18 October 2024

ELS Analysis

- An Energy Focused Advisory & Consultancy Helping Clients Through the Transition

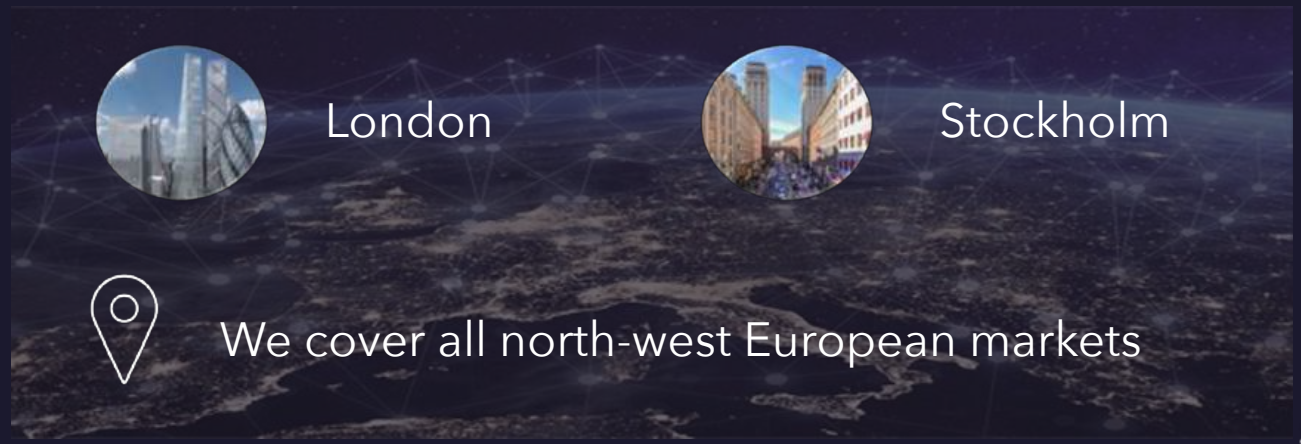
Tendering Procedures for Offshore Wind

A Comparative Analysis

Updated Version

Objective & fact based analysis driven by expertise & in-depth knowledge of energy markets and policies

ELS Key Markets & Core Competence



Energy Markets

Fundamentals – Outlooks - Optimisation

Business Strategies

Market Entry – Investments – M&A

Policy Analysis

Regulations – Political Risks - Implementations

Table of Content

Möt författarna:

Elin Akinci
CEO & Co-founder
elin.akinci@elsanalysis.com

Shana Cases
Regulatory Analyst
samuel.ciszuk@elsanalysis.com

Carl Rosenberg
Policy Analyst
rebecka.bergholtz@elsanalysis.com

Introduction

On behalf of the Swedish Wind Association, ELS Analysis has updated the previous report on a comparative analysis on different tendering procedures for offshore wind. The updated report covers the main design models for both non-auction based and auction-based permitting procedures. The comparative analysis also includes a brief description of eleven countries' permitting processes in the Baltic and North Seas up to date, in order to give an overview of current trends regarding both regulatory and policy developments for offshore wind.

The main purpose of this report is to provide the Swedish Wind Association with further knowledge about the different permitting and tendering procedures regarding offshore wind, with a specific focus on how the project risk is allocated between state and wind developer. This report also aims to evaluate the Swedish permitting process in light of current market and policy developments. The report therefore ends with a discussion about possible legal and policy options for Sweden, particularly in regard to its future permitting procedure design for offshore wind.

The report is structured into three chapters. The first chapter covers non-auction based permitting systems, and the second chapter analyses auction-based systems. The third and final chapter provides a comparative analysis of countries' tendering procedures. The report's main conclusions and recommendations are presented at the report's beginning.

