least 10 years old or older, there is ample opportunity for all states, all project developers, all asset owners, and all investors to collectively take maximum advantage of the available wind resources in the U.S. and repower older wind parks with more efficient technology.

MORE INFO www.intelstor.com/store

Fishing industry, offshore groups form corporation

The Morro Bay Commercial Fishermen's Organization (MBCFO), the Port San Luis Commercial Fisherman's Association (PSLCFA), and Castle Wind LLC (Castle Wind), a joint venture between Trident Winds Inc. and TotalEnergies Renewables USA are forming the Morro Bay Lease Areas Mutual Benefits Corporation (Morro Bay MBC)

The purpose of the Morro Bay MBC is to facilitate communication, coordination, and cooperation between the California Central Coast commercial fishing industry and offshore wind project developers, as well as to provide financial resources in furtherance of California Coastal Act policies.

Morro Bay MBC creates a pathway for the industry to demonstrate to the fishermen and fishing communities, to BOEM, and to the California Coastal Commission, the commitment of project developers to responsible offshore wind development that protects and supports a sustainable commercial fishing industry.

The MBCFO represents the working men and women of Morro Bay, California's waterfront. (Courtesy: MBCFO)

"We recognize the imperative behind developing our offshore wind resource for the benefit of all Californians and appreciate that developers like Castle Wind understand the importance of minimizing and compensating for the possible impacts of the offshore wind farms off Morro Bay on the fishing community," said Tom Hafer, president of the MBCFO.

"The newly formed Morro Bay MBC will help ensure that the Central Coast fishing industry is meaningfully included in the development of this new industry."

"We, as a humanity, are facing a climate emergency and have to put all our efforts toward achieving a clean-energy future," said Alla Weinstein, CEO of Castle Wind LLC. "With any energy project of this magnitude, there are likely to be impacts. Our approach has been to acknowledge, as early as possible, that impacts may occur, which is why we have been working directly with the Central Coast fishermen since the inception of Castle Wind. By establishing the Morro Bay MBC at this early stage in the process, Castle Wind has created a platform for the developers to mitigate anticipated impacts of offshore wind to the commercial fishing industry without causing stakeholder fatigue."

The Morro Bay MBC furthers the 2018 mutual benefits agreement signed by MBCFO, PSLCFA, and Castle Wind, which was exclusive to the three signatories. The Morro Bay MBC's structure is open to all project developers who will secure site leases in the Morro Bay Wind Energy Area, and to fishermen that can prove they have been fishing in that area even if they are not members of MBCFO or PSLCFA.

The board of the newly-formed organization — which includes two representatives from each MBCFO and PSCFA, two representatives from Castle Wind, two seats for representatives from other project developers, and one Harbor Master – will be working together to encourage other project developers to join the Morro Bay MBC prior to the upcoming lease auction.

MORE INFO www.castlewind.com | www.mbcfo.org

Clir Renewables signs four new multi-farm contracts

Clir Renewables, the market intelligence platform for wind and solar, recently signed four new multi-farm contract, signaling an increase in demand for its performance and risk intelligence services across wind and solar.

Encompassing Clir's Portfolio, Risk and M&A offerings, the deals span new and existing owner-operators across Europe and North America. It accounts for 62 utility scale projects with a total energy capacity exceeding 13 GW — enough to power 10 million homes.

As demand for renewable energy

Attendees discuss the business of wind at International Wind Congress. (Courtesy: International Wind Congress)

increases — and stakeholders experience heightened competition — the industry is recognizing the need for actionable intelligence to improve operational and financial performance. Clir provides visibility into common, controllable performance and risk factors by benchmarking peer and industry data.

With more than 200 GW of operational data, and wind, solar and natural catastrophe claims, Clir enables a deeper understanding of performance and risk in an industry context. Clients leverage these insights to increase project returns, enable proactive maintenance, extend asset life, and develop accurate financial model assumptions to access improved debt and insurance terms.

"As investors seek a competitive advantage in heightened market, they need to ensure investments are best-in-class," said Gareth Brown, CEO, Clir Renewables. "Owners and operators are looking for deeper insights into asset performance and risk, and we look forward to leveraging the world's largest dataset to help clients maximize the value of their portfolios. With 11.4 GW of wind and 1.6 GW of solar assets across three continents, these four new deals showcase the industry's need for valuable insights into assets as the renewables space continues to grow."

MORE INFO www.clir.eco

International Wind Congress covers turbine life cycles

International Wind Congress 2022 covered solutions for wind-farm construction, prolonging the life cycle of turbines, technologies to reach goals set for 2030, and international partnerships in the wind energy sector. The conference was November 6-7.

After the sessions that covered the life cycle of turbines and its improvement, European EPCs and developers shared their experience about wind-farm construction. Brian Boye from Semco maritime talked about how to ensure communication needs from construction to O&M. Also, a senior communications manager at ABO Wind, Daniel Duben, emphasized the importance of transparent communication for onshore wind projects.

The second day, PGE company shared advantages of the Baltic Sea; Ministry of Economic Affairs and Communications of the Republic of Estonia showed strategic perspectives of the offshore wind industry in that country; and National Grid Ventures highlighted the integration of offshore wind and interconnection in the North Sea. The next edition of the International Wind Congress is set for November 6-7, 2023, in Berlin.

MORE INFO windcongress.com