

*Clean Energy Finance and Investment Roadmap*

*Workshop II: offshore wind & green hydrogen – 11 May 2022 (hybrid)*

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## Unlocking investment in Offshore Wind and Green Hydrogen: summary notes

India has an ambitious target of 500 gigawatts (GW) of renewable energy capacity by 2030 as well as net-zero ambitions by 2070. Meeting these objectives will require development of clean energy solutions such as offshore wind and green hydrogen production. Both have been highlighted in national policy objectives, with the Offshore Wind Policy that was notified in 2015 and the National Hydrogen Mission announced by Prime Minister Shri Narendra Modi in August of 2021. The Government has further signaled its support to these nascent industries with notices such as the 2018 Guidelines for Offshore Wind Power Assessment Studies and Surveys and the recent Green Hydrogen and Green Ammonia Policy, released in February of 2022.

This emerging policy framework, alongside efforts by initiatives such as the Indo-Danish Centre of Excellence for Offshore Wind (COE-OSW) and new co-operative agreements between Indian and international industries for green hydrogen development, are helping to bring together the various pieces needed to enable the first offshore wind and green hydrogen projects in India. Support for other measures (e.g. port infrastructure development and domestic manufacturing capacity) can also help enable scale and cost-competitive deployment. Importantly, achieving offshore wind and green hydrogen ambitions will also require measures to enable the quantum of low-cost capital needed to deploy these solutions competitively and at scale.

The Clean Energy Finance and Investment (CEFI) Roadmap workshop was opened with remarks by the Joint Secretary of the Ministry of New and Renewable Energy (MNRE), Shri Dinesh Jagdale, who provided an overview of on-going activities, including proposed financial support such as the Viability Gap Funding for the first offshore wind projects, to unlock investments for offshore wind and green hydrogen development. Mr. Jagdale notes that whilst most of the technology is available, viable business models must be developed, and India will need to overcome several constraints to enable the offshore wind and green hydrogen industries. Costs are today still above alternative options, such as onshore wind, solar and fossil-based (grey) hydrogen. Lowering the cost of technology deployment, including improving the cost of finance, will be critical, particular as offshore wind and green hydrogen projects are capital-intensive. Improvement in technology cost or financing rates will therefore strongly influence the final Levelised Costs of Electricity (LCOE) and Hydrogen (LCOH).

The OECD Clean Energy Finance and Investment Mobilisation (CEFIM) programme and Natural Resources Defense Council (NRDC) then presented findings from the first Roadmap workshop (see summary notes and presentations at <https://www.oecd.org/cefim/india/roadmap/>) as well as from consultations with stakeholders. Several key themes emerged from these discussions, such as the need of a long-term policy and regulatory framework with clearer signals on revenue support and stability (e.g. through offtake guarantees), as these solutions will impact how stakeholders assess risks. Relevant infrastructure like ports and transmission capacity were also highlighted to ensure the entire

value chain is aligned to enable a robust pipeline of projects. This includes support for establishing domestic manufacturing and supply chains, which will play a key role in bringing down technology costs. Finally, cost of finance was emphasised as a critical factor in achieving India’s ambitious targets, which will require support to encourage early equity investors willing to bear some early-market risks as well as solutions to access capital markets for the scaling up of capacity development.