> *Governments worldwide face challenges in meeting climate targets, ensuring energy security of supply, and making energy affordable for all, in a challenging market and politically unstable environment. The urgency of the situation is underscored by the fact that offshore wind is a vital part of achieving governments' objectives. However, it is only through well-designed tendering processes an uptake in investments will take place. This report aims to offer a timely, and in-depth understanding of the business environment, while still taking a comprehensive view. The ELS team hopes to provide a solid analysis to help industry and policy makers make well thought-through decisions, that will enable and speed up growth in the offshore wind industry.*

- Elin Akinci, CEO & Co-founder, ELS Analysis

Kontakta ELS Analysis:

elsanalysis.com

els@elsanalysis.com

ELS Analysis

What´s new?

In this new update, ELS Analysis dives deeper into the evolving offshore wind landscape, reflecting on the significant regulatory shifts and market dynamics that have unfolded since the previous report was published last year. While Chapters 1 and 2 remain largely similar yet up to date, the updates are most prominent in Chapter 3, offering a more comprehensive overview of how the tendering procedure frameworks for offshore wind operate across Europe and how these have evolved since our previous report.

In addition, the report's overall design has been refreshed to enhance clarity and navigation, making it easier to access key information.

An overview of main updates:

- **Tendering procedures revamped**: ELS Analysis has expanded and updated the analysis of tendering procedures across multiple countries, providing a clear understanding of how different frameworks shape offshore wind markets.
- **EU's role**: Following the unveiling of the EU Wind Power Action Plan, a new sub-section is included outlining the recommendations countries must follow to meet the overall mandatory offshore wind targets by 2030.
- **Country-by-country auction comparison**: A new table compares the latest auction conditions across countries. This section highlights the distinctive elements of each country's auction process, which influence overall outcomes.
- **Technology-neutral framework**: Building on the prior report's conclusions about the two-step auction process, ELS Analysis has now introduced an exploration of technology-neutral frameworks. This added discussion enriches our previous findings, offering a holistic view of how offshore wind auction designs can be incorporated into broader energy policy frameworks.

This updated report remains committed to providing actionable insights and helping stakeholders navigate the ever-evolving offshore wind landscape. Whether you are focused on regulatory frameworks or auction strategies, this edition offers a more straightforward path forward in a complex market.

Conclusions

1 National offshore wind targets: A key driver for strategic deployment and long-term success

The establishment of national offshore wind production targets plays a critical role in enabling the successful deployment of offshore wind energy. There is a strong correlation between legally binding targets and effective planning, execution, and evaluation of national strategies. Setting step-by-step targets for 2030, 2040, and 2050 provides long-term certainty for both developers and policymakers, fostering a more structured and predictable approach to offshore wind growth.

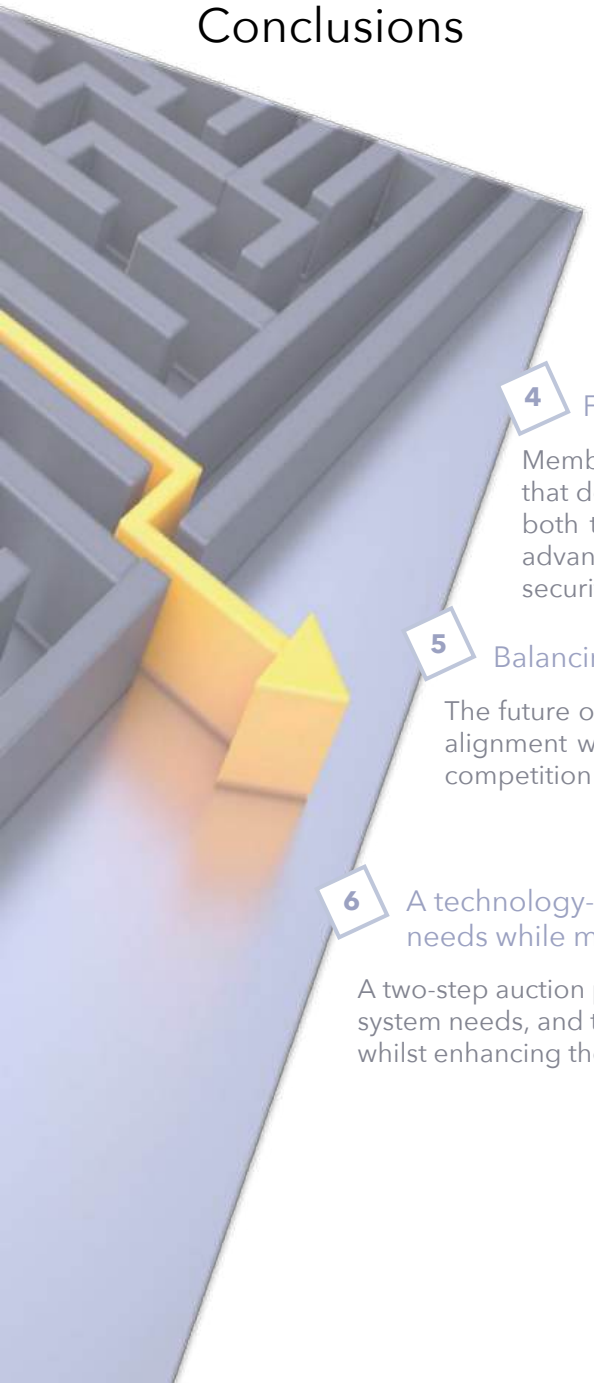
2 Auction-based systems are becoming the prevailing system for offshore wind permitting

