

## A Straw in the Wind - Will Achieving Grid Parity Propel India's Offshore Wind?

Anasuya Gangopadhyay & Bidisha Banerjee

India is endowed with a 71 GW [offshore wind](#) potential, as per the assessment by the [National Institute of Wind Energy \(NIWE\)](#), but the country is yet to set up its first offshore wind plant. In a timely move, the Government of India has initiated bids for offshore wind development of a 4 GW capacity recently.

While no viability gap funding will be available for the 4 GW project, the power evacuation would be subsidised by the government to some extent (onshore evacuation). The bid winners are expected to sell the [electricity](#) generated from offshore plants directly to consumers, mainly industries, as the levelised cost of electricity ([LCOE](#)) for offshore wind has reached the price level of industries in the high-tariff band defined by distribution companies.

As per the reports published by the Centre of Excellence for Offshore Wind and [Renewable Energy](#) (COE), a knowledge hub jointly launched by India and Denmark, Tamil Nadu might have an offshore LCOE of about 7 INR/kWh in 2025. However, in 2023, the round-the-clock price of electricity sold in the Indian Energy Exchange was 5.62 INR/kWh, with the evening peak price of about 7.3 INR/kWh. Thus, offshore wind-generated electricity remains more expensive than the electricity being sold in the energy exchange, posing a challenge as industrial consumers might opt for open-access purchase of electricity instead of expensive power from offshore.

There are various challenges to achieving [grid parity](#), including inadequate [grid infrastructure](#), uncertainty in policies and contracts, the need for a robust [local manufacturing](#) base, and environmental considerations. The lack of evacuation and transmission infrastructure limits the utilisation of attractive wind sites, and clear targets and contract certainty are crucial for project initiation and tariff reduction. Developing a competitive local manufacturing base requires supportive infrastructure and community engagement. Further, balancing environmental protection with energy needs is imperative, necessitating careful project planning and community acceptance.

However, the efforts for promoting offshore wind in India are on the right track to achieving grid parity soon. Our analysis using the Financial Modelling of Offshore wind in India (FIMO) tool designed by the COE shows that the energy generated from offshore wind plants in Tamil Nadu will reach grid parity by 2031.

So, is grid parity the only obstacle for the scale-up of offshore wind?

With the seabed auction for offshore wind, various risks involved in wind generation are being shifted to bid winners. Unlike its onshore counterpart (with a 30% capacity utilisation factor [CUF]), offshore wind can boast of a higher CUF in certain regions such as Tamil Nadu (40%–60%). However, offshore wind demonstrates similar variability as its onshore counterpart, making the generation prediction challenging. This would lead to difficulties in bidding in the open energy market. Besides the regular day-to-day variability, there are possibilities of high-impact low-probability events such as the lack of wind generation for a long time. Such long wind lulls observed in recent years in the United Kingdom pushed the nation to resume the use of coal and gas-based electricity generation plants to meet power demands.

Further, India is one of the most vulnerable nations with respect to climate change, as per the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021). Changing climate patterns lead to the risk of frequent extreme events such as cyclones, which might force offshore wind turbines to cease generation. These risks would have a negative impact on the bankability of offshore wind projects. Thus, these uncertainties must be considered for determining the financial support being provided to offshore wind generators.

To fully unleash India's offshore wind potential and achieve grid parity, focusing solely on the LCOE is not sufficient. By conducting commercial viability studies, investing in grid infrastructure, and engaging stakeholders, including local communities and environmental groups, India can pave the way for successful offshore wind development. Additionally, leveraging knowledge sharing and technology transfer through partnerships with countries having an established offshore wind sector will accelerate progress. Addressing financial risks through innovative tools and adopting a holistic approach that integrates stakeholder engagement and environmental considerations will ensure a smooth path towards India's offshore wind aspirations, ultimately contributing to a sustainable energy future.

Recognising the advantages of offshore wind turbines, such as superior wind quality and efficient energy conversion, is crucial. The National Offshore Wind Energy Policy, led by the Ministry of New and Renewable Energy, provides a framework for development. Conducting resource assessments and surveys in an exclusive economic zone by the NIWE is essential for identifying high-potential zones. Moreover, focusing on pre-feasibility studies, including the Facilitating Offshore Wind in India (FOWIND) project in Gujarat and Tamil Nadu, will aid in augmenting offshore wind development in the country.

Pursuing India's offshore wind ambitions is not only about reaching grid parity but also about navigating the complexities of implementation, mitigating risks, and ensuring inclusive development. With concerted efforts and strategic planning, India can harness the full potential of its offshore wind resources, ushering in a new era of clean and sustainable energy for generations to come.

[This piece was written by Anasuya Gangopadhyay, who works in the Mitigation team, and Bidisha Banerjee, who works in the Renewable Energy and Energy Efficiency team, at the Center for Study of Science, Technology and Policy (CSTEP), a research-based think tank]