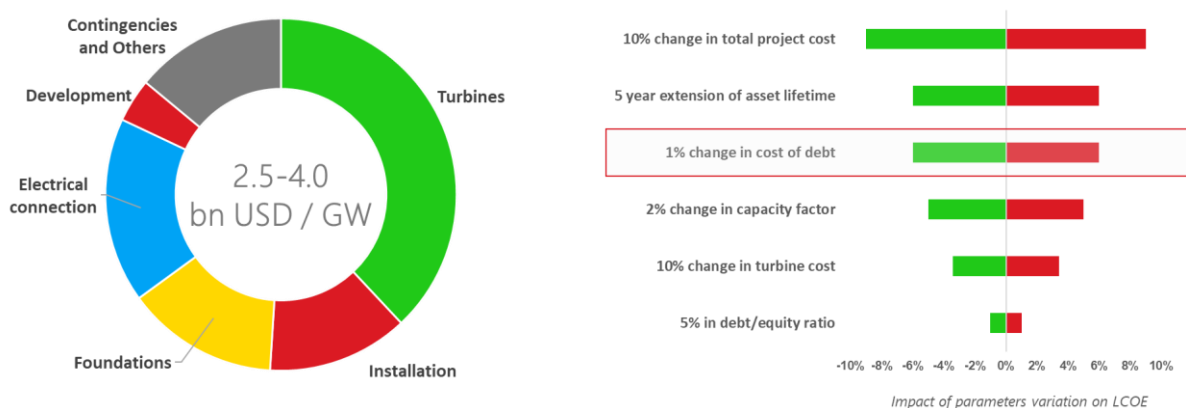
MNRE subsequently presented its current plans for offshore wind. The Ministry noted an indicative auction trajectory for offshore wind in Gujarat, with future auctions planned for Tamil Nadu. MNRE also confirmed that the Solar Energy Corporation of India (SECI) will secure purchase agreements for electricity, with prices determined through the auctions. The government will cover evacuation infrastructure to the substation and will provide lease agreements for 25 years after commissioning. Additionally, MNRE is setting up a test facility to replicate the successful experience of test centres in the United Kingdom. The site, on Rameshwaram Island, will allow for testing of equipment, providing important data to inform how to optimise technology. It will equally act as a training centre.

MNRE also presented current developments in the National Green Hydrogen Mission. As momentum for green hydrogen in India grows (e.g. with creations of joint ventures), MNRE plans to create a Single Online Portal that will host all regulations necessary to develop projects. A working group is likewise preparing the proposal for a framework of regulations and standards. These efforts, amongst others, will look to cover the entire value chain for hydrogen use, from demand creation through green hydrogen targets to supply support (e.g. with incentives for domestic equipment and green hydrogen production) and market enablers, such as infrastructure and supply chain development, support for R&D and creation of regulations and standards.

**Group discussion: assessing investment needs and the impacts from the cost of finance**

CEFIM and NRDC opened the group discussion with a presentation considering the potential impact from the cost of finance on offshore wind and green hydrogen developments. A number of elements, such as improving turbine and electrolyser costs, will play a key role in achieving competitive LCOE/LCOH. The cost of finance will also play a critical role in achieving targets to 2030 and beyond. For example, lowering the cost of debt by 1% for offshore wind projects may lower LCOE by as much as 5%, representing to a return of roughly USD 100 million for each installed GW.

*Figure 1: Illustrative impact from the cost of finance on offshore wind project*



Group discussions notes that financing of offshore wind and green hydrogen projects is linked to various elements, from perceived risks from policies and regulations to availability of equipment and infrastructure and expectations on future project pipelines. For example, India will need to import turbines and electrolysers for the first projects, which will influence early project costs. Local content requirements and import duties may subsequently delay projects and increase development costs. It therefore will be important to identify levers that address the complex value chains for hydrogen and offshore wind projects in order to achieve cost reductions where possible and de-risk early investment.

Participants noted that thorough risk studies can help to lower the cost of finance, particularly as these can provide comfort to investors, especially when paired with risk mitigants such as offtake guarantees and/or eventual support schemes such as import duty reductions or use of export credits by international partners. Data acquisition was also noted as a critical step in assessing risk, where offshore wind developers highlighted a preference to collect detailed information themselves once given exclusivity to study specific zones. Additional technical reports, such as on-going assessments looking at potential supply chain gaps and infrastructure needs, will also help developers and investors to assess expected project costs, where gains in project CAPEX will influence the overall need for financing (and consequent impact of the cost of finance on project development).

Other elements can help to address project costs. For instance, replicating the solar approach to standardise contracting would simplify the development of projects (and costs to development). Production-linked Incentive (PLI) schemes can equally incentivise manufacturers to establish capacity in India, which should lower equipment costs, particularly for scaling up development. These will likely need complementary signals, such as the planned fertilizer and refinery industry obligations for green hydrogen use, to ensure a sufficient future pipeline to justify investment in large manufacturing plants.