Auction-based systems are increasingly becoming the dominant approach for offshore wind permitting, replacing administrative tender systems. This shift is driven by the flexibility auctions offer to both governments and developers, as well as the ability to share project and market risks between the state and asset owners. There is also a strong correlation between auction-based systems and offshore wind production growth. However, and to fully capitalize on this trend, countries should explore the various auction design options available, allowing for tailored tendering processes that align with national needs and preferences.

3 Balancing auction-based systems: Ensuring market diversity in offshore wind

While auction-based systems are increasingly favoured for offshore wind permitting, they pose a risk of reducing market participant diversity due to the high transaction costs that can create barriers for smaller and newer developers. To mitigate this risk, tendering systems must aim to be more inclusive, which is why pre-qualification criteria in auctions should be broadened beyond financial and technical requirements to include other qualifications, fostering greater diversity and encouraging wider participation from various market players while still ensuring project viability.

Conclusions



4 Following EU recommendations on offshore wind boosts competitiveness and target achievement

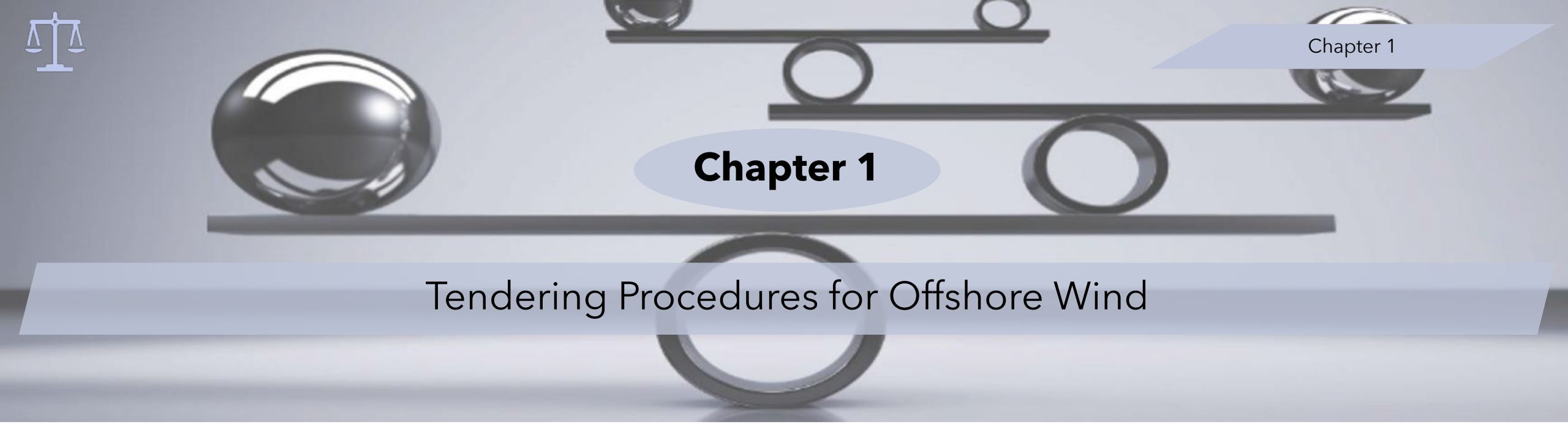
Member States that align with the EU's recommendations for offshore wind or other renewable technologies enhance their competitiveness compared to those that do not. By following these guidelines, countries not only position themselves as leaders in the renewable energy sector, but they are also more likely to meet both their national targets and contribute to the EU's collective energy and climate goals. This adherence fosters a unified approach, streamlining efforts to advance renewable energy infrastructure, while creating a competitive edge through accelerated innovation, investment attraction, and strengthened energy security across the Union.

