2nd Clean Energy Finance and Investment Consultation Workshop

"Unlocking finance and investment for clean energy in the Philippines"
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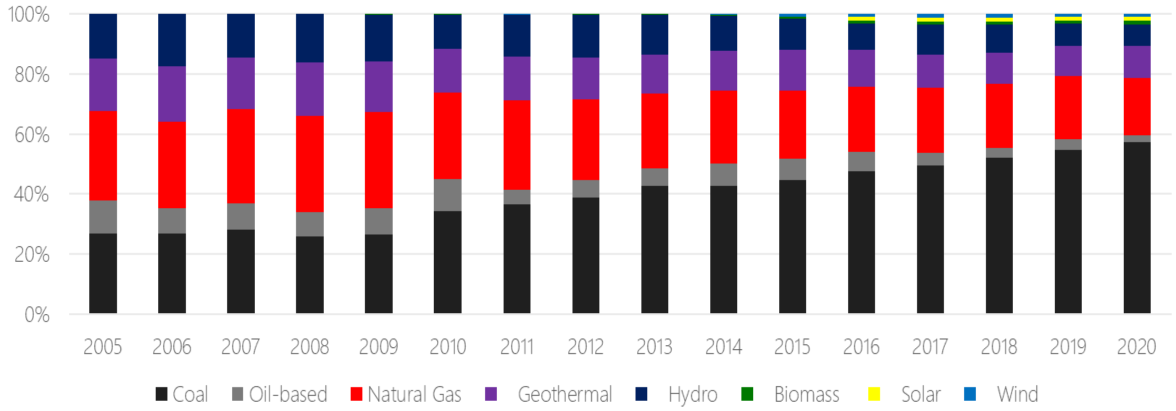
Improving the investment climate for clean energy projects

The Philippines has been making important efforts to wean its power system off fossil fuels and to encourage renewables deployment. The Department of Energy (DoE) has provided several incentives to accelerate renewable energy development in the country under the legal and institutional framework of the Renewable Energy Act (RA 9513) of 2008 (often dubbed as the RE Act or Law). The RE Act has ushered in the adoption of, most notably, a feed-in tariff scheme (2010), Renewable Portfolio Standard rule for on-grid areas (2017), the green energy option programme or GEOP (2018), Competitive Renewable Energy Zones or CREZ (2018), and the green energy auction programme or GEAP (2021).

Figure 1. Power generation mix, 2000-19



Source: DOE statistics and information.

Despite these efforts, the growth of coal in the country's energy mix has outpaced that of renewables over the last 20 years (see Figure 1). Solar, wind and biomass power capacities remain much below the country's potential. As discussed in Workshop 1, and through an investor survey, several challenges and barriers have hampered the implementation (and hence, the effectiveness) of those policies.

First, permitting and land access is a pressing challenge, presenting major and persisting roadblocks to renewable energy projects in the Philippines. While the implementation of the Energy Virtual One Stop Shop (EVOSS) System in 2019 has successfully reduced permitting lead time (by around a 100 days), the process remains lengthy (around 1773 days) and cumbersome and could be further streamlined. This requires cooperation and buy-in from various government institutions (e.g., Local Government Units or LGUs, the Energy Regulatory Commission or ERC, etc.) under EVOSS, particularly as they wield key responsibilities over renewable energy project permitting (e.g., environmental impact assessment, siting etc.). Streamlining permitting will be particularly important to foster the development of an offshore wind industry in the country, as discussed in the next section.

Equally, land access for renewable power projects remains complex, mainly due to fragmented land ownership and a burdensome land conversion process (e.g., from agricultural to industrial use). Various land reform programmes over the past fifty years led to the redistribution of agricultural land from landowners to tenants, and thus, the fragmentation of landholdings (about 1.5 hectares per tenant beneficiary). Consolidation of small and fragmented landholdings is complicated and uncertain, making it challenging for wind and solar farm projects to secure their large-scale land requirements.

Another key challenge concerns the adoption of the GEOP (meant to widen the corporate sourcing of renewables), which has been lower than expected due to numerous issues. This includes a lengthy "supplier switching" process characterised by delayed registration or certification, complex process for upgrading meters, coordination issues with distribution utilities or electric cooperatives, and so on. Equally, the lack of harmonisation of compliance requirements and registration process between the GEOP and the Retail Competition and Open Access (RCOA) mechanism (another scheme allowing the corporate sourcing of power – including from non-renewable sources) was highlighted as an important area to be addressed to ensure uptake.

The ad hoc inclusion of piecemeal mechanisms governing procurement, such as RCOA, or price caps as stated in Department Circular No. DC-2017-12-0015 create distortions in the wholesale electricity supply market (WESM). In the absence of a functional spot power market, WESM continues to rely on long term contracts that undergo frequent renegotiations. Price caps sometimes result in WESM prices falling below what power generators need to recover their supply costs. With an obligation to supply due to the "must run" status of certain power plants, power generators must either default on their supply obligations or face significant losses by complying. Overall, while the regulatory interventions were intended to achieve "stable and affordable" costs of power supply, the results are at times contrary to intended objectives.

