Design options for wind energy tenders

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EWEA
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Introduction

The Guidelines on State aid for environmental protection and energy 2014-2020 indicate an evolution towards tendering (competitive bidding) as a reference system for public support allocation to renewable generators from 2017.

The proper design of tenders is of utmost importance to sustain wind energy's growth path: wind power is currently the generating technology with the highest rate for new installations in 2014 (43.7%)[1]. Installed wind power capacity is expected to reach 320GW in 2030, producing 778TWh of electricity that will cover 23% of the EU's electricity demand[2].

In this document, EWEA aims to provide an overview of existing tender schemes and lessons learned from their implementation. EWEA hereafter outlines the considerations that national authorities need to take into account when setting up a tender system.

Background

The objective of the wind industry is to be competitive in a well-functioning electricity market, delivering the benefits of wind energy in the most affordable way. Investments made possible by long-term volume targets supported by dynamic support mechanisms drive down costs and help minimise the need for specific support.

The industry, therefore, believes that tenders may be considered as a support allocation mechanism provided they are designed properly and allow for the cost effective deployment of wind energy. Tenders can help minimise abrupt or retroactive changes in national markets as they provide a long-term support mechanism to investors.

However, experience shows that the effectiveness of tenders lies very much in the details of the design. Due to the limited European and international experience with tendering, public authorities will seek the appropriate tender format on a learning-by-doing basis thus challenging the industry (developers, financing institutions, etc.) to adapt wind business models to constantly evolving tender arrangements. Tenders present participants with higher risks (costly applications, uncertainty over project selection and guaranteed remuneration) which are internalised in bids and could result in higher support costs.

Serious shortcomings associated with tenders in the past included:

- Investor uncertainty over the price deterred investment;
- Investors bidding too low to ensure they won the tender were not able to develop the project as the economics did not guarantee sufficient returns;
- Complex tender procedures and financial risks discouraged small players from participating;
- Sites selected without regard for environmental impacts resulted in public opposition and/or undesired environmental consequences leading to project being blocked;
- Sites selected with little regard for territorial distribution led to certain areas or regions being over-solicited whilst others ignored;
- Where there was little or no competition, there was no incentive to lower prices.

There is no tender design system that is a complete success story because tenders are subject to continuous adaptation of both design elements and participants behavior. For a tender to be effective, it has to achieve competitive prices (cost-competitiveness criterion) and high realisation rates (efficiency criterion). Tenders should also incentivise research and innovation efforts and allow for the development of cutting-edge wind technologies.

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[1] EWEA, Wind in power – 2014 European statistics, February 2015
[2] EWEA, Wind energy scenarios for 2030, August 2015

Whereas the State aid guidelines consider tenders as an effective and cost-efficient instrument for allocating public support to renewable energy, it is noteworthy that tenders do not necessarily fit with all market situations and do not always generate the lowest levelised cost of electricity (LCOE). Tenders should be considered as one amongst numerous support mechanism design options rather than as a silver bullet for reducing renewable energy support. Member States should have enough flexibility in applying the State aid guidelines' provisions by determining whether the market is sufficiently liquid and whether there is a homogenous bidding structure allowing for effective tendering. If that is not the case, Member States should allocate support outside of the tender process as per the opt-outs provided by the State aid guidelines.

State aid guidelines: caveats to tendering principle

Under Article 126, Member States may opt-out from tendering in the following cases:
- Only one or very limited number of projects or sites could be eligible;
- Tendering would lead to higher support levels;
- Tendering would result in low project realization rates.

The Guidelines prescribe for technology-neutral tenders unless they lead to a sub-optimal result in view of:
- The longer-term potential of a given new and innovative technology;
- The need to achieve diversification;
- Network constraints and grid stability;
- System (integration) costs;
- Need to avoid distortions on the raw material markets from biomass support.

Article 127 provides a "de minimis" rule which exempts wind installations with an installed capacity of up to 6 MW or 6 generation units, and demonstration projects from tendering.

No-regret tender principles

While the need for flexibility in implementing the State aid guidelines should be respected, the industry has identified a number of non-regret options to be considered when setting up a tender.

- Prior to setting up a tender mechanism, national authorities must:
  - Provide the necessary policy framework, including long-term renewable deployment targets and trajectories as well as budget allocations for renewable energy support;
  - Perform a thorough assessment of the state of play of the industry, supply chains, power technology mix, strategic potential of a given technology for a specific market, deployable capacity, deployment constraints;
  - Carefully consider whether tenders are best suited to achieve overall policy objectives and fit with national market circumstances.

