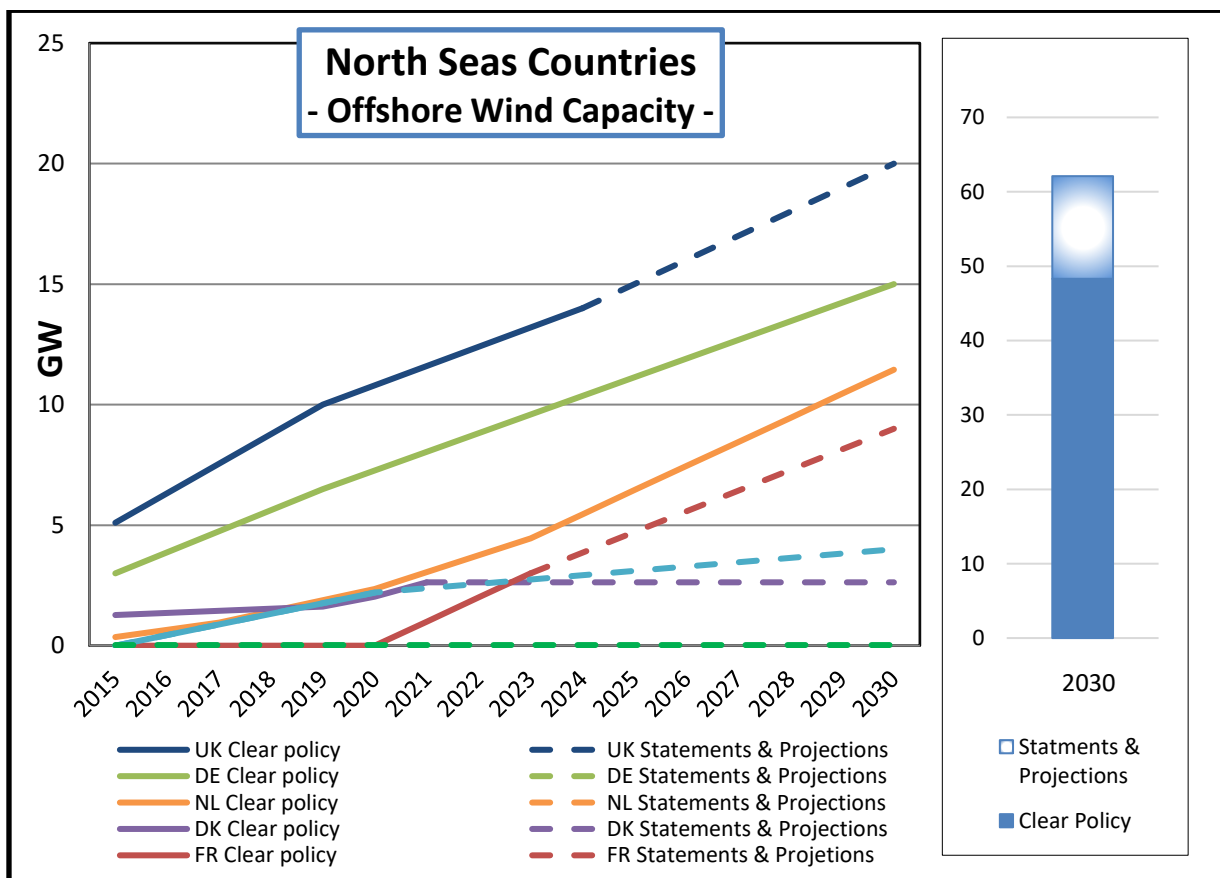


Support Schemes for Offshore Wind - Emerging Best Practices -

Offshore wind deployment in the North Seas

The North Seas has a great potential for offshore wind deployment. The sector and the region have experienced a strong growth in recent years along with an impressive reduction in technology costs.

Businesses underlined the importance of stable and predictable offshore wind deployment in order to achieve further cost reduction and maintain a sustainable supply chain. To tap further potential, North Seas countries have adopted deployment plans for offshore wind. For 2020, national policies target a total installed capacity of approximately 25 GW. The North Seas countries indicated in their policies cumulative targets of 48 GW in 2030. If additional objectives (that have not yet been transposed into national legislation) contained in national policy statements are implemented, a total of approximately 62 GW of installed capacity of offshore wind could be reached in 2030. The offshore industry advocates for a capacity of 70 GW to be installed in Europe by 2030.