Stakeholders also highlighted challenges surrounding the competitive selection process (CSP) rules, which were adopted in 2018 to help distribution utilities comply with the Renewable Portfolio Standard (RPS) requirements in a price-competitive way. While there have been issues in the past (with winning projects under CSP being retroactively cancelled and forced to bid again), the CSP seems to have been a welcome measure by distribution utilities overall. Still, current requirements to classify CSPs by technologies' mode of operation (e.g., baseload, mid-merit, peak) were said to potentially limit access of variable renewable projects to CSPs and thereby contravene the CSP's technology neutrality principle.

Ensuring the availability of supporting grid infrastructure was also highlighted as an important priority to scale up renewable energy deployment. In this regard, the Competitive Renewable Energy Zone (CREZ) system was overall praised as an important opportunity to improve grid planning and extend grid development to places that optimise the use of the country's renewable resources. However, the CREZ has not yet been adopted by the National Grid Corporation of the Philippines (NGCP). Meanwhile, developers are still required to advance the cost of transmission upgrade/extension. Going forward, it will be important to improve grid planning and development to support greater levels of decentralised, variable renewable energy while ensuring financial sustainability for NGCP and affordability for costumers.

Finally, stakeholders highlighted some of the challenges facing off-grid project developers. Indeed, electric cooperatives in remote areas often lack support and capacity to develop and fund projects. Similarly, accessing the Universal Charge on Missionary Electrification (UCME) subsidy is often difficult, considerably slowing project development. Potential solutions to consider include facilitating the UCME process (notably through pre-approved rates by the ERC as well as establishing training facilities for electric cooperatives (particularly for the development, installation and operation of power plants).

Accelerating investment in offshore wind

As an archipelagic country of 7000 islands, the Philippines is endowed with abundant offshore wind resources. The World Bank estimates that offshore wind in the Philippines has a technical resource potential of 174 gigawatts (GW) and the possibility to supply over 20% of the country's electricity by 2050[1]. While some of these resources are found in shallow waters close to population demand centres, the vast majority (90%) are in waters deeper than 50 metres and will necessitate the use of offshore wind turbines installed on floating platforms.

Under its Nationally Determined Contributions (NDCs), the Philippines targets peak greenhouse gas emissions by 2030[1]. Currently, about 87% of the country's carbon emissions come from burning coal and oil. To reduce emissions from fossil fuels, the National Renewable Energy Program (NREP) aims to increase the share of renewables to 35% of the electricity mix by 2030, and 50% by 2040[2]. According to World Bank estimates, offshore wind has the potential to contribute more than 28 GW of the new generating capacity required by 2030.

In addition to helping achieve climate commitments, offshore wind would also bring other social and economic benefits to the Philippines. Being a significant importer of fossil fuels, the Philippines can improve its energy independence and security by relying on indigenous offshore wind resources. Further economic benefits, such as reduced land stress, local job creation, port and grid infrastructure improvements, increased foreign direct investments, industrial growth through supply chain development, and eventual energy cost reductions are also expected.

The Philippine government has already taken steps to support the development of offshore wind capacity. The Department of Energy (DOE) has awarded 30 wind energy service contracts (WESCs) to offshore wind developers, representing plans for a cumulative capacity of 21 GW. For instance, in 2021, PetroGreen Energy Corporation has secured WESCs for three offshore wind projects off the coasts of Occidental Mindoro, Iloilo, and Ilocos Norte[3]. Having received endorsement from the DOE, it is currently working on 5-year technical studies for the 1 GW North Luzon Offshore Wind Power Project before seeking further endorsements. Despite such signs of progress in the Philippines offshore wind sector, a number of risks and challenges will need to be addressed before it can fully realise its potential (Table 1).

Table 1. Key risks involved in offshore wind development and their relevance for the Philippines

Risks	Description	Relevance for the Philippines
Technology risk	Lack of access to commercially mature and cost-effective technologies can limit offshore wind development and raise energy costs.	Initial development will rely on well-established fixed offshore wind technology. Floating turbines (eventually required for deep water installations) not yet commercially mature.
Policy risk	Lack of clarity on policy targets and strategy can hamper investor confidence.	No national-level targets or strategy for offshore wind.
Environmental and social risk	Non-alignment with international environmental and social impact assessment (ESIA) standards can cause construction delays and reduce investor appetite.	Marine spatial planning and ESIAs for offshore wind development not yet conducted.