- The introduction of tendering systems should not result in any retroactive changes to existing support mechanisms. A sufficient transition period is necessary to allow industry players to adapt as well as to avoid market standstill. One way to allow for such an adaptation could be to entitle projects from the old regime to opt for the new one (e.g. Poland).

- Tenders should be organised on a regular basis, at reasonable notice and should provide visibility on the size and overall budget to be awarded over multiple years. Avoiding stop-andgo bidding rounds decreases risk premiums, attracts bidders and allows for greater price reduction.

- In general, tenders are better suited for larger markets with a high diversity of players. A large number of participants can result in competition, real price discovery and cost-reduction.

- The tender procedure should be fully transparent and open to as many participants as possible. Material and financial prequalification criteria as well as penalties need to be well calibrated in order to allow a variety of credible players to participate in the bidding process.

- Prototype technologies should be exempted from tendering. A separate budget needs to be set in order to incentivise technology innovation and cost reductions.

- Tenders should provide separate baskets and budgets for deployed and less deployed technologies in order to properly take into consideration their specific characteristics and cost profiles.

- The contracted energy volumes in a tender procedure should, preferably, be purchased by a single and credit-worthy offtaker.

- Tender design should ensure coordination between different administrative levels responsible for renewable projects deployment. Streamlining planning and permitting procedures will decrease transaction costs, ensure better territorial distribution of projects and could contribute to diminish public opposition to wind projects.

- No one-size-fits-all tender scheme exists. Additional experience with tenders will be required to provide for an optimal design on a case-by-case basis. Tenders should therefore not be considered as the only option for allocating public support to renewable energy generators.

Overview of design options

Item	Options	Assessment
TENDER FRAMEWORK		
Tender organisation and site selection	Centralised approach whereby public authorities select wind sites and openly provide information to all interested parties prior to the tender launch.	The centralised approach could simplify the administrative procedures for wind project developers and reduces transaction costs. A one-stop-shop arrangement could facilitate the environmental licensing procedures, permits and land management.
	Decentralised (cluster) approach whereby several developers propose sites that compete for public support among themselves	Tendering greenfield sites in a cluster approach leaves the pre-development work (e.g. natural endowment assessment) and site selection to developers, who are also responsible for securing land ownership rights, permits and grid connection.
Pre-qualification criteria	Material pre-qualification criteria (preliminary licenses, land permits, grid connection, etc.)	Pre-qualification criteria affect the cost of participating in a tender as well as the ability of a bidder to take a project through completion. They should therefore be well balanced in order not to deter investors at an early stage of the tender process but also to ensure that credible players participate in the process. Project-related pre-qualification criteria are best suited to ensure a variety of players can participate in the tender process.
	Financial pre-qualification criteria (Bid bonds, project finance track record, etc.)	Bid bonds are paid by all participants or only from the successful bidders to prove their commitment in constructing the project. Upon timely completion of the submitted offer, investors recover the whole amount of the bid bond, but in case of delays, some of it is retained. Defining the right level of the bid bond can be challenging: if too high, it increases projects' risk premiums and pushes away potential participants; if too low, implementation rates will be diminished. In case of very strict material pre-qualification rules, bid bond requirements could be relaxed.

Penalties	Termination of awarded contract, lowering of support levels, etc.	Penalties should be well calibrated in order to attract competent bidders and maximise rates of implementation. In case of too low pre-qualification criteria and the absence of penalties, developers would be able to withdraw from projects without consequences making the tender inefficient. Penalties should be high enough to incentivise serious bidders but not too rigid to turn away potential participants. Penalties should be able to distribute the project risks between involved stakeholders and differentiate between delays originating from project developers and those stemming from public authorities (e.g. delays in licensing procedures) or external factors (e.g. changes in commodity prices). Deadlines for building the projects are another way to ensure higher implementation rates provided that lead times are technology-specific and reasonable.
Remunerated product	Remunerating capacity (EUR/MW)	Capacity payments reward bidders with a fixed payment independent of the power production. Defining an adequate capacity payment level is challenging as it need to be high enough to cover, together with the market price, the overall cost of the project.
	Remunerating energy (EUR/MWh)	Energy payments grant bidders with a fixed payment for the power produced. They are currently better suited to reward the most efficient players and allow for the maximisation of wind production.
Bands	Technology-neutral whereby all technologies compete on par	Technology-neutral tenders grant support only to the least-cost technology options thus creating low technology diversification and excluding technologies with cost reduction potential (e.g. offshore wind). Often, they tend to separate the auctioned product into baskets whose definition is crucial in creating competition and liquidity among available technology options. Therefore, designing a technology-neutral tender in a clear, transparent and non-discriminatory manner is a challenging task given the specific characteristics of different generation technologies.
	Technology-specific whereby technologies are differentiated	To ensure security of supply and system stability there is a need for a variety of technologies and not just the least cost ones. Technology-specific tenders better allow policy makers to design a specific generation mix fitting with national resource endowment. Moreover, different technologies production characteristics and cost profiles require different auction features in