In recent years, offshore wind deployment has increased strongly in the North Seas region. North Seas countries have set up specific support schemes to support offshore wind deployment. The majority of them apply technology-specific auctions for offshore wind. While Member States are still exploring different design options, sharing information and discussing the respective advantages and disadvantages of different schemes is highly beneficial. SG3 serves as a platform for such exchange of information, best practices and joint learning. This process allows optimisation of support scheme design and may lead to improved results. SG3 also serves as a platform to enable a better understanding of the similarities and differences between support schemes. This may be used as a basis for increasing the alignment of certain elements of support in the future, in particular with a view to enabling possible future joint offshore projects that would be linked to the support schemes of several countries.

Overview of existing schemes

Nearly all North Seas countries have moved towards a competitive support allocation via auctioning, with the exception of Belgium where support is granted following a negotiated procedure and Ireland which does not have a support framework for offshore wind in place at present.

The table below compares the key elements of the schemes showing differences and similarities. It compares type and length of support payments, allocation criteria for support payments, site development, as well as auction design elements such as pre-qualification criteria and the cost sharing approach for grid connection of the wind park. Many of the above parameters influence the allocation of risk between the governmental authorities on the one hand and the project developer on the other. This also affects the cost allocation of offshore wind deployment and needs to be kept in mind when analysing the respective auction results.

	BE	DK	FR	DE	NL	UK	IE	SE
Support Scheme	tax financed feed-in tariff	tender	Tender; latest tender is being run by competitive dialogue.('dialogue concurrentiel')	tender ¹	tender	tender	n/a	n/a
Technology specific	yes	yes	yes	yes	yes	partly ²	n/a	n/a
Support period	19 years	50.000 Full Load Hours	20 years	20 years	15 years ³	15 years	n/a	n/a
Type of premium	feed-in tariff	sliding premium/CfD	sliding premium/CfD	sliding premium/CfD	sliding premium/CfD	sliding premium/CfD incl. pay-back requirement if strike price is above market price	n/a	n/a
Pricing mechanism	pay-as-bid	pay-as-bid	pay-as-bid	pay-as-bid	pay-as-bid	pay-as-clear	n/a	n/a
Pre-qualification	n/a	Yes, see below	Yes, see below	Yes, see below	none ⁴	Yes, see below	n/a	n/a
- material/technical	n/a	technical	technical	[mat.?)		Planning	n/a	n/a

¹ Transitions phase, tenders for installation operating as of 2021.

² Grouped in mature and less mature technologies.

³ Possible extension of one year if eligible production is left over.

⁴ But requirements specified in the subsidy tender.

		experience	capacity			permission + Crown Estate Agreement for the lease of the site		
- financial	n/a	financial eligibility ⁵	financial capacity	100€/ kW 200€/ kW as of 2026 (central model)		none	n/a	n/a
Location	pre- defined area	pre- defined area (central model)	pre-defined area (central model)	pre-defined area (central model)	pre-defined area (central model)	open location	n/a	n/a
Grid cost sharing	Case-by-case decision ⁶	shallow (large scale projects) deep (near shore ⁷)	shallow ⁸	shallow	shallow ⁹	deep ¹⁰	n/a	n/a

⁵ Turnover of 4-15 billion DKK and equity ratio of 20 % or certain financial rating

⁶ The total cost for the financing of the submarine grid is decided by the regulator and this on the basis of the offers that have to be taken into account following the concession owner.

⁷ TSO responsible for onshore grid enforcement.

⁸ Legislation currently being progressed through the French Parliament will provide for the TSO to own and operate the offshore grid and for the developer to only pay shallow costs.

⁹ TSO responsible for offshore platform and export cable.

¹⁰ After completion, transmission is sold to TSO.

