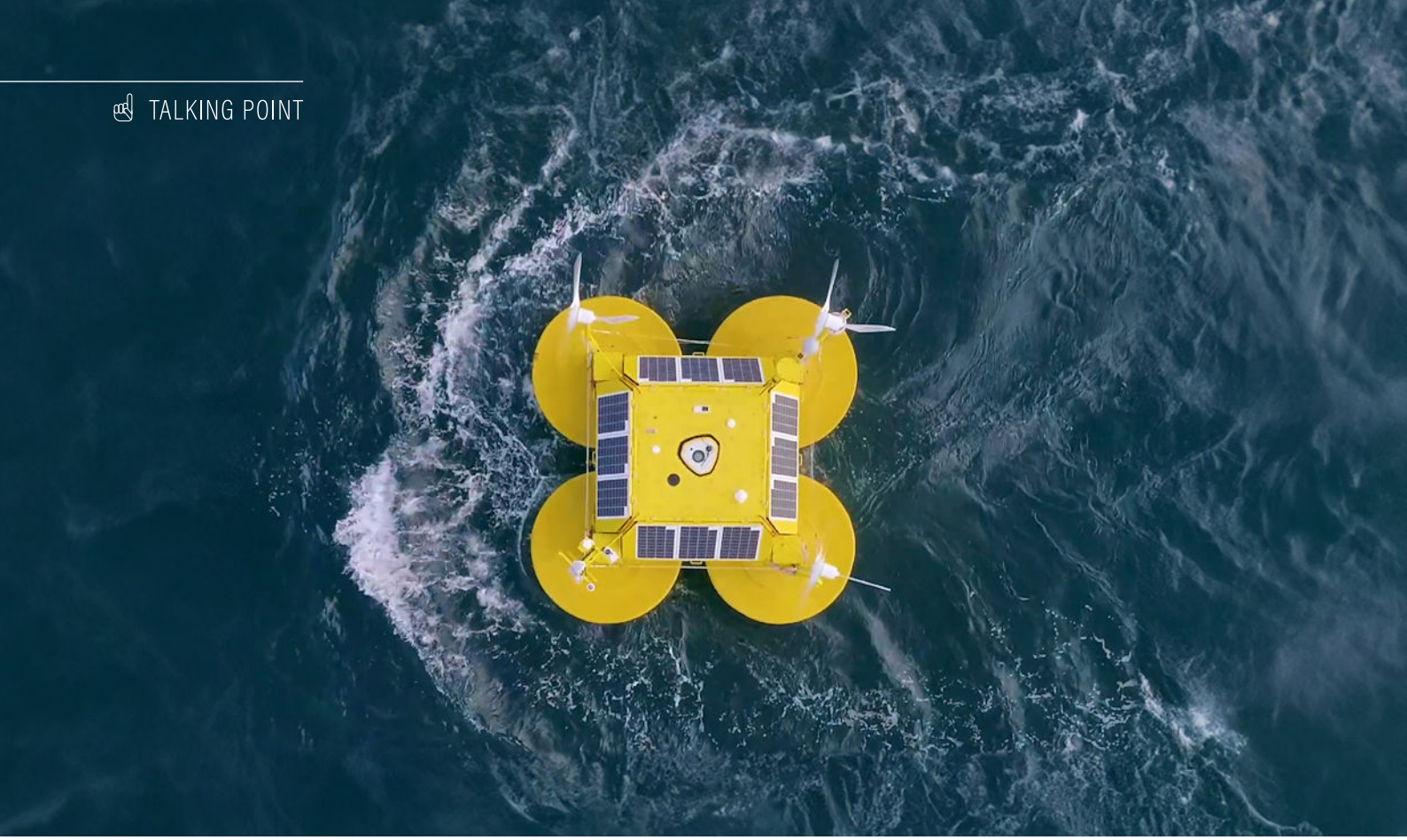

Pioneering data and fresh thinking on the US East Coast

A global provider of energy data and intelligence, TGS recently completed what it asserts is the world's most extensive multi client offshore wind measurement campaign along the US East Coast. This pioneering initiative aims to revolutionize how wind energy potential is assessed and optimized, using advanced technology and collaborative data sharing.

Setting the stage: a vision for offshore wind measurement

TGS has long been recognized as a leader in providing scientific data and intelligence solutions to the global energy sector. With a track record spanning over four decades, the company prides itself on pushing the boundaries of innovation in energy data analytics. The decision to initiate the US East Coast multi client offshore wind measurement campaign represents a strategic move to support the acceleration of offshore wind energy development.

Offshore wind measurements are few and far between on the US East Coast, despite them providing the highest quality data available to understand the wind resource strength and variability, which is the fuel for offshore wind projects. More measurements reduce a project's uncertainty and risk, which increases investors' confidence, leading to better financial terms that save developers millions of dollars. Profitable projects lead to more offshore wind developers wanting to build more projects. Thus, deploying new measurements is a great way to accelerate offshore wind energy.