		order to provide a level-playing field and non-discriminatory treatment in the tender process.
TENDER PROCEDURE		
Price-finding mechanism	Sealed-bid: bids are submitted simultaneously and remain undisclosed	Sealed-bid is a static auction because no exchange of information occurs about the price of the auctioned product. In theory, information asymmetry might result in the "winner's curse" whereby the winner underestimates the true value of the auctioned product, underbids in order to win but ends up with an unprofitable price. However, sealed-bid offers low transaction costs and is simple which attracts participants.
	Iterative process: either descending or ascending clock where the auctioneer establishes a price ceiling, which decreases/increases during the iterative bidding process, until a bidder accepts to procure at a certain price level	Iterative bidding procedures are dynamic auctions whereby participants gradually unveil their offers and can adapt them to their competitors' bids. In theory, the possibility of misjudging the true value of the auctioned product, resulting in winner's curse, decreases. However, iterative bidding could potentially involve strategic behavior. A descending clock is most commonly used but competition levels depend upon the ceiling price. If the ceiling price is too low, only a small number of bidders will participate, consequently leading to undersupply and lack of competition. If it is too high, there is a risk of opportunistic bidding.
	Hybrid: two-stage auction combining descending-clock with sealed-bid	Hybrid auctions provide for price discovery during the descending clock at the first tender stage and participants preserve the confidentiality of their bids during a second sealed-bid round. However, this arrangement is quite complex to administer.
Payment arrangement	Pay-as-bid: each bidder receives the price he has offered	Pay-as-bid could minimise overall policy costs because bidders only receive the minimum support requested for projects. In theory, however, it might result in low realisation rates due to opportunistic bidding.
	Pay-as-clear (uniform/marginal pricing): all bidders receive the price set by the most expensive accepted bid (marginal price)	Under uniform pricing, bidders may have an incentive to disclose real costs because the final compensation is not linked to individual bids. In theory, strategic bidding could occur as participants bid low hoping to get higher remuneration than needed if the marginal price exceeds their offers.

Tender systems for onshore wind

Out of the 128.8 GW of wind energy capacity installed by end-2014, the bulk – 120.6 GW[3] comes from onshore. Onshore wind installations are expected to reach 254 GW in 2030 covering 16.7% of the EU electricity demand[4]. The technology has already reached cost-competitiveness with conventional power generation (once carbon costs and external costs are internalised) in Germany and the UK in the second half of 2015[5].

Onshore wind is a particularly challenging technology for tendering because of the complex project development process, the involvement of various permitting authorities and the need for local acceptance.

Considerations

1. Technology-neutral versus technology-specific tenders

While in principle onshore wind can successfully compete in technology-neutral tenders (e.g. UK) in many cases, a technology-specific approach may be more appropriate to take into account particular situations (absence of homogeneous bidding structure) and priorities (local player involvement) at the national level. In a number of leading onshore markets (e.g. Germany, Spain, Italy) such considerations include setting up a realistic annual deployment target that includes both new installation potential and repowering needs of the wind generation fleet.

2. Tender rewarding energy (EUR/MWh)

Onshore wind tenders should, at least in the short-term, remunerate energy produced (EUR/MWh). The awarded product should offer a long-term investment signal that provide investors with visibility over future revenues and to subsequently diminish risk and lower prices during the bidding process.

3. Decentralised site selection

Given the decreasing availability of high resource onshore sites, project developers are best suited to use their know-how in identifying good sites for onshore deployment. Streamlining planning and licensing procedures should be a priority for national authorities as the numerous permits required impede project development.

4. Level-playing field for local/community actors

Tenders tend to favor large professional players over smaller actors who cannot bear too stringent economic prequalification criteria and are subject to higher risk premiums. Smaller actors involvement in onshore wind deployment can play an important role to help counteract local acceptance issues.