[1] https://niccdies.climate.gov.ph/files/documents/Philippines%20NDC%20Quick%20Facts.pdf

[2] https://www.pna.gov.ph/articles/1159659

[3] https://powerphilippines.com/petroenergy-to-tap-foreign-partner-for-offshore-wind-project/

Regulatory risk	Legal and regulatory barriers can complicate the business environment and discourage foreign investments.	No clear leasing and permitting procedures for offshore wind.
Supply chain risk	Lack of local supply chains and adequate port infrastructure for turbine components and blades can raise the cost of offshore wind development.	Strong regional supply chains and port infrastructure for near term development.
Transmission risk	Limited transmission grid capacity and inadequate interconnections limit offshore wind development potential.	Transmission infrastructure is inadequate and requires upgradation and expansion.
Price risk	Lack of clarity on price policy (feed-in tariff, competitive tendering) for offshore wind can create revenue uncertainty for developers.	No price policy for offshore wind announced yet.
Offtake risk	Lack of a clearly defined off-taker for offshore wind power purchase agreements can create uncertainty about counterparty creditworthiness.	No single or pre-defined national off-taker.
Credit risk	Lack of experience among local financial institutions in offshore wind project finance can limit supply of financing and raise the cost of capital.	Local banks inexperienced in offshore wind projects.
Foreign exchange risk	Adverse movements in domestic currency relative to hard currencies (such as the US Dollar) can reduce foreign investor appetite.	Costs in foreign currency are expected to be mainly upfront and easily hedged.

Note: Risks are highlighted based on their relevance for the Philippines – red indicates high risk, green indicates low to medium risk.
Source: OECD analysis and WB (2022), Offshore Wind Roadmap of the Philippines, https://esmap.org/ESMAP-Offshore-Wind-Roadmap-for-the-Philippines.

To support the Philippines in harnessing its offshore wind sector development, the World Bank issued "The Offshore Wind Roadmap of the Philippines"[4] in April 2022. The roadmap provides strategic analysis of the Philippines' offshore wind development potential, considering the opportunities and challenges under different, hypothetical growth scenarios and identifying key actions to accelerate the sector's development. Building on this work, the CEFI Roadmap will identify concrete actions focusing primarily on the financing and investment aspects to operationalise the World Bank's offshore wind Roadmap and thereby achieve the country's targets.

Key considerations for unlocking finance and investment for offshore wind in the Philippines highlighted below are intended to inform discussion under the Roadmap's second Workshop related to offshore wind.

Financing offshore wind in the Philippines: Key considerations

From a financing perspective, the following four risk areas are key to improving the prospects for offshore wind in the Philippines.

Identifying offshore wind development zones

Demarcating offshore wind development zones where resource potential is high and risks are low helps create an attractive investment environment for developers, particularly when accompanied by financial incentives. This requires conducting holistic feasibility studies, including thorough technical feasibility assessments (e.g., wind resource measurement, typhoon risk, geological surveys of seabed and substrates, etc.), marine spatial planning, robust environmental and social impact assessments (ESIAs), as well as infrastructure needs assessment. Provided that feasibility assessments are conducted in line with international best practices, their results can help establish offshore wind development zones and guide the site selection of demonstration stage projects.

[4] *WB (2022), Offshore Wind Roadmap of the Philippines, https://esmap.org/ESMAP-Offshore-Wind-Roadmap-for-the-Philippines.*

Since no such feasibility studies have yet been conducted in the Philippines, international partners can provide financial and technical assistance to help establish offshore wind development zones in the country, as was done in the case of India (Box 1). Providing clear policy targets or signals, such as through a technology-specific capacity target for offshore wind, would help bring in international partners and developers with strong offshore wind expertise.

Box 1. International collaboration to identify India's offshore wind development zones

In India, several initiatives led by international partners, including the Government of Denmark and the European Union, have supported preparation of offshore wind development, for instance through technical reports, mapping and feasibility studies (Table 2). In addition, the Indo-Danish Centre of Excellence for Offshore Wind (COE-OSW) also organised several workshops in recent years to support planning and permitting, financial framework and auction design, grid and offshore wind supply chain infrastructure, technical standards and rules for innovation. Building upon these initiatives, sixteen preliminary offshore wind development zones were identified off the coast of two Indian states – eight near Gujarat and eight near Tamil Nadu.

Table 2. Key assessments in support of offshore wind development in India

	Dates	Actors	Main Achievements	Link
Facilitating Offshore Wind Energy in India (FOWIND)	2013-19	GWEC-led consortium (C-Step, DNV GL, WISE and the GPCL), supported by the European Union	Identified 16 zones through offshore mapping and produced technical studies (e.g. on supply chain and port infrastructure) as well as pre-feasibility and feasibility reports for Gujarat and Tamil Nadu	https://gwec.net/members-area-market-intelligence/fowind/
First Offshore Wind Power project in India (FOWPI)	2016-19	COWI and WFMS, supported by the European Union	Provided technical assistance and produced studies (including surveys, environmental scoping, cost-benefit analysis, and conceptual design, etc.) leading to the pre-financial investment decision (pre-FID) for zone off the coast of Gujarat	https://www.cecp-eu.in/resource-center/post/fowpi-website/home
Financial modelling of offshore wind farms in India (FIMOI)	2019-22	COE-OSW, supported by the Government of Denmark	Produced LCOE estimates for the first offshore wind farm in India (February 2021) and updated cost assessments (April 2022), as well as a Technology Catalogue (February 2022) and LCOE and VGF tool (April 2022)	https://coe-osw.org/the-fimoi-report/

Notes: GWEC = Global Wind Energy Council; C-Step = Centre for Study of Science, Technology and Policy; WISE = World Institute of Sustainable Energy; GPCL = Gujarat Power Corporation Limited; WFMS = WinDForce Management Services Limited.

