Energistyrelsen

Summary of market dialogue on 3 GW offshore wind in the North Sea

Department
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Following the absence of bids for the three offshore wind farms in the North Sea, the Minister for Climate, Energy and Utilities asked the Danish Energy Agency (DEA) to conduct a market dialogue to investigate the background for the outcome of the procurement procedure. This memo summarises the results of the market dialogue.

Scope of the market dialogue
The DEA held separate meetings with 17 companies. The companies consisted of a wide range of active developers and subcontractors selected on the basis of their expression of interest in the procurement procedure in EU-Supply and their contributions to previous market dialogues. Furthermore, 9 written inputs were received to supplement the oral dialogue.

Questions to the market participants
The overall purpose of the market dialogue was to identify the decisive factors explaining why the companies decided not to bid for the 3 GW offshore wind in the North Sea.

The survey was based on questions related to:

1) The market conditions
2) Terms and conditions with regard to permits/licences from the authorities and the grid connection agreement
3) The specific terms of the concession agreement
4) The type of procurement procedure chosen and the procurement specifications

Summary

The companies all pointed out that, despite generally very good locations in Denmark, with good wind and seabed conditions, they were unable to make a satisfactory business case. This is due to a combination of sharply increasing costs (CAPEX, OPEX and financing costs) and the prospect of low and uncertain earnings opportunities in the Danish electricity market (DK1) due to expected low electricity prices, lack of sales opportunities and market uncertainties related to the electricity and hydrogen markets.

Several of the companies mentioned that they initially expected a positive business case when the procurement procedure was announced, but due to the aforementioned factors, their expectations gradually deteriorated towards the bid deadline. However, most point out that no single factor was decisive, but rather a

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combination of several of the factors discussed in more detail below. It is also worth noting that players point out that several uncertainties, particularly market uncertainties, would lead to higher risk premiums and returns requirements.

On the expenses side, CAPEX costs have increased significantly, especially in recent years, due to general inflation and pressure on supply chains. Pressure on suppliers is partly driven by the fact that many countries are applying 2030 targets, making it difficult and expensive to enter into agreements with suppliers, especially for wind turbines, cables and ships, for wind farms to be established in 2030 or soon after. Similarly, rising financing costs, among other things due to rising interest rates, have added to the costs side of the negative business case with little variation between the developers.

On the revenues side, companies mention expected lack of demand and therefore a likelihood of low electricity prices. In this respect, many point out that positive expectations that the hydrogen market would develop and purchase larger amounts of power from renewable energy have not materialised. This has meant that most developers have looked into supplying power solely or primarily to the Danish electricity grid, where there is already a high share of renewable energy, including wind energy with consequential downward pressure on prices. Several companies point to an untapped potential for electrification in Danish society and they stress that the absence of large industrial consumers in Denmark compared to other countries reduces opportunities for risk hedging via PPAs (power purchase agreements).

In light of the limited demand, many point to uncertainties regarding future electricity prices when such large amounts of offshore wind are offered simultaneously (6 GW with the possibility of overplanting and the expected Energy Island Bornholm). The potential volume increase in relation to a limited increase in electricity consumption results in low expected electricity prices and significant uncertainty, which companies have factored into the business case.

With respect to hydrogen, the market dialogue shows that several companies have actively explored the option - and often as the first option - to combine offshore wind with hydrogen production, including with regard to developments in traditional Danish electricity consumption. There are different views on the possibilities of hydrogen, but uncertainty about the German hydrogen market, challenges in reducing the price of green hydrogen, rising costs of both the necessary renewable energy production and hydrogen technology, and concerns regarding a hydrogen pipeline to Germany have all encouraged most companies to exclude the possibility of coupling hydrogen production with offshore wind being from their business case.

Companies predominantly support the overplanting option in the procurement procedures. Several highlight the innovation that the option could generate, as well

as the flexibility combined with the possibility of direct lines, which is particularly relevant if the hydrogen market develops. However, several also point to the uncertainty that overplanting may create if the concession areas in the North Sea are all offered for procurement at once and there is uncertainty about the total amount of renewable energy that will be produced, as well as potential wake effects from overplanting from nearby offshore wind.

With regards to improving the business case, the companies point to various options for support, especially in light of the limited opportunities to increase demand in the Danish electricity market in the short term. A majority point to the need for support through a so-called (two-sided) CfD, especially in order to counter future uncertainty in the electricity market and to ensure interest and sufficient competition in a possible future procurement procedure. A two-sided CfD would secure developers against the electricity price risk, as the same settlement price would be received, regardless of the market price. The developer would thus receive support when the electricity price is lower than the agreed reference price. Conversely, the developer would have to pay the state when the electricity price is higher than the agreed reference price (hence two-sided).