Therefore, pre-qualification criteria should be project-related (provision of building consent, grid-access connection, land acquisition) rather than bidder-specific (experience, project portfolio) to ensure small players participation. Entry barriers for smaller players could be relaxed via the application of “de-minimis” rules. Bid bond requirements should be set at a reasonable level to ensure that smaller, yet credible, players can participate in the tender process.

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[3] EWEA, Wind in power – 2014 European statistics, February 2015
[4] EWEA, Wind energy scenarios for 2030, August 2015
[5] BNEF, Levelised Cost of Electricity Update – H2 2015. In Germany, onshore costs $80/MWh compared to gas at $118/MWh and coal at $106/MWh. In the UK, onshore costs $85/MWh compared to $115 for CCGT and $115 for coal-fired installations.

National Tender Experiences in Onshore Wind

Italy

Tendering period	2013	2014	2015
Tender schedule	1 per year		
Available budget	€5.8 bn annual cumulative spending limit for RES support (excluding solar PV)		
Tendered product	Capacity		
Support mechanism	CfD (fixed price)		
Tender design	Technology-specific (quotas set for onshore wind above 5 MW) Sealed-bid (participants submit a discount to a reference tariff)		
MW tendered	500 MW	400 MW	356 MW
Participants	18	47	61
Project delivery	30% delivered		
Award and compliance criteria	• For plants up to 20 MW, only an environmental evaluation required; • For plants beyond 20 MW, environmental evaluation and final building permission required; • Proof of financial capacity: capitalisation of at least 10% of the overall cost of the investment; • Bid bond; • Plant to be operational in 16 months; for each month of delay subsidy is lowered by 0,5%.		
Outcome	– Capacity tendered too low compared to bid capacity in 2014 and 2015; – Delays in grid connection resulted in low realisation rates; – Loose criteria for bid bonds allowed speculative approach to the bids.		

Netherlands (SDE+ scheme)

Tendering period	2011	2012	2013	2014
Tendered product	Budget			
Support mechanism	Sliding feed-in premium			
Tender design	Technology-neutral Annual budget cap 5 sequential tender phases with subsidy levels increasing from phase to phase “First come, first served” subsidy allocation rule			
Overall budget	€1.5bn	€1.7 bn	€3bn	€3.5 bn
Winning	11 approved	1 approved	65 approved projects	49 approved

bids	projects awarded €194.3mln[6]	project awarded €2.3 mln	awarded €628 mln	awarded €309.5 mln
Project delivery	99%[7]	100%	37%	0%
Award and compliance criteria		Delivery period – 4 years Environmental license	• Differentiation of remuneration for wind projects depending on location-dependent full load hours; • Penalty for non-realisation by the 4 years deadline: project excluded from SDE+ for five years; • Realisation progress checked by public authorities 1 year after project started; • Projects of over €400 mln obliged to provide bank statement.	
Outcome	– Issues with site selection; – Administrative barriers led to project delays.			

Portugal

	Phase A	Phase B	Phase C
Tendering period	July 2005 – October 2006	July 2005 – September 2007	May 2008 – December 2008
Tendered product	Capacity		
Support mechanism	Feed-in tariff		
Tender design	Technology-specific		
MW tendered	1200 MW	400 MW + 100 MW + 100 MW	200MW (divided in 13 lots – from 6 to 50 MW)
Participants	4 consortia, 1 excluded	3 consortia	122 bidders for 13 lots
End price awarded	Approx. 70€/MWh	Approx. 70€/MWh	Approx. 74€/MWh

[6]NEA, 2014 Report on Renewable Energy, http://english.rvo.nl/sites/default/files/2015/09/Renewable%20energy%20report%202014_0.pdf

[7] NEA, 2014 Report on Renewable Energy, http://english.rvo.nl/sites/default/files/2015/09/Renewable%20energy%20report%202014_0.pdf

Project delivery	100%	8,5% (34MW) 50% (by the end of 2016)	17,5% (35 MW)
Award criteria	• Economic impact; • Creation of an industrial cluster; • Support to innovation; • Technical abilities.		• Regional counterparts (LCRs) – 30%; • Tariff discount – 70%.
Outcome	+ High level of project delivery / commitment of awarded bidders; + Fast market consolidation; + Minimizing risk of failure on implementation; + Guaranteed implementation and turbine concentration allowed local industrial development; + Creation of an industrial cluster for wind energy, representing accumulative investment of €290 mln[8].		– Lack of visibility over future tender rounds.