Emerging Best Practices

Tendering procedures have shown impressive cost reductions

There is a clear trend towards auctioning of support for offshore wind. With the exception of Belgium, all North Sea countries have moved towards tendering. The table below shows the results of auctions for offshore wind support. The auction results are not directly comparable between countries as they depend on the design of the support scheme and on costs that are not necessarily included in the bid price in some countries, such as the cost for the grid connection or the cost of site investigations and site permitting. Nevertheless, the trend of falling support costs is clearly visible. It seems that the auctioning of support has led to a constant re-evaluation and in the vast majority of cases a lowering of the required support level to below that of previous feed-in tariff schemes.

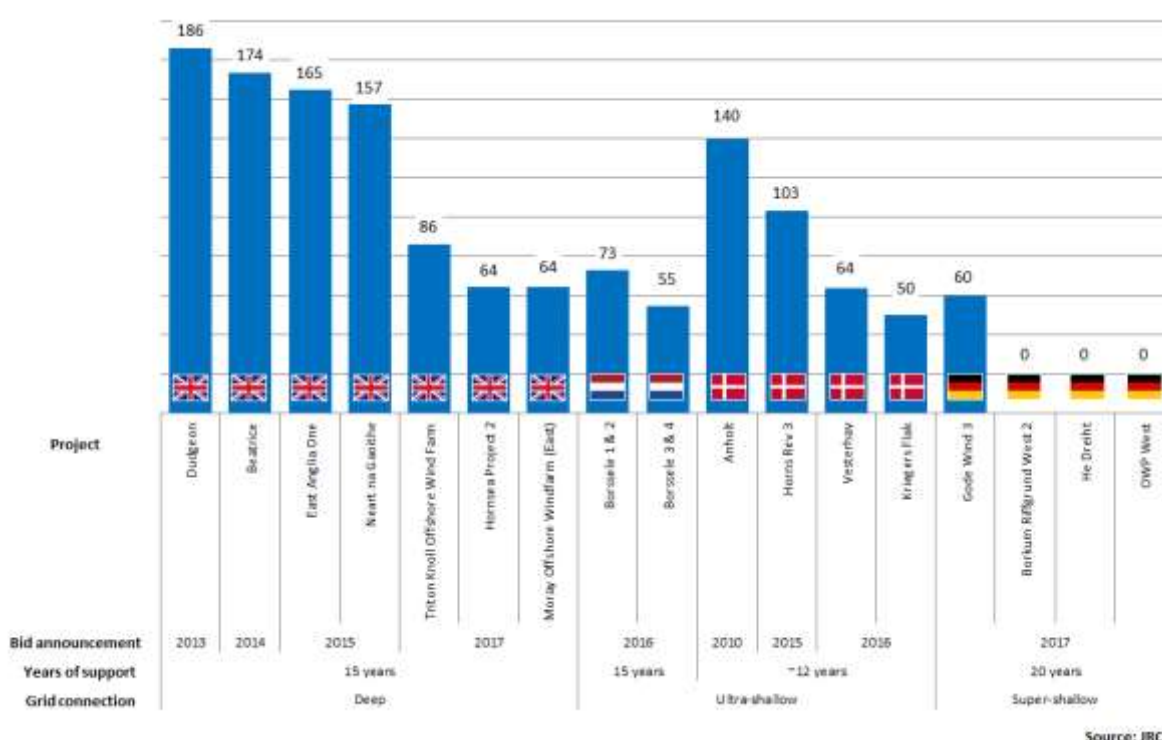


Figure 1 Figure 1. Development of winning bid prices (EUR/MWh) of offshore wind energy projects in recent competitive tender bid support schemes.

Note: All prices at the date of bid announcement.

Note: DE tender results include electricity market prices; i.e. auction results of "0" mean that projects bid at market price levels.

Support schemes including direct marketing increase market integration of offshore wind

Nearly all North Seas countries apply support schemes that require direct marketing of the produced electricity with a feed-in premium or a Contract for Difference (CfD) scheme. Direct marketing schemes ensure that offshore wind electricity producers take part in the electricity market.