Only a few companies highlight state financing of the export cable, together with a possible reduction of other costs such as preliminary investigation costs, radar costs, guarantee costs and/or relaxed penalties, as sufficient to encourage new bids. In this respect, companies mention the importance of maintaining exposure of offshore wind to market prices and some concern about the interaction between CfD support and the electricity market. A few highlight the possibility of a combination of the above measures, ongoing adjustment options in a CfD to take account of future changes in the market situation (with inspiration from the UK), and the possibilities for support for the consumption side (e.g. electrolysis).

With regard to timetables, there is a unanimous need for additional flexibility. Flexibility in relation to year of installation is generally desired, so that challenges in relation to supply chains can be accommodated, for example. Companies point out that the installation deadline for any future offshore wind farms should be 2032 at the earliest, and several point to 2033 or 2034. However, most emphasise that it is difficult to predict a good start-up year so far into the future, and therefore flexibility is crucial to be able to match projects with opportunities to sell the electricity and the capacity of subcontractors. Several point to the size of the penalties and guarantees as an obstacle, and the majority of companies want these to be relaxed. However, most companies are positive about the design of the penalties for delays, with relatively low penalties for short delays, which increase for longer delays.

Similarly, companies point to the need for continuous procurements, for example 1-2 GW per year over a longer period of time in light of the limited market demand for

electricity and thus the uncertainty of electricity prices. This is further justified in that it will allow the demand side to keep up, and the prospect of a more stable business will help subcontractors to invest in new factories and therefore offer lower prices. Finally, a number of companies point to the need for sufficient time to prepare their bid from opening a call for tenders to the bid deadline. Four-five months is considered by most as too short, while some mention that six months would be sufficient. Others point to eight months or longer.

Regarding other procurement conditions, no actual decisive elements were identified. Most point out that government co-ownership increases the complexity and uncertainties associated with the procurement, but generally do not consider it a decisive reason for not bidding. Furthermore, companies point to a number of factors that have had a slightly adverse impact on them, in particular challenges with wake effects from future development, exclusionary financial suitability requirements and the desire to transition to a dynamic auction rather than closed bid auctions. Finally, several companies mention that Denmark is also in competition with other countries in the offshore wind sector and that, due to the massive expansion in the world, developers are increasingly prioritising limited development resources for the most attractive projects.

More detailed report

The overall purpose of the market dialogue was to identify the decisive factors explaining why the companies decided not to bid for the 3 GW offshore wind in the North Sea.

The survey was based on questions related to:

1) The market conditions
2) Terms and conditions with regard to permits/licences from the authorities and the grid connection agreement
3) The specific terms of the concession agreement
4) The type of procurement procedure chosen and the procurement specifications

1) Market conditions

During the market dialogue, the companies noted that the three locations in the North Sea are extremely attractive due to good wind and seabed conditions. Nevertheless, the companies could not build up a positive business case. Some companies identified this immediately after the announcement based on an overall assessment of the business case. Others worked extensively with the procurement documents and decided not to bid much closer to the deadline.

All the companies reported that the absence of a solid business case is due to sharply increasing costs (CAPEX and OPEX) and the prospect of lower earnings opportunities in the Danish electricity market (DK1) due to expected low electricity prices, lack of sales outlets and uncertainties related to the potential increase in volume . Similarly, rising interest rates on financing increase the cost side, while market uncertainties mean developers require a higher return on investment.

In particular, companies highlighted the significant increase in CAPEX over a short period of time due to general inflation and strong pressure on supply chains in the market. The companies refer to the fact that many countries are applying 2030 targets, making it very difficult and expensive to enter into agreements with suppliers, especially for wind turbines, cables and ships, for projects to be established in 2030 or soon after. Exact estimates of rises in CAPEX vary, but increases in the order of +30% are cited, with variations within technologies (turbines, towers, ships, cables, etc.). Some companies also mention that the supply chain requires pre-payment for components, which makes the project more expensive in the early stages.

Most companies consider low electricity demand in DK1 as decisive. This includes concerns that the anticipated development of the hydrogen market, which could have consumed large amounts of electricity, has failed to materialise. Several highlight a generally untapped potential for electrification of Danish society and the absence in Denmark of large industrial consumers which could form the basis for new PPAs (power purchase agreements) and thus risk hedging. Further to this, companies point out that various initiatives to support electricity consumption in Denmark could improve the conditions for entering PPAs, including supporting greater demand from data centres, transition of the heating sector or transition to electrofuels. Others point to the need to support energy exports.