United Kingdom (Non-Fossil Fuel Obligation - NFFO)

	NFFO-1	NFFO-2	NFFO-3	NFFO-4	NFFO-5
Tendering period	1990	1991	1994	1997	1998
Tendered product	Capacity				
MW tendered	600 MW	1000 MW	1500 MW	1700 MW	1177 MW
End price	£0.07-0.065/kWh (€0.088-0.081/kWh)	£0.072 - 0.065/kWh (€0.09-0.081/kWh)	£0.0435/kWh (€0.05/kWh)	£0.0346/kWh (€0.04/kWh)	-
Project delivery	24%	17%	21%	9%	14.5%
Outcome	– Uncertainty over number of bidders; – Lack of visibility of future bidding rounds; – Winner's curse; – Bidding was allowed on sites without planning permission or grid connection resulting in low delivery; – Lack of penalties resulted in low realisation rates (only 26% overall).				

[8] IRENA/GWEC, 30 years of policies for wind energy – Portugal, 2012

United Kingdom (Contracts for Difference - CfD)

Tendering period	2014
Tendered product	Budget
Support mechanism	Feed-in premium
Tender design	Sealed-bid Pay-as-clear Hybrid (technology-neutral but distinction between "technology pots" of established (e.g. onshore wind) and less established (e.g. offshore wind) technologies
End price (in established technologies pot)	£79.23 for delivery 2016 – 2017 (1 project)[9] £79.99 for delivery 2017 – 2018 (2 projects) £82.50 for delivery 2018 - 2019 (12 projects)
	• Planning permission; • Grid connection evidence; • Penalty for non performing: exclusion of the site from future auctions; • Penalty for delay: reduction of CfD period.
Outcome	+ Bidding prices lower that the administratively set strike prices (for instance, administrative strike price £95 compared to £79.23 for delivery in 2016/2017 achieved; £90 compared to £79.99 for delivery 2017 – 2018; £90 compared to £82.50 for delivery 2018 – 2019); – Low overall budget allocation resulted in very intense competition.

Brazil

Tendering period	2009 – ongoing
Support mechanism	Feed-in tariff
Tender design	New energy auctions (Technology-neutral or technology-specific) Reserve energy auctions (Technology-specific or RES-specific) Hybrid – first stage descending clock, second stage – sealed-bid
Awarded capacity	1806 MW (2009) 528 MW (2010)
Award criteria	• Environmental permits; • Preliminary grid access permit; • Resource measurements by an independent authority; • Winning projects to start delivery in 3 years (A-3 auction); • Bid bonds: 1% of project costs in 1st phase, 5% in 2nd phase; • Penalties: delay by more than 1 year – contract can be terminated without justification / complex penalty regulation for non-delivery of electricity.

9 DECC, CfD Allocation Round One Outcome, February 2015

Outcome	+ Standardized long-term energy contracts offered; + Continuous price reductions from 57.87 EUR/MWh in 2009, to 45 EUR/MWh in 2010, and reached 35.25 EUR/MWh in 2013[10]; NB: It is noteworthy that price reductions were linked to factors unrelated to the tender procedure design, namely very high capacity factors, different cost structure and the economic crisis in Europe which has pushed investors to seek new and promising wind markets in Brazil. Moreover, the Brazilian Development Bank (BNDES) awarded favorable financing conditions to project developers, including loans covering for up to 80% of the investment refundable in up to 16 years. Local Content Requirements are imposed on developers to qualify for loans. – Complicated penalties regime increased risk premiums for developers; – Limited participation for smaller players due to inflexible auction design; – Underbidding occurred; – Low realisation rates due to projects contracted at unrealistic prices; – High pressure on prices seemed to have a negative impact on environmental issues.

South Africa

Tendering period	2011 - 2016
Tender schedule	5 auction rounds by 2016
Support mechanism	Feed-in tariff
Tender design	Technology-specific Pay-as-bid Sealed-bid Multi-criteria
Awarded capacity	1,196 MW (2012)
End price	$0.17/KWh (2011)[11] $0.13/KWh (2012)
Award criteria	• Land acquisition proof; • Proof of commercial viability of the project; • Technical, environmental, financial requirements; • Bid bonds; • Contract cancellation if commitment under PPA not achieved; • LCR provisions as well as community involvement and plant ownership, which accounts for 30% of the final bid evaluation.
Outcome	+ Steadily increasing competition levels (from 53 in 2011, 79 in 2012 to 93 in 2013);[12] – First auction characterised by excessive auctioned volume resulting in low competition levels; – Low diversity of successful companies in the first three windows; – Only the last tender reached prices comparable to the pre-tender FIT period.