Source : Clean Energy Finance and Investment Roadmap of India (2022)[5].

[5] https://www.oecd.org/environment/clean-energy-finance-and-investment-roadmap-of-india-21b6e411-en.htm

Investments in transmission infrastructure

The Philippines' archipelagic power system results in clusters of interconnected markets. Subsystems in Luzon and parts of major Visayan islands (Cebu, Panay, Negros and Leyte) coexist with off-grid markets served by the Strategic Power Utilities Group (SPUG). Mindanao is unconnected to either subsystems in Luzon or Visayas.

Several challenges arise due to market fragmentation and limited grid interconnections in the Philippines, such as:

1. **Difficulty evacuating power to demand centres**. For instance, geothermal generation in Negros and Leyte and hydropower generation in Mindanao cannot be supplied to Luzon, Cebu or Panay in times of excess generation due to lack of reliable interconnections.
2. **Curtailment of renewable power generation.** For instance, the transmission grid in the Negros island is now unable to accommodate any further solar power generation, due to the already high levels of solar and geothermal generation, thus leading to curtailment of excess solar generation.

Offshore wind development will require an accelerated expansion of transmission capacity to ensure reliable interconnectivity to make investments bankable, particularly due to its significantly higher throughput as compared to solar. This includes building new and expensive transmission lines, offshore substations, and subsea cabling to connect offshore wind projects with onshore demand centres. It also involves upgrading the capacity of existing grid infrastructure to accommodate greater power generation. Both upgrading and building new transmission assets require significant investments, particularly in the case of large-scale deep waters projects located far offshore as is likely in the Philippines.

The National Grid Corporation of the Philippines (NGCP), a private consortium of local and international companies, is in charge of operating, maintaining, and developing the transmission grid infrastructure in the Philippines. The NGCP is regulated by the Energy Regulatory Commission and the publicly owned Transmission Company (TransCo) remains the owner of all transmission assets in the Philippines. While the NGCP currently envisions investments worth USD 9 billion to develop new transmission corridors over 10 years under the latest Transmission Development Plan (TDP), more detailed power system needs assessments and a greater vision to 2050 will be required to support offshore wind development[6]. Keeping up with offshore wind development and its greater interconnectivity will equally necessitate building the NGCP's both technical and financial capacity.

Investing in transmission infrastructure brings benefits beyond offshore wind development by contributing to ongoing electrification efforts as well as supporting the integration of further variable renewable energy resources in the Philippines. Transmission infrastructure upgrades can take up to 10 years spanning needs assessments, planning, designing, and implementation. The cumulative investment requirements can be substantial, thus making non-concessional debt financing potentially prohibitive. Alternative financing mechanisms can be explored, including private investments (Box 1) – in this regard, using blended finance or development finance can have a key role to play in mobilising private investment in transmission infrastructure (Box 2).

[6] https://www.nsenergybusiness.com/news/ngcp-investment-transmission-network/

Box 1. BOOT models for transmission infrastructure investments

A widely used business model (oftentimes under public private partnership arrangements) to attract private sector investments into transmission infrastructure is known as the Build, Own, Operate, and Transfer (BOOT) model. This model involves long term (generally 25 years) contracts allocated to private companies through competitive bidding procedures. The winning contractor undertakes to finance, build, own and operate new transmission lines or interconnections at a fixed bid price applicable for the entire duration of the contract. Once the contract expires, the transmission assets are transferred to the state-owned transmission company.

Prominent examples of the BOOT model being used for transmission infrastructure investments can be found in Brazil and Peru. Brazil raised USD 15.9 billion in financing for 21,317 kilometres of new transmission lines over 11 years (1999-2010), 15 auctions and 67 projects. 30-year concession contracts were awarded, following the BOOT model, to bidders offering the lowest transmission tariff at the auctions. While auctions were open to both privately and publicly companies, the majority of the capital was raised from private sources.

Similarly, Peru mobilised about USD 1.3 billion over 13 years (1998-2011) to finance both the expansion of existing and the construction of new transmission assets. 30-year BOOT concession contracts being awarded through competitive auctions rose significantly after 2007, following the provision of contractual guarantees that the entire bid revenues could be recovered by the concessionaire over the contract duration.

Source:https://iea.blob.core.windows.net/assets/2b8496af-191d-4d3c bc28b722e5fa5813/Businessmodelsforprivatelyfinancedtransmission.pdf; https://documents1.worldbank.org/curated/en/786091468189572248/pdf/99009-ESMAP-P146042-PUBLIC-Box393185B.pdf

Box 2. Blended finance and impact investing

Impact investing makes up a wide spectrum of asset classes, objectives, and mandates. It can materialise via private placements, such as private equity, venture capital, project finance, bonds, and other debt facilities, or through publicly traded securities markets such as stocks and funds which tend to be managed on a portfolio basis. A recent survey by Global Impact Investing Network (GIIN) estimated the size of the impact investing market to be in the order of $702 billion as of 2020, with 20% allocated to energy and infrastructure.