Several companies mentioned that they have actively explored the option to combine offshore wind with hydrogen production, including with regard to developments in traditional Danish electricity consumption. However, uncertainty about the German hydrogen market, the challenges of reducing the price of green hydrogen, and rising costs of hydrogen technology have all contributed to the hydrogen market not developing as hoped. The lack of certainty regarding a hydrogen pipeline to Germany have also encouraged most companies to exclude the possibility of coupling hydrogen production with offshore wind from their business case.

Companies would generally prefer the 6 GW to be tendered over a number of years, with 1-2 GW per year instead of 6 GW all at once. In this context, the companies mention that if 6 GW were offered all at once, consumption would not have time to keep up with the expansion, leading to significant uncertainties regarding electricity prices, which the developers include in their business cases. This is especially pertinent in light of the fact that the hydrogen market has not developed as hoped, and therefore it is assumed that most of the capacity will be delivered into the Danish electricity grid. Companies stress that Denmark already has a very high share of renewable energy in the grid, including from wind, which puts downward pressure on prices, especially during the hours when the farms would be producing electricity. An additional volume of this magnitude would therefore require significant changes in Denmark to ensure demand. In comparison, companies point out that the demand side is different in countries such as Germany, the Netherlands and Belgium, where more renewable energy is still required to replace coal and gas in the electricity sector, and where the number of large industrial consumers is significantly higher. Furthermore, companies believe that procurements of 1-2 GW annually over a number of years would provide more investment certainty in the supply chain, and make it easier to invest in new production capacity and thus have a positive effect on CAPEX.

With regards to improving the business case, the companies point to various options for support, especially in light of the limited opportunities to increase demand in the Danish electricity market in the short term. A majority point to the need for support through a (two-sided) CfD, especially in order to counter future uncertainty in the electricity market and to ensure interest and sufficient competition in a possible future tendering procedure. CfD is mentioned by the majority of companies as necessary to provide sufficient security for the business case, as a CfD alleviates the problem of the lack of opportunities for risk hedging in the market via PPAs (power purchase agreements) in Denmark. However, some companies are concerned about the interaction between CfD support and the electricity market and prefer projects on market terms, i.e. exposure to price fluctuations and risks in electricity prices.

Costs of export cables are mentioned by some companies as particularly significant to the business case as they make up around a quarter of CAPEX. In this context, several companies highlight that in a number of other countries the TSOs construct and finance export cables and suggest a return to the model before Thor Offshore Wind Farm, where Energinet was responsible for establishing and financing export cables. It is suggested that this model could minimise the risks and costs for the developer, particularly because, unlike Energinet, establishing export cables etc. is not the developers' core competence, and offshore wind developers in competition with large TSOs may have a less favorable negotiating position in relation to scarce cable supply. Conversely, other companies prefer to establish export cables themselves, but with reimbursement of costs, because they find there is great flexibility if they can plan the routing themselves, e.g. in connection with the establishment of direct lines and PtX facilities.

With regard to the choice of type of support, a majority point to a (two-sided) CfD, and only a few companies highlight government financing of export cables together with a possible reduction of other costs, such as feasibility study costs, as sufficient to encourage new bids. A few others point to a combination of removing export cables from the scope of bids and introducing a CfD. A few point to the need to support the consumption side (e.g. for hydrogen production or consumption). Finally, with inspiration from the UK, some point to ongoing adjustment opportunities in a CfD through regular tender rounds, and some recommend offering both CfD-supported offshore wind farms and farms with concession payments.

2) Permits/licences from the authorities and the grid connection agreement
With regard to permits/licences from the authorities, environmental surveys and grid connection, companies point to the relatively high costs of preliminary investigations in Denmark. They also mention the costs for military radars. Costs have not been a deciding factor in developers' decision not to submit a bid, but the companies cite the above as an expense that the government may consider looking at to reduce the costs side for developers. Companies suggest that either the government could cover the costs, or that the costs could be spread over the project period instead of falling due in connection with the construction licence. Some have also suggested that the costs could be reduced by allowing developers to carry out the preliminary surveys themselves.

3) The specific terms of the concession agreement
With respect to the terms of the concession agreement, including penalties, conditions for joint state ownership etc., no actual decisive elements in the tender terms and conditions were identified for the absence of bids, but there are certain recurring views.