[10] Ecofys, Design features of support schemes for renewable electricity, January 2014
[11] IRENA, Renewable energy auctions in developing countries, 2012
[12] IRENA, A Guide to design, 2015

Poland (Industry-led trial auction)

Tender framework as per the Polish RES Act (February 2015)	
Tendering period	Auction applicable as of 1 January 2016
Tender schedule	At least 1 per year
Tendered product	Capacity and budget
Support mechanism	CfD-type feed-in tariff
Tender design	Hybrid technology-neutral (separate auctions for installations below and above 1MW)
Award and compliance criteria	• Compliance with local zoning plans; • Grid connection conditions; • Environmental permit; • Project to be operational within 4 years; • Electricity supplies forecast required for up to 19 years ahead; operators subject to penalties if generation is 15% below forecast; no reward of excess electricity; • Financial guarantees from banks (alternatively a payment of PLN30/kW deposit of planned generation capacity).
Considerations	– Unclear whether the auction winner will be allowed to correct the building permit to install newer technology within the 4 year building period. Changing a building permit might result in delays in project realisation.
Outcome of the industry-led trial auction[13]	
Tender design	Hybrid technology-neutral (baskets for installations below and above 1 MW, both additionally divided in below and 4000h/year) Sealed-bid Pay-as-bid
Outcome	– Despite technology-neutrality, baskets' definition auction promoted certain technologies over others; – Baskets definition did not mirror the pipeline of projects ready to be built thus creating different competition intensity; – In the above 1MW, above 4000h category, biomass did not meet competition from other technologies which resulted in high prices and unawarded volume. On the contrary, intense competition took place in the below 4000h basket, where mainly wind projects participated, resulting in underbidding.

[13] With the adoption of the new RES act in February 2015, Poland is set to replace its green certificates RES support scheme by auctions in 2016. A trial auction was organised by the Polish Renewable Energy Association, PwC and the Domanski Zakrzewski Palinka Legal Office in order to test investors' preparedness to participate in a tender.

Tender Systems in Offshore Wind

The offshore wind industry set a milestone in the first half of 2015 by adding over 4 GW[14] of new capacity. Offshore wind installed capacity is expected to grow from 8GW by the end of 2014 to 66GW in 2030 covering 7.7% of the EU electricity demand [15].

The offshore wind sector provides valuable insight into how existing tender systems have been set up and deployed. Within the Member States with offshore wind markets, Denmark and the UK have tenders in operation, with the tenders rolling out in the Netherlands and a tender system being tabled in Germany.

Considerations

The scale of developments and investment required to develop offshore wind requires unique considerations that may not apply for onshore or other renewable energy technologies.

1. Centralised or decentralised allocation

Whilst centralised site allocation is not appropriate for onshore wind, the system exists in offshore wind for Denmark, whilst the UK has adopted a decentralised system. The Netherlands are starting a centralised allocation system in 2016 (Borselle). Both systems have shown to reduce costs over time. It should be noted that the UK places pre-planning and transmission costs onto the developer, meaning that UK tender prices are higher than Danish tender results. However, the UK system does allow for greater competition in terms of the scope and the cost of energy revealed in the tender result is more transparent in the UK as fewer costs are socialised.

A centralised system places a degree of emphasis on government to determine the sites to enter for tendering. Site selection should ultimately be an exercise decided by organisations best equipped to assess resource and general technical viability. Governments can instead focus on streamlined administrative procedures to process permits for project development in a timely manner. A one-stop-shop approach is advisable in order to ensure efficient coordination between the responsible authorities. An advantage of centralised planning is that grid connection of several wind farms can be planned centrally, which opens the scope for grid synergies.

2. Pre-Qualification Criteria and Penalties

When conducting a tender for sites at significant scale, governments should rightly implement pre-checks and penalties to ensure that a bidder has the resources to see a project through to completion. However, overly strict criteria and penalties can harm the effectiveness of reaching a competitive price for the project by unnecessarily excluding sets of investors or developers.

This has been a critical point for offshore wind where the scale of investment naturally limits participation, but a point that should be considered with more mature technologies where a larger pool of market players exist. A careful blend of financial and technical criteria, and project milestones should be designed in any tender system with the size and maturity of the market in mind.