Blended finance enables impact by incorporating concessionary (or social) capital to take on non-bankable risks. This can be done in a variety of ways. First loss capital, for example, is typically provided by non-profit entities, concessional funds, and governments. If the investment fails, social capital absorbs the losses that it was designed to cover (e.g. exploration failure for geothermal). When successful, social capital is paid back with or without a return so that it can be redeployed to other socially beneficial investments. In this way, a dollar towards impact investing can mobilise several dollars from private finance. Examples of these mechanisms are described as the following, including public-private partnerships (PPPs):

- **Direct investments** may take the form of concessional capital applied to projects or companies to boost private investment.

- **Credit lines** are extended to banks and other financial institutions in support of specific niches such as small-holder farms and Small and Medium Enterprises (SMEs).

- **Green bonds** are raised for projects as well companies to provide longer-term financing backed by DFIs and multilateral development banks (MDBs) in specific risks, such as political risks and liquidity risks.

- **Guarantees and insurance for credit enhancement** are among the earliest forms of blended finance. It seeks to safeguard investors against certain types of commercial or political risks that the private markets would not have an appetite for. A traditional player is the World Bank through its Multilateral Investment Guarantee Agency (MIGA).

- **Grants and technical assistance** take the form of non-refundable moneys, often extended by DFIs geared towards technical capacity, feasibility studies and other types of assistance to improve the chances of success of the project.

- **Local currency loans and investments** expands the sources of funding that better align with local currency revenues that the venture is expected to generate. Multilateral financial institutions and specialised funds may come in to provide the cross-currency hedge to make the transaction work.

Source: Moreira, A at Barcelona, RG (2022). Dynamic Decisions: Energy PIVOT, Adaptive Moves, Winning BOUnCE. London: World Scientific Publishing Europe

Policy incentives for investment promotion

A strong policy landscape with clear and favourable policy incentives helps promote investments in a given renewable energy sector. In the Philippines, the RE Act provides the legal and institutional framework for harmonising policies and providing fiscal and non-fiscal incentives to promote the development of renewable energy technologies. Most notably, a Feed-in-Tariff (FiT) scheme implemented in 2010 and subsequently revised multiple times provides attractive long-term above-market prices to developers of solar, onshore wind, ocean, run-of-river hydropower, and biomass. The FiT program has successfully supported around 1,400 megawatts (MW) of new renewable energy capacities installed.

Attractive FiT regimes are particularly useful for creating new renewable energy markets. Once technologies become commercially mature and markets become self-sustaining, FiTs can be phased out and replaced by competitive tendering regimes and limited revenue support schemes to reduce fiscal burden. The Green Energy Auction Program (GEAP) provides the framework to transition to competitive tendering for renewable energy procurement in the Philippines.

The Philippines can learn from the experiences of other countries that adopted a transitionary policy approach. Relevant examples of such transitions are found in countries like China and the United Kingdom for offshore wind (Box 3 and Box 4) and Spain for onshore wind (Box 5). Both China and the UK introduced caps on revenue support mechanisms to control fiscal spending in the initial market creation phase, and once the market was mature, transitioned entirely to competitive tendering. On the other hand, Spain took an adaptive approach to disbursing capital outlays by transitioning from traditional FiTs to a regime that accounted for the grid costs of variable renewables.

Box 3. Evolution of offshore wind price policy in China

China installed 16.9 GW of offshore wind capacity in 2021, surpassing the total capacity added by the rest of the world combined and more than quadrupling its own capacity addition from the previous year. Price policy design had a major role to play in China's emergence as the largest and the fastest-growing market for offshore wind in the world.

The first offshore wind concession tender in China was held in 2010 for a cumulative installed capacity of 1 GW. This tender design accorded 55% weightage to the price component in the auction score and awarded bids that came closest to the average price in the tender. Four State-Owned Enterprises won contracts in this tender with bidding prices ranging from 0.62 to 0.78 CNY/kWh. However, these projects were delayed for over eight years, mainly due to underbidding by the SOEs such that they were unable to cover the actual cost of delivering the promised capacity at those prices.

In 2014, following the failure of the concession tendering scheme, two salient changes were introduced in China's offshore wind development policy: a fixed feed-in-tariff (FiT) was set (0.75 CNY/kWh for intertidal and 0.85 CNY/kWh for nearshore), and responsibility for tendering projects was devolved to provincial governments. Under the fixed FiT regime, contracts were allocated competitively through auctions at the province level and developers were paid the provincial benchmark price of coal-fired power by the grid company. The difference between the fixed FiT and the benchmark price was paid by the National Renewable Energy Fund (NREF).

The fixed FiT regime was successful in boosting investor confidence and establishing an offshore wind market in China. Installed capacity of offshore wind grew almost tenfold from its inception in 2014 to expiry in 2018. However, the decline in offshore wind prices was not commensurate with the high level of market growth, leading to the NREF having to pay consistently high subsidies and running high deficits (CNY 112.7 billion in 2017). In 2018, this led to a transition in China's price policy from a fixed FiT regime to a bidding FiT regime.