All North Sea countries applying direct marketing schemes apply sliding market premiums/CfDs which adapt support volumes according to the (average) electricity price. They lower the risk for

project developers as their overall remuneration (electricity price + premium) will remain stable. Furthermore, they ensure that support levels will be adapted automatically to market prices changes (e.g. increase due to a higher ETS price) and will lead to lower support costs in times of rising electricity prices. The time period over which the electricity price is averaged to determine the premium, however, is different in North Seas countries and ranges from a yearly average (Denmark) to monthly (Germany, France) to hourly (United Kingdom). A longer average period increases the incentive for the operator of an installation to adapt their production to changing market prices, in order to optimise market revenues versus average premium payments. On the other hand, the longer the average period is, the more the premium payments may differ from average market prices, which may lead to higher support costs for the public.

Most North Seas countries determine the support level in the tenders via the pay-as-bid approach. The United Kingdom uses a pay-as-cleared approach.

Support for offshore wind is mainly technology-specific

Nearly all North Seas countries have technology-specific support schemes for offshore wind, with the United Kingdom operating a modified version of a technology-neutral scheme which groups technologies as mature and less mature. In the UK, offshore wind competes with other emerging renewable technologies including anaerobic digestion, wave and tidal, etc. North Seas countries regard a certain technology-specification of tenders as important so that support schemes can be designed to take the particular characteristics of offshore wind into account. It also helps avoid windfall profits for mature technologies.

Judging by the results of the auctions, it appears that competition among offshore developers in the North Seas area is sufficient to ensure that support levels decrease in line with technological progress and market maturity.

Prequalification requirements for tender participation need to find an equilibrium between attracting sufficient bidders (competition) and ensuring high realisation rates

Most North Seas countries include technical and/or financial pre-qualification criteria. Pre-qualification criteria are designed to increase the probability that the winning bidder will be able to actually deliver the project. Tender procedures show considerable differences in their pre-qualification criteria which might be the result of the specific experience in a country.

In France, the new “competitive dialogue” (dialogue concurrentiel) provides for the pre-selection of candidates based on applicants demonstrating adequate technical and financial capacity. While Denmark and Germany have opted for financial pre-qualification criteria (bid bonds proportionate to planned capacity), the United Kingdom and the Netherlands have not introduced financial pre-qualification criteria, but demand technical pre-qualification to be demonstrated (such as planning authorisations, lease agreements for the site etc.). Due to the decentralised model in the UK (see below), where large parts of the site investigation are under the responsibility of the project developer, it is assumed that a project developer has already committed significant financial

investment to a project before participating in an auction which has a similar effect as the provision of a financial deposit/bid bond.

The main challenge when defining pre-qualification criteria is to find the right balance between ensuring sufficient participation and competition within the tender and ensuring actual project realisation afterwards. If prequalification criteria are too strict, for instance because they demand extensive experience or high financial guarantees, this could close the market for new entrants or increase the overall project costs. Weak pre-qualification criteria on other hand might reduce the likelihood that the project will be built.

In most North Sea countries the selection and pre-investigation of sites is undertaken by a public authorities (centralised model) and the costs for the onshore connection are borne by the TSO (shallow approach for the distribution of grid costs)

There are two main models for site selection and development: the centralised and the decentralised models. In the centralised model, public authorities pre-investigate and select sites where the development is to take place. In the decentralised model the project developer is responsible for selecting and investigating the sites. There is a clear tendency towards the centralised model in the North Seas countries: DK, BE and NL use the centralised model and in France, too, governmental authorities select the area. In the most recent French auction, the national authorities undertook some of the site investigations while the developer is responsible for carrying out the specific environmental impact assessment and for obtaining the foreshore lease. France is currently in the process of reforming permitting processes. In the new model currently under consideration, the government will undertake in-depth site investigations and will auction on the basis of a permitting envelope. Today only DE and UK operate a decentralised model but DE will move to centrally defined sites for all tenders taking place as of 2021. In the UK, the developer covers the major part of pre-investigation of the sites which it leases from the Crown Estate.