3. Technology-specific tenders

Technology-specific tenders are best suited for offshore wind in order to capitalise on its specific generation characteristics and to tap into its cost reduction potential.

[14] EWEA, The European offshore wind industry – key trends and statistics 1st half 2015, July 2015
[15] EWEA, Wind energy scenarios for 2030, August 2015

Offshore Wind Tender Scheme Designs

United Kingdom

Relevant authorities	**Department of Energy and Climate Change (DECC)**
Overall framework	Electricity Market Reform (EMR)
National target for offshore wind	None
Support Mechanism	CfD - Contracts for Difference Feed-in premium A 'top-up to wholesale' capped at strike price
Price Determination	Highest bid in delivery year for sites leased by The Crown Estate Pay-as-clear
Open/Sealed bid	Sealed-bid
Inflation correction	Yes, CPI
Income assessment	Hourly average price
Quantity of Support	15 years from commissioning in target delivery window
Defined Schedule for allocation? (Y/N)	Yearly - but current allocation on hold
Remuneration budget	Constrained Allocation Rounds (Application windows, with expectation of rationing)
Qualification Criteria	
Financial	Prequalification proof of: - Incorporation to relevant tax jurisdiction. Post CfD contract allocation: - Evidence of Substantial Financial Commitment to be provided at key milestones; - Proof of 10% of capital costs spent via invoices OR poof of major construction contracts signed by one year after CfD contract signature; - Major construction contracts signed; - FID / Financing secured as evidenced by signed loan agreement;

	- Crown Estate Lease signed; - Energy Yield Assessment; - Key project consents.
Technical	Prequalification criteria: Planning permission has been secured either by: - Development consent from Secretary of State (Planning Act 2008); - Section 36 Consent (Electricity Act 1989); - Order from Welsh Ministers under the Transport and Works Act 1992; - A Grid Connection Offer has been accepted; - Government certificate issued which validates supply chain plan (for projects over 300MW). Post CfD contract allocation: - Project at least 80% commissioned within Target Commissioning Window (TCW) for difference payments to be triggered, starting 15 year term. Determining where the one-year TCW sits around the Target Commissioning Date (TCD) is at the discretion of developer; - Failure to deliver a specified percentage of capacity by Longstop date (2 years after end of TCW) will mean CfD reduction or termination; - Phased projects only qualify for up to 1500MW in three phases. 25% of total capacity must be constructed in the first phase, which must have TCD before March 2019 for first allocation round projects, and the last phase's TCD must be less than two years after the first TCD. These dates will move back as other years become available.
Other Limitations	1 application per project
Planning Considerations	
Planning Risk	Developer undertakes all planning investigations
Grid Connection Responsibility	Developer sells to the Offshore Transmission Owner (OFTO)
Outcome from 2014 round	£119.89 for delivery in 2017-2018 £114.39 for delivery in 2018-2019 + Over 1.1 GW of offshore wind contracted; + Bidding prices were lower than the strike prices set administratively by Government (for instance, administrative strike price £140 for delivery in 2017/18 compared to £119.89 achieved; £140 compared to compared to £114.39 for delivery in 2018/19); – A single wind farm taking up £165mln out of the £265mln Pot2 budget, therefore supply chain can be affected if auction is impediment on deployment.

Denmark

Relevant authorities	Danish Energy Agency (DEA)
Overall framework	Promotion of Renewable Energy Act
National target for offshore wind	2.7 GW by 2021
Support Mechanism	Financed by Public Service Obligations (PSO) paid by electricity consumers Feed-in-premium Difference between strike price and wholesale price
Price Determination	Project specific at pre-developed, centralised sites Pay-as-bid
Open/Sealed bid	Preliminary bid followed by negotiation with ENS as basis for defining the final tender specification, leading to a final sealed-bid
Inflation correction	No
Income assessment	Hourly average price
Quantity of Support	50,000 full load hours or 20 years
Defined Schedule for allocation? (Y/N)	Yes - per available project
Remuneration budget	No, expenses vary with the electricity price. But the 350 MW multi-site nearshore tender currently running is the first with an administratively set ceiling for the strike price of € 93.8 / MWh.
Qualification Criteria	
Financial	Prequalification proof of: - Minimum DKK15bn yearly turnover (average 3 year value; the figure varies per available project size); - Equity ratio of 20% or above; OR - LT debt rating of BBB- or higher (S&P, Fitch), Baa3 (Moody's); - All data submitted to be IFRS compliant; - CFO sign-off on no known significant changes from last balance sheet; - EU economic operators (financial institutions) regulated by EU directives on financial institutions must submit an independent auditor's opinion in lieu of equity ratio/LT debt ratings; - Non-EU economic operators must also supply an independent auditor's opinion, in addition to information on regulatory environment they are subject to.