Under the new bidding FiT regime, all projects approved after 2019 were subjected to a price cap of 0.80 CNY/kWh in 2019 and 0.75 CNY/kWh in 2020. Developers could submit bid prices up to the fixed price ceiling and the lowest bidders were awarded the tender. While this system fostered price competition, it also accorded a lower weightage (40%) to the price component in the auction score as compared to the 2010 round of competitive auctions. Other criteria like enterprise capability (25%), progressiveness of technology (15%) and plan of implementation (20%) also factored into the auction score. By de-emphasising the impact of bid price, this system thus prevented the phenomenon of under-bidding that caused the 2010 round of auctions to fail.

Since 1 January 2022, there are no longer any central government subsidies available for offshore wind in China. New projects are required to be built at grid parity with regulated coal power prices (equivalent to around half the FiT price for offshore wind), unless provincial subsidies are available. Some provincial governments have rolled out their own FiTs to replace the central support scheme, although these are much smaller and less likely to drive further capacity expansions. Instead, other factors such as increasing project sizes and economies of scale, separating interconnection costs from project costs, equipment cost cuts, as well as policy push from the new emissions trading system and forthcoming renewable portfolio standards are more likely to maintain the momentum in the offshore wind market in China.

Source: Youzouhou Wei et al (2021), Evolution of price policy for offshore wind energy in China: Trilemma of capacity, price and subsidy, https://www.sciencedirect.com/science/article/pii/S1364032120306547#bib9 ; Malt Jansen et al. (2022), Policy choices and outcomes for offshore wind auctions globally, https://www.sciencedirect.com/science/article/pii/S0301421522002257; S&P (2021), How far is China's offshore wind from reaching grid parity?, https://ihsmarkit.com/research-analysis/how-far-is-chinas-offshore-wind-from-reaching-grid-parity.html

Box 4. Policy drivers for cost reductions in UK offshore wind power

Over a decade since its first demonstration project in 2000, offshore wind is now the cheapest source of electricity in the UK. In the latest round of auctions held in July 2022, offshore wind projects won the largest share of capacity (7 out of 11 GW awarded) at a record-low price of £44/MWh at current prices. This is more than four times cheaper than the cost of running gas-fired power plants (£196/MWh) in the UK at today's rates (although the cost of off-shore wind was still higher prior to the current gas crisis).

The success of the offshore wind market in the UK has been driven by two key policy interventions: the Renewable Obligation Certificates (ROC) scheme from 2002-2019 and the Contracts for Difference (CfD) model from 2013 till date.

Under the Renewables Obligation (RO) regime, electricity suppliers were required to procure a certain percentage of their electricity from renewables. Every renewable electricity generator was allocated a fixed number of ROCs for every MWh generated, depending on technology type and commissioning date. For example, fixed offshore wind received 2 ROCs per MWh while floating offshore wind received 3.5 per MWh. Electricity suppliers met their renewables obligations requirement by purchasing ROCs from renewable electricity generators on the open market. For every MWh generated, offshore wind generators thus received the value of their ROCs (kept stable at around £45 per ROC) on top of the wholesale electricity price, amounting to total earnings of around £140-£150 per MWh. The RO regime thus successfully kickstarted the offshore wind industry in the UK, although it was a significant burden on public finances.

In 2013, the CfD model was introduced as an alternative to the ROC regime in order to create a competitive market and lower the cost of decarbonisation. A CfD is a long-term bilateral price agreement through which the renewable electricity generator is guaranteed a fixed 'strike price'. If the strike price is above the market price of electricity, the government counterparty (the Low Carbon Contracts Company or LCCC) pays the difference to the renewable generator; if it is lower, the generator must pay the difference to the LCCC. The CfD system thus incentivises generators to find ways to lower costs to maximise margins.

In 2014, after a transitionary period to ensure revenue stability and avoid delays, an auction mechanism was introduced to allocate contracts and determine strike prices. The auctions were based on a 'pay-as-cleared' format, such that all successful bidders were offered the highest strike price. A Levy Control Framework was also instituted to set annual caps on government subsidy spending in order to limit the financial burden passed on to consumers through energy bills.

The CfD regime has been very successful in spurring growth in the UK offshore wind market. While offshore wind accounted for only 54% of the capacity awarded in the first auction round in 2015, this share grew to 96% in 2017 and 93% in 2019, achieving further price reductions with every round. The well-functioning power market and market-friendly regulatory regime helped accelerate technological innovations, such as the use of floating offshore wind technology, which further contributed to cost reductions. Further, unlike the RO, CfDs came with an obligation to submit Supply Chain Plans for bids exceeding 300 MW. Coupled with the implementation of the Offshore Wind Sector Deal, this regime was successful in developing local supply chains and contributing to skills and jobs creation.