As regards the pre-investigation of sites, the models vary with regard to the degree of responsibility attributed either to the government or the developer. It seems advantageous to include at least a minimum level of preliminary and basic site investigation (e.g. basic seabed studies) to be done by a governmental authority. However, opinions differ as to what degree more detailed studies and investigations should be left to project developers, even though in practice both governments and companies rely on the advice of the same specialised consultancies for their site investigations. As regards installation specific investigations and post-build monitoring that are directly linked to the final set-up and layout of the wind park, there is consensus that these specific studies should be done by the project developer.

Another important parameter is grid connection to land. Except for the pre-2021 German regime, all North Seas countries with a centralised model have a shallow financing regime for the connection to shore. Only the current German model allows the developer to select the site despite shallow grid costs, leaving the government with little control over which site is selected but with the responsibility to bear the costs for its connection. In the decentralised UK model, the project developer is responsible for the financing and construction of the grid connection to the shore. In this system, the developer needs to consider the cost for grid connection in its tender for support.

France is currently in the process of passing legislation under which the TSO will be assigned the responsibility for the development and operation of the offshore grid. The grid costs will therefore no longer be included in the bid prices.

Despite the general trend towards centralised models with shallow grid costs, the advantages and disadvantages of each model are discussed, in particular with a focus on the responsibilities for grid connection. Parts of the industry have stated their preference for models in which the project developer is in charge of the construction of the transmission infrastructure in order to have the entire project development done by the same entity. Others appear hesitant to take on the additional responsibility of grid connection, arguing that this increases capital requirements.

Period of support and concessions

North Sea countries provide support over periods between 15 years (the Netherlands and the United Kingdom) and 20 years (Germany and France). Denmark defines the maximum amount of full-load hours (FLH) during which support is granted regardless of the duration.

In case of shorter time periods, stakeholders have indicated a preference for a full-load-hour approach since this would allow them to “stop the clock” during times when the installation is not producing (e.g. times of negative prices, no wind or heavy storm that might force installations to cut their production temporarily).

As regards concession periods, stakeholders expressed their clear preference to extend concessions beyond support periods to allow project developers to maximise electricity output and market revenues.

Common Principles/ First Conclusions

SG3 serves as a platform for North Seas Member States to update each other on their experience with designing support schemes for offshore wind and to learn from each other’s experiences. It also serves as a platform to identify best practices and lessons learned from existing support scheme design and as a platform to jointly discuss and work on measures to tackle challenges that may arise in the deployment and financing of offshore wind in the North Seas.

By identifying similarities and differences between currently existing support schemes, the work of SG3 will also provide a basis that can be used for the preparation of potential joint projects in the future. The results of SG3 on support scheme design will show where similarities and where differences exist in current national support schemes that would need to be addressed and aligned where joint projects are being pursued.

Offshore wind is still a rather new sector which develops dynamically. North Seas countries have been implementing different support schemes and there is a clear benefit in testing different concepts and ideas to adapt to new developments and changes. Full alignment of support schemes for offshore wind across the North Seas therefore does not seem to be particularly beneficial today. On the contrary, competition of ideas and joint learning seems crucial for the rapidly developing offshore sector. Stakeholders have also expressed the view that a diversity of different support

design options is - for the moment - beneficial in the North Seas region since it enables project developers to diversify their project portfolio and hedge risks.

Nonetheless, based on the discussions within SG3, some emerging best practices and proposals for possible common principles for offshore support scheme design in the North Sea region can be identified (see box below).

- **Auctions should be the default support mechanism for new offshore wind installations.** Auctions have revealed impressive reductions of support levels.
- **Support should incentivise market-responsiveness** Market based support in form of a market premium/CfD enhances market-responsiveness of electricity production from offshore wind.
- **Auctions should include sound material and financial pre-qualification requirement.** The right balance is important to allow for sufficient participation in the tender while at the same time ensuring project realisation. SG 3 will further assess the effect of different pre-qualifications elements as well as penalties in case of non-realisation with a view to identifying best practices.
- **A basic pre-investigation of sites for future offshore wind generation by governmental authorities seems beneficial.** However, there are different options up to which level of detail pre-investigation of sites should be done by governments or by project developers instead. Installation-specific studies that require detailed knowledge on the eventual park layout should be done by project developers themselves.
- **Aim for sufficiently long support periods and concessions that go beyond the support period.** Aim for concession periods that go beyond the support period