Technical	Prequalification criteria: - References for last 10 years on offshore projects developed and managed, with at least one site of minimum 100MW capacity; - O&M references for at least offshore wind project over 25MW; - Disclosure on use of Environmental, HS, Quality, and Risk management systems.
Other Limitations	- Max. 10 applicants per tender; Changing in the composition on economic operators requires written consent of DEA; - For the nearshore tender: onshore regulation on local acceptance applies meaning that 20% of the ownership shares shall be offered to the local citizens at cost price and possible loss of property value shall be cowered by the developer.
Planning Considerations	
Planning Risk	DEA takes on preliminary site geo-investigations, EIA, Met ocean, UXO Full investigations taken by developer during tender
Grid Connection Responsibility	TSO Energinet.dk finances, constructs, operates substation platform and export cable Near-shore Developer takes on substation and grid connection to shore

Outcome from tender rounds

Tendering period	**2004-2005**	**2008**	**2009-2010**	**2013–2015**
Site	Horns Rev 2	Rødsand 2	Anholt	Horns Rev 3
Support mechanism	Sliding FIP	Sliding FIP	Sliding FIP	Sliding FIP
Tender design	Technology-specific	Technology-specific	Technology-specific	Technology-specific
	Multi-criteria	Single-bid	Single-bid	Single-bid
		Price only	Price only	Price only
MW tendered	209	207	400	400
Participants	4	4	4 pre-qualified, but only 1 company bid	4 pre-qualified companies
Price	Strike price: DKK 518/MWh (€69.5/MWh) for the first 50,000 full load hours	Strike price: DKK 629/MWh (€84.4/MWh) for the first 50,000 full load hours	Strike price: DKK 1005/MWh (€140/MWh) for the first 50,000 full load hours.	Strike price: € 103/MWh) for the first 50,000 full load hours
Project delivery	2009	2010	2013	2017-2020
Award and compliance criteria	No local content requirements	No local content requirements	No local content requirements	No local content requirements

			No premium is granted when negative prices on the spot market.	No premium is granted when negative prices on the spot market.
Outcome	+ One-stop-shop arrangement for administrative and permitting issues; + Guaranteed grid connection.	+ One-stop-shop arrangement for administrative and permitting issues; + Guaranteed grid connection; – The right to build was won by a consortium consisting of two companies for a price of DKK 499/MWh (€67/MWh). The bid was withdrawn due to an increase in turbine prices. This led to the introduction of compliance penalty in subsequent tenders.	+ One-stop-shop arrangement for administrative and permitting issues; + Guaranteed grid connection; – Low competition and relatively high price probably caused by inflexible tendering conditions, such as high compliance and delay penalties and short construction period of 3.5 years; – Too stringent pre-qualification requirements hamper competition.	+ One-stop-shop arrangement for administrative and permitting issues; + Guaranteed grid connection; + Healthy competition.

Netherlands (Entry into force in December 2015)

Relevant authorities	**Netherlands Enterprise Agency (RVO)**
Overall framework	Regulation on Offshore Wind Energy 2015
National target for offshore wind	700MW each year for 5 consecutive years
Support Mechanism	SDE+ - Stimulation of Sustainable Energy Production Feed-in premium Difference between basic price and wholesale price with profile and imbalance price factors as corrections
Price Determination	Project specific at pre-developed, centralised sites Pay-as-bid
Open/Sealed bid	
Inflation correction	No
Income assessment	Yearly average price
Quantity of Support	15 years after subsidy grant (not from first the start of power production) Payable for full load hours equivalent to 36% load factor
Defined Schedule for allocation? (Y/N)	Yes, 350MW x 2 annually for 5 years
Remuneration budget	
Qualification Criteria	
Financial	Applicant must pass financial feasibility test: - Equity capital at least 10% of the investment; - Provide two bank guarantees to provide for penalty payments; - EUR 10mln after winning the tender; - EUR 35mln one year after winning the tender.
Technical	Site realisation within 5 years of Site Decision
Other Limitations	
Planning Considerations	
Planning Risk	RVO takes on site investigations, scoping EIA
Grid Connection Responsibility	TSO (not under subsidy scheme) TenneT finances, constructs, operates substation platform and export cable.