Source: Carbon Trust/UCL (2020), Policy, innovation and cost reduction in UK offshore wind, https://prod-drupal-files.storage.googleapis.com/documents/resource/public/Policy-innovation-offshore-wind-report-2020.pdf

Box 5. Spanish regulatory support for onshore wind deployment

The evolution of Spain's regulatory support for renewables with technological advances and market maturity illustrates a transition from FiT to market-driven mechanisms. As shown in Figure 2, the successful deployment of wind power, and its eventual scaling to supply more than a third of Spanish power needs, proceeded as follows:

1. ***Feed-in tariffs*** were used to support the initial projects when wind power was marginally accounting for less than 5% of power supply. The excess costs of load rebalancing as intermittent supplies were incorporated were fully borne by coal and gas-fired power plants;
2. ***Floor and cap pricing*** was introduced as a way for suppliers and consumers to familiarise themselves and learn to manage pricing volatility. As measurement techniques advanced, excess costs of load rebalancing were allocated to wind power.
3. ***Delegated despatch*** was made feasible when wind and to a lesser extent, solar power, were pooled under a subsystem. Comparable despatch rules were applied to wind when variability began mimicking hydropower, making wind power a mainstream supply with similar obligations.
4. ***Subsidies realignment*** occurred when policy support was reduced while market pricing and despatch rules governed how risks and returns are allocated within a dynamic wholesale power market.

Spain, as well as most developed markets, was heavily criticised for cutting subsidies sharply. After a lull in deployment, the market for wind, and eventually for solar power, resumed its growth trajectory. Reliance on market driven mechanisms such as capacity auctions and a functioning wholesale power market, rather than subsidies, was instrumental in unleashing private capital in funding a new round of capacity additions.

Figure 2. Spanish regulatory evolution

	Feed-in Tariffs - FiT	Floor and cap	Delegated despatch	Subsidies re-alignment
Objective	Develop renewable energy capacity	Introduce incentives and penalties to integration	Centralise despatch to reduce supply intermittency	Reduce tariff and budget deficits
Technical	Marginal capacity	Mandatory output forecasts > 10 MW	Pooling of wind farms capacity > 10 MW	Compulsory pooling of renewable energy > 10 MW
Regulatory	Preferential despatch	Fault-ride through capability optional for wind farms	Mandatory connection to delegated despatch centre > 10 MW	Fault-ride through capability for all renewable energy
Economics	Subsidies dependence; fixed revenues	Price flexible upside; Pricing signal to investment	Transparent pricing and capacity bidding	Volume limits to subsidised supplies; surplus volumes paid at market prices
Legal	RD 2818/1998	RD 436/2004	RD 661/2007	RD1565/2010

Source: Barcelona, R G (2017). Energy Investments: An Adaptive Approach to Profiting from Uncertainties. London: Palgrave Macmillan.

Innovative financing and de-risking mechanisms

Offshore wind projects are highly capital-intensive with large investment needs per MW installed. They are also associated with high risks (Table 1), particularly in markets like the Philippines where there is no proven track record for offshore wind. Large ticket sizes and high-risk perception often raise the cost of finance for offshore wind projects. Innovative financing mechanisms and de-risking instruments will thus be required to offset these risks, boost investor confidence and lower the cost of finance.

Different financing mechanisms can be employed depending on the project cycle stage. For example, primary finance or greenfield investments for offshore wind projects are often raised using a combination of debt and equity. In demonstration stage markets like the Philippines where local financial institutions may not have the expertise to finance offshore wind, consortium- or syndication-based finance from a mix of local and international sources can be used (Box 6). In such arrangements, international financial institutions provide the technical expertise while domestic financial institutions bring the local know how to finance offshore wind projects. Other sources of finance such as infrastructure investment funds or trusts and green debt instruments are predominant for re-financing already operational projects.

Box 6. Consortium financing for Taiwanese offshore wind projects

Loan syndication and consortium finance have been central in offshore wind financing in Taiwan since the demonstration phase began in 2012. However, the composition of these financing vehicles is changing, from being mainly led by international financial institutions to seeing a growing involvement of local equity and debt financiers.

For instance, Formosa 1, a 128 MW demonstration phase offshore wind farm, was financed by a 16-year banking facility set up by three international lead project sponsors – Macquarie Capital (50%), Orsted (35%), and Swancor (15%). Eleven banks, both international and domestic, participated in this facility and had raised USD 613 million at the time of financial close in 2018.

Similarly, the 589 MW Changfang and Xidao offshore wind project was financed by a consortium of 25 international and domestic banks and financial institutions, with 6 export credit agencies providing credit guarantees. This project, owned by Copenhagen Infrastructure Partners with minor stakes held by two local life insurance companies, had raised a total of USD 3 billion by financial close in 2020.

On the other hand, the 298 MW Zhong Neng project is owned by China Steel Corporation (51%) and Copenhagen Infrastructure Partners (49%), thus becoming the first offshore wind project in Taiwan with a local lead sponsor. USD 1.6 billion was raised in equity and debt financing by the lead sponsors and a consortium of 20 local and international banks.

Source : Charles Yates et al. (2019), Financing Offshore Wind in Taiwan[7].

Further, de-risking instruments can be designed and implemented based on the most salient types of risks contributing to the cost of finance in a given market. For instance, revenue uncertainty can hamper investor confidence in demonstration stage offshore wind projects, and fiscal incentives such as the viability gap funding used in India can counter this (Box 7).

