RECHARGE

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'Critical need' | California floating wind boom requires $8bn in grid upgrades: ISO

Surfers head into the Pacific Ocean in California Photo: Bruce Bennett

Caiso sees multi-billion-dollar transmission system renovation needed to unlock state's offshore energy potential while leveraging existing nuclear and gas infrastructure

By **Tim Ferry**

State independent systems operator California ISO (Caiso) forecasts up to 10GW of floating wind power feeding into the grid by 2040, requiring some $8.1bn in transmission upgrades, according to its draft *20 Year Transmission Outlook*. The $8.1bn to be spent on offshore wind transmission upgrades would be part of an overall **$30.5bn transmission investment** to integrate 120.8GW renewable energy and storage needed for the state to reach 100% clean energy generation.

"There is a critical need for more proactive, long-term transmission planning and coordination," Caiso CEO Elliot Mainzer said. "This type of forward-looking planning and coordination is essential to meeting the state's energy policy goals in a reliable and cost-effective fashion."

Adam Stern, executive director of industry advocacy group Offshore Wind California, told *Recharge*: "We're pleased to see that Caiso has included a large, multi-gigawatt share of offshore wind — in the range of 10GW — in its 20-year forecast and planning for California's transmission needs. With the long lead times, we must get started now to plan and build out the transmission required. Offshore wind will be an essential part of California's clean-energy mix."

California has two formally designated wind energy areas (WEA) in federal waters off its coast at Morro Bay in Central California with up to 3GW of potential and Humboldt in Northern California with 1.6GW of potential capacity.

The state is **calling for 4.6GW of offshore wind spinning off its shores by 2030** and the Bureau of Ocean Energy Management (BOEM), the agency charged with managing development in federal waters, is **planning for lease sales as soon as the end of this year**.

Of the 10GW total, the Caiso forecasts 4GW of offshore wind developed in the north, and 6GW along its central coast. The **Diablo Canyon call area** neighbouring Morro Bay has as much as 4.9GW of potential capacity but is constrained by naval activity and so far, has not been upgraded to WEA.

The Caiso notes that central California has garnered considerable commercial interest from developers due to its proximity to load centres and access to substantial grid infrastructure at California's 2.2GW Diablo Canyon Nuclear Station, which is set to close by 2025, as well as some 15GW of natural gas fired capacity also on the chopping block, and would require only minimal network upgrades to integrate offshore wind.

Nearly all the transmission upgrades would need to be installed in the state's north coast, which has some of the US' richest offshore wind resources with average speeds of 9 meters/second but is far from load centres and only has light transmission infrastructure. The report calls for two 500kV alternating current (AC) lines connecting to a 500kV substation and a high voltage direct current (HVDC) line to another 500/230 kV substation.

The Caiso is also considering an HVDC deep sea cable to the San Francisco Bay Area, with further plans for an **offshore grid** that would collect power from individual wind farms to interconnect at fewer points. California has an estimated **112GW of potential capacity**, according to the National Renewable Energy Laboratory (NREL), but its steep Outer Continental Shelf requires that all of it will be in floating, a sector that is only now being commercialized.

The lack of transmission capable of incorporating the targeted **30GW of offshore wind by 2030** established by the Biden administration is a key bottleneck facing the industry. The **$1tn Infrastructure Act** passed last year invests $65bn over five years into the US grid, and a number of states led by **New Jersey** are working on planned solutions to integrating offshore wind into local and regional grids.