While the market is only starting to emerge, participants noted that solutions to lower development costs will likely rely on combinations of public and private capital, including possible blended finance from international donors, to address early project risks and support market development (including to ensure needed training and capacity of market actors). Multiple sources of finance are also needed, as has been shown by experiences such as the consortium of investors for North Sea offshore wind projects. This will help to address individual risk, given the overall quantum of capital required.

On the demand-side, the workshop group noted that there needs to be realistic expectations on the offtake tariff for offshore wind, which would be better compared to new gas power plants, considering the cost of flexibility for the electricity system. Early market applications, such as blended hydrogen in gas networks, can help to boost demand with limited impact on final prices to consumers. Participants also noted that green ammonia offers large opportunities to drive demand, especially as ammonia and fertiliser are net imports in India today.

Lessons from the international community on best practices and successful approaches can also help identify solutions suitable for the Indian context and that can reduce project costs. For example, the contract for difference (CfD) model such as that used in the United Kingdom could address risks for offshore wind investors. This could also possibly apply to green hydrogen producers (e.g. to help ensure competitiveness with price swings in fossil fuel based ammonia). Indian players would also benefit from experiences in addressing offtake risk (both volume and price) and execution risks (e.g.

operations and maintenance costs and resource uncertainty). Participants noted that there is large appetite to enter the Indian market, including through joint ventures for technology development, which should help lower technology costs over time. Early co-operation, including engagement of export credit agencies, can support these initiatives, as can other government-to-government or multilateral initiatives to address technology transfer, development and innovation.

### **Group discussion: lowering the cost of finance for early clean energy development**

The second group discussion highlighted the need for solutions to de-risk financing of projects. In addition to measures to address risks for early market development (e.g. through offtake guarantees and support for technology transfers), participants underscored the need for solutions that can address risks and help to lower the cost of finance. It was highlighted that grants and concessional loans by themselves will not likely lower the overall cost of finance and project development, especially as capital for large players is not necessarily an issue (at least for early market development). Expanding Priority Sector Lending (PSL) rules to target specific segments (e.g. offshore wind) was also raised as a possible way to increase lending to offshore wind and green hydrogen, but participants noted this still may not address the cost of finance. Rather, the group highlighted that developers and investors were specifically looking for measures address risks in early market development.

A number of possible solutions were then discussed. This included the potential role of public financial institutions and export credit agencies, who can provide combinations of equity and long-term tenure loans (e.g. around 20 years) to support uptake of offshore wind and green hydrogen technologies. Multilateral institutions can also contribute by extending credit lines, proposing guarantees or by offering credit wrapping. Development Finance Institutions (DFIs) likewise could finance projects as co-participants or through other forms of blended finance to help close the viability gap of new technologies and reduce risks for private capital. Overall, participants stressed that whatever the form of these instruments, they should be designed for specific risks. Participants also noted that to be effective, solutions may require a judicious mix of support, including domestic and offshore financing, credit lines from multilaterals, and guarantees from development partners, etc.

The overall scale of capital needed to achieve offshore wind and green hydrogen ambitions was also discussed. Green finance flows were around USD 20 billion per year pre-COVID 19, whereas India needs as much as USD 170 billion per year to 2030 to achieve its Nationally Determined Contribution (NDC) targets (offshore wind and green hydrogen alone will likely represent several tens of billions). Identifying solutions to leverage limited public resources and increase available (and affordable) commercial finance will play a critical role in addressing this USD 150 billion financing gap.

One way to help direct finance to clean energy development is through a sustainable finance framework (where the financial sector will need to mobilise around 10% of total bank credit in India, which amounts to around USD 1.5 trillion today). Development of a national green taxonomy (possibly based on existing ones, such as those in Europe and Singapore) can provide a clear set of rules and mitigate perceived risk of 'green washing'. Company disclosure requirements can likewise help investors to monitor the quality of portfolios, particular as the pool of investors seeking ESG performance continues to grow in India and globally.