Credit enhancement instruments can similarly be provided to counter credit risks. For example, UK Export Finance (UKEF) has provided buyer credit guarantees worth GSP 200 million to help finance the Greater Changhua 1 Offshore Wind Farm in Taiwan[8]. Credit guarantees provided by export credit agencies like UKEF lower the credit risks of international projects while also boosting the domestic country's offshore wind export potential.

[7] https://webpageprod-ws.ntu.edu.tw/Download.ashx?u=LzAwMS9VcGxvYWQvMTAzMi9ja2ZpbGUvMGU5ODViYTAtMzQ2OS00MTdkLWIxZmUtNmJlMjJlOTIyYTQ1LnBkZg%3D%3D&n=MDMtMy0tQ2hhcmxlc19ZYXRlc19fRHJfTWFya19MZXlib3VybmUucGRm;

[8] UKEF supports offshore wind deal in Taiwan and UK green jobs with £200 million - GOV.UK (www.gov.uk)

Further, innovative hedging mechanisms are being explored to address foreign exchange risk. For example, in Vietnam, power purchase agreements stipulates that the off-taker will make payments in Vietnamese Dong, adjusted for the official State Bank of Vietnam VND/USD exchange rate on the date of invoicing, anytime within 25 business days after the invoice date. However, they do not provide for any guarantee as to same-day conversion to USD nor with respect to commercial availability of USD, thus exposing developers to some short-term exchange rate risk, in particular as hedging options are generally limited[9]. In Taiwan, the Zhong Neng (Zone 29) 298-megawatt offshore wind farm marks the first green swap for an offshore wind farm in Taiwan, with Crédit Agricole CIB managing the novation of the full swap to more than 10 banks and the conversion of 25% into a green swap[10].

Box 7. Proposed incentives to de-risk offshore wind projects in India

In 2022, India's Ministry of New and Renewable Energy released a Strategy Paper proposing incentives to support its offshore wind development plan to 2030. The proposed incentives include viability gap funding (VGF) for the first 3 GW, as well as guaranteed grid connections, waiver of transmission charges, renewable energy credits, and carbon credit opportunities for further capacity additions.

The new Strategy delineates 3 models for offshore wind development, each with a unique tendering trajectory and incentive structure. Model 1 will be followed for projects planned in the demarcated offshore wind zones for which detailed technical feasibility studies have already been conducted. Model 2 will govern projects planned in government-identified zones for which detailed studies have not yet been carried out. Developers will have to conduct the studies on their own, with the possibility to avail either one of the two sub-models: Model 2(A), under which they participate in government tenders, or Model 2(B), under which their projects will supply electricity for captive consumption, bilateral off-takers, or sale on the open access market. Model 3, which is nearly identical to Model 2(B), will be applicable to future projects developed in additional demarcated zones which are not yet identified and not covered by Models 1 or 2.

While projects under Models 1 and 2(A) would be eligible for VGF, those under Models 2(B) and 3 would benefit from waiver of transmission charges, renewable energy credits with multipliers, and carbon credit opportunities. Access to power evacuation infrastructure will be guaranteed by the government to all projects across models.

Source: MNRE (2020), Strategy Paper for Establishment of Offshore Wind Energy Projects https://mnre.gov.in/img/documents/uploads/file_f-1657274400252.pdf

9 https://www.mayerbrown.com/-/media/files/perspectives-events/publications/brochures/2021/08/vietnam-wind-energy-guide.pdf

10 https://www.ca-cib.com/pressroom/news/one-stop-shop-approach-supporting-taiwan-offshore-wind-farm-ambition-zhong-neng

Conclusion

There exists great potential for offshore wind development in the Philippines, given its abundant natural resources and ambitious climate commitments. However, several risks and barriers will need to be overcome for the country to realise its full resource potential.

First, there is a need to improve the investment climate for renewables in general by addressing issues with permitting and land access, corporate procurement procedures, competitive selection process, and subsidy access and disbursal. Specifically for offshore wind, there is a similar need to strengthen the enabling environment for investments and deployment. This can be done by collaborating with international partners to develop holistic feasibility studies – spanning technical resource measurements, marine spatial planning, environmental and social impact assessments, and infrastructure needs assessment – which will further enable the identification of the most promising offshore wind development zones in the country. Further, improving and strengthening the grid infrastructure in the Philippines is a prerequisite for accelerating offshore wind development, and the country can explore the use of models such as public-private partnerships and blended finance to step up investments in this area.

Meeting the Philippines' offshore wind potential entails significant capital requirements, and the use of favourable policy incentives and de-risking mechanisms can help attract capital into this sector. Learning from the experiences of other countries like the UK, China and Spain, the Philippines can consider a transitional fiscal incentive structure to help create the market for offshore wind in the country and to kickstart the industry. Private capital can be attracted with the help of de-risking mechanisms that address specific risks, such as credit guarantees, viability gap funding, and foreign exchange hedging instruments. Innovative financing models and investment approaches, like consortium finance or loan syndication, can help diversify the sources of finance and further mitigate risk.