The genesis of the campaign

The campaign began with TGS deploying a state-of-the-art floating LiDAR buoy system in the New York Bight area. This initial phase aimed to gather high resolution numerical weather prediction (NWP) model data alongside real time floating LiDAR wind measurements. The integration of these two data sets was pivotal in accurately forecasting the long term wind energy potential across the region.

Expanding horizons: scale and scope of the program

As the campaign gained momentum, TGS expanded its footprint along the US East Coast, deploying four additional floating LiDAR buoys encompassing a stretch of approximately 600 kilometers from the Virginia/North Carolina border to Massachusetts. This ambitious expansion marked the East Coast's largest simultaneous measurement program to date, underscoring its commitment to comprehensive data coverage and accuracy.

The multi client approach adopted by TGS ensured that multiple stakeholders could access identical floating LiDAR data across several offshore wind development areas. Unlike traditional proprietary measurement campaigns, this approach promoted transparency, collaboration, and cost efficiency among wind energy developers and investors.

From July 2022 to July 2024, the company acquired and processed data from five strategically positioned buoys. Each buoy served as a sentinel, capturing at least one full calendar year of critical metrics such as wind speed and direction at turbine hub height, significant wave heights, and comprehensive ocean current profiles. Moreover, it integrated advanced instrumentation at four out of five locations, including in air acoustic recording devices for monitoring avian and bat activity, additional seabed mounted sensors for more detailed ocean measurements, and whale and porpoise passive acoustic monitors to detect marine mammal vocalisations.

The technology behind the data

Central to the success of the campaign was TGS's deployment of floating Light Detection and Ranging (LiDAR) buoys, provided by EOLOS. These systems use remote sensing and laser pulsing technology to measure wind speed and direction at multiple heights above the sea surface, particularly for offshore wind projects.

These wind and solar powered LiDAR buoy systems boast stage 3 validation accuracy, which is the industry's highest level of certification, meaning that the collected data have the lowest uncertainty possible. This cutting edge technology enabled precise data collection in varying offshore conditions, ensuring reliability and consistency throughout the measurement period. Additionally, these systems are anchored to minimize disturbance and outfitted with various sensors that allow for the collection of metocean data, including wave heights and ocean currents, and environmental data like acoustic monitoring of avian and marine life.

Data accessibility and analysis

Critical to the campaign's effectiveness is TGS's Wind AXIOM platform; a robust site evaluation and wind data analytics tool. This platform served as the gateway for stakeholders to access, analyse, and derive value from the extensive data generated by the offshore wind measurement campaign.

Through Wind AXIOM, users can explore a multitude of data points, from wind resource models and metocean conditions to environmental factors affecting offshore wind operations. This comprehensive approach empowers stakeholders to make informed decisions regarding energy output projections, annual revenue forecasts, supply chain logistics, and operational strategies.

Wind AXIOM enables detailed comparisons across global project locations, allowing developers to baseline prospective new developments against known assets. Project scenarios may also be easily compared to understand how project economics are affected by changing project specifications such as hub heights or turbine technology.

Unique insights and strategic implications

Beyond mere data collection, TGS's offshore wind measurement campaign offered unique insights and strategic implications for the emerging but fast growing US offshore wind market. The dataset facilitated the validation of existing wind resource models, enhancing the accuracy of off take solicitations, and reducing risk evaluations associated with project financing and development.

Furthermore, the campaign provided critical insights into extreme event studies and filled data gaps that had previously hindered developers' ability to accurately assess offshore wind project viability. This holistic approach positioned TGS as a key enabler of sustainable energy solutions, fostering confidence and investment in offshore wind infrastructure.

Focus on the Central Atlantic

A pivotal aspect of TGS's campaign was its focus on the Central Atlantic region, where two buoys were deployed in April 2023. These buoys were strategically positioned offshore Virginia, east of Chesapeake Bay, and at the Virginia/North Carolina border, aligning with the leases to be awarded during BOEM's upcoming offshore wind lease auction on August 14th.

This is the first time in the history of offshore wind when such a comprehensive package of wind, metocean, and environmental data will be available for auction bidders to access and incorporate into their bidding strategies.

TGS's campaign data allow bidders to accurately assess the wind resource and expected annual energy production (AEP) at the two Central Atlantic leases to be auctioned.

The campaign data also enable bidders to derisk several aspects of their preconstruction analyses including the turbine foundation design, environmental compliance, turbine technology, and construction planning, which reduces the overall project uncertainty and improves the levelized cost of energy (LCoE).

Pioneering sustainable energy solutions

TGS's floating LiDAR buoy campaigns represent a landmark achievement in advancing sustainable energy solutions on the US East Coast. Additional multi client wind measurement campaigns have now been expanded to new geographies, including the US West Coast, Norway, and Germany. By using cutting edge technology, collaborative data sharing, and strategic deployment strategies, TGS has set a new standard for offshore wind measurement and analytics.

Looking ahead, the insights derived from this campaign will continue to inform policy decisions, investment strategies, and technological innovations in the offshore wind sector.

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