Lastly, the group highlighted the need for greater co-ordination and co-operation, especially given the complexity of establishing robust offshore wind and green hydrogen value chains in a way that reduces risks and the overall cost of finance. Bilateral initiatives can bring quick results, but the group noted a preference for co-ordination across partners, as is already done through industry initiatives such as the India chapter of the Global Wind Energy Council (GWEC) or the India Hydrogen Alliance (IH2A). Such co-ordination (e.g. through a country platform) can help to bring together industry, donors and investors to ensure risks across the value chain are addressed. This would also help to ensure specific challenges are addressed, whilst duplication of efforts is avoided.

### **Group discussion: unlocking required capital to realise 2030 renewable energy ambitions**

The last group discussion underscored the critical role of unlocking large scales of capital to meet green hydrogen and offshore wind ambitions. Even with support for early market risks and for cost improvements in project development, there will remain significant investment needs to meet 2030 targets and beyond, where no single bank or investor will be able to meet such intensive capital requirements. For example, domestic lenders already play a key role in financing on-shore wind and solar, but power sector lending limits and the overall magnitude of funds required for offshore wind and green hydrogen will require them to tap into other financial pools, such as secondary markets. Private players, including big industry, will also need to guarantee a certain return on capital employed as overall investment levels increase, meaning they will require financial leverage.

Participants noted that developed markets have employed public finance to spur offshore wind and green hydrogen, but that replicating this approach would be too costly for India, particularly given the scale of ambitions. Support would be better placed in enabling more complex financial solutions. For instance, green bonds and sustainability-linked bonds can raise money for offshore wind and green hydrogen projects. Close to USD 7 billion in green bonds was already issued in India in 2021, and sustainability-linked instruments and Masala bonds are also helping to mobilise capital. Support for first issuances for offshore wind and green hydrogen in India, for example through the government's plans to issue green bonds or with support from multilateral financial institutions, could raise awareness for these projects and provide improved insight (e.g. on asset performance) to investors. Participants noted that bonds do not necessarily need to be the first port of call either. Green loans and sustainability loans could be used in the first instance, where these instruments could help transitioning industries to come into green finance (as they are not typically eligible for 'use of proceed' green bonds).

Domestic lenders, the public sector and DFIs can also help support industry and developers in preparing for capital markets. This can be through use of de-risking instruments as well as through training and capability building support, for instance through help in structured finance development or for the preparation of ESG and corporate sustainability information for investors. Development of clear standards (e.g. through a sustainable finance framework) and definitions (e.g. on energy transition activities) can also help. Participants noted that these activities play an important role: pipeline generation does not happen just because there is opportunity; rather support enables sectors to have investable propositions ready for investors.

## **Key highlights and takeaways from the workshop discussions**

A clear message from the workshop was that financing solutions will depend on addressing risks across ecosystems. Long-term planning with clear policies, related infrastructure development and measures to reduce counterparty risk are prerequisites for early market development and to engage investors. A wide array of solutions (e.g. offtake contracts, viability gap funding, foreign currency hedging) can provide better signal than grants, provided that they target the reduction of the most salient risks.

International support (e.g. via export credits and development finance) can build upon on-going technical co-operation, joint ventures and technology collaborations. Participants welcomed these initiatives, underscoring the need for strengthened international co-operation, in particular on the donor side. This will ensure all components of the offshore wind and green hydrogen value chain are sufficiently covered and will help to reduce duplication of efforts. Co-ordination could be through industry associations or via international organisations, but several participants proposed the government should lead on the creation of a country platform to gather players. This could equally be used to encourage investor dialogues.

Blended finance can play a central role in the next decade to help projects reach final investment. Participants emphasised the great opportunities and the high uncertainty of offshore wind and green hydrogen projects, where support from multilateral development banks and DFIs can address risks (e.g. as co-investors or through sub-ordinated debt and equity) to unlock commercial finance. Concessional finance, for example providing suitable loan tenures for offshore wind and green hydrogen (e.g. above 15 years after commissioning date) can also support.

Lastly, the group highlighted that the magnitude of investment required will necessitate a blend of actors (e.g. with public, private and international funds) as well as measures to prepare offshore wind and green hydrogen projects for capital markets. Lessons from global experience (e.g. on taxonomy and capital market development) can enable opportunities in line with ambitions.