One common view among the companies is that joint state ownership is a complicating element in the tender documents, which, together with a number of other elements, contributes to greater uncertainty. In particular, companies mention uncertainties regarding the scope of the state's rights, including veto rights, control and influence on dividend payments, blocking the possibility of divesting ownership, and restrictions on the ability of the SPV to share data with the concession winner. They basically would prefer the state to be a passive investor.

Several companies address uncertainties related to wake effects, especially from future offshore wind and adjacent concession areas offered at the same time, including from overplanting. Several mention that it would be appropriate to establish buffer zones around the areas or alternatively to reduce the minimum power density in the farms so that there are lower requirements for utilisation of the total capacity of the area, thus giving developers more opportunity to design the farm and take into account possible external wake effects. When asked directly, companies seem to prefer low minimum power density over government-designated buffer zones. A few companies mentioned that compensation should be available if areas with wake effects are later offered for procurement.

Companies predominantly support the overplanting option in the procurement procedures. Several highlight the innovation that the option could generate, as well as the flexibility combined with the possibility of direct lines, which is particularly relevant if the hydrogen market develops. Moreover, the possibility of feeding additional capacity into the grid on days when the turbines produce less power was mentioned. This could ensure better utilisation of the infrastructure. However, several also point out that overplanting may create challenges if the farms in the North Sea are all offered for procurement at once. Partly because of greater uncertainty about the total amount of renewable energy that will be produced, and partly because wake effects from overplanting from nearby wind farms would possibly have to be included.

Penalties and guarantees were mentioned by several as too high, and some companies indicated that they included penalties for delays in their business case from the start due to the tight time schedule given the pressure on supply chains. This increased the cost of the projects. However, subcontractors in particular stressed the importance of penalties to attract serious bidders and create certainty for projects and enable planning down the value chains.

Several companies mentioned that they consider the progressivity in the delay penalties appropriate, with penalties for short delays being relatively low, but increasing for longer delays. Some pointed out that the government's right to withdraw from the concession agreement if the construction start-up milestone is delayed entails too much risk for the developer. Finally, a number of companies

noted that the size of the exit penalty in the Danish tendering procedures is relatively high compared to other European countries.

Several companies mentioned that sustainability requirements are an important part of the procurement. This applies to environmental sustainability requirements as well as requirements regarding social clauses and cyber security. It was argued that these requirements strengthen the competitiveness of European actors and promote sustainability initiatives in the market. Some companies consider the level as appropriate because it pushes the market, but not too hard, while others stated that the sustainability measures could be even more ambitious.

4) Type of procurement procedure chosen and the procurement specifications

In general, no actual decisive elements were identified in the type of procurement procedure or in the procurement specifications, although the developers had several comments.

Many mentioned that there can be advantages to dynamic auctions, in which bidders can see their competitors' bids and are given an opportunity to submit better bids within a given period of time. The developers point out that dynamic auctions provide a better opportunity to adapt to competitors' bids. However, some mention that the benefits of this auction type depend on whether the tender is for a single site or several sites.

There were mixed opinions about the timeline for future procurement procedures. Several mention that they want a new tender this year (2025) or as soon as possible. In this respect, some mention that Denmark risks being overtaken by projects launched in other countries if announcement of a procurement in Denmark is postponed for too long. Others recommend that the DEA work very thoroughly on the material and that this is more important than opening a new tendering procedure quickly.

Developers agree that the start-up deadline should be moved to after the "peak" in the market around 2030, but there is disagreement about how long bottlenecks in the market will last. 2032 is mentioned as the earliest completion year, while others mention 2033 or 2034 as appropriate completion years. However, there is general agreement that it is difficult to predict exactly when it would be appropriate to establish the farms, so flexibility in the schedule is crucial in order to match the projects to the potential demand for the electricity and to the capacity of the supplier markets. Several consider that a construction window of 1-2 years from start-up to completion is appropriate.

A number of companies point to the need for sufficient time to prepare their bid, i.e. the period from opening a call for tenders to the bid deadline. In general, it is

considered that 4-5 months would be too short. Some mention that 6 months would be sufficient, while others mention 8 months or longer, partly because they need time to negotiate and close agreements with subcontractors, buyers and potential partners, and internal processes also take time.

Finally, several companies mention that, despite its excellent offshore areas, Denmark is also in competition with other countries in the offshore wind sector, and that, due to the major global expansion, developers are increasingly prioritising their limited development resources for the most attractive projects. Projects in the Netherlands, Belgium, Germany and the UK are mentioned as attractive, among other things, due to better opportunities to sell the electricity, more risk hedging in the electricity market, higher electricity prices, the possibility of subsidies in certain countries or TSO responsibility for the export cables.