5 Balancing market consolidation with increased complexity

The future of Europe's offshore wind auctions hinges on offsetting complexity with accessibility. While negative bidding drives innovation and non-price criteria ensure alignment with national and EU objectives, auction frameworks must stay inclusive. Ensuring predictability through pre-investigated sites will be crucial for fostering competition and keeping projects on track.

6 A technology-neutral allocation system with a two-step auction allows Sweden to accelerate energy deployment and address system needs while maintaining market balance.

A two-step auction process balances the needs of established developers and new entrants, ensuring fair competition. Meanwhile, a technology-neutral approach aligns costs, system needs, and timelines, driving market efficiency and supporting long-term energy goals. Together, they create a transparent, structured path for energy deployment, whilst enhancing the overall system.



Chapter 1

Tendering Procedures for Offshore Wind

In the past, the **administrative allocation of permits** was the standard method for approving offshore wind projects, until various auction-based systems were introduced. The shift towards auction tendering represents a significant policy change. This transition has largely been driven by the proven success of auctions as the most effective method for delivering new offshore wind installations. Auctions balance risk more evenly between the asset owner and the state, unlike the administrative allocation system, where the wind developer often bears most of the risk.

While administrative allocation was once widespread, it is now primarily used in countries that lack a dedicated offshore wind strategy or legislative framework. In such cases, the permitting process for offshore wind projects continues to fall under general maritime laws, rather than being adapted to the specific requirements of offshore wind development. This reliance on outdated legal frameworks highlights the need for a more targeted approach to meet the industry's evolving needs.

Administrative tender procedures, on the other hand, are frequently used in countries undergoing a transition, particularly those integrating offshore wind into their existing legal systems. These procedures often serve to complement auction-based systems, as seen in Poland. For example, a country may choose to combine competitive auctions in pre-selected, high-priority wind zones with administrative tenders in areas that have not been pre-designated by the government. This dual approach can help maximize the potential for offshore wind development across the nation.

Both administrative allocation of permits and administrative tender systems generally begin with the developer submitting an unsolicited application to develop offshore wind at a chosen site. In the case of administrative tenders, this is typically followed by a governmental call for additional applications to organize a competitive tender for that site. Once all applications are submitted, a tender commission is formed on an ad hoc basis for each project. This commission issues regulatory specifics and the relevant criteria for the site, reviews all applications, and selects the most suitable developer based on the established criteria. The transparency of administrative tender processes can vary, but they generally offer more clarity and predictability than administrative permit allocations, which tend to involve multiple stages and the uncertainty of whether permits will be granted.

In Denmark's now-defunct **open-door procedure**, the initiative to develop an offshore wind farm rested with the project developer. The developer would submit an unsolicited application for a license to conduct preliminary investigations in a specific area. However, since Denmark also employed an auction-based system for pre-selected sites, open-door projects could not expect approval if they were located in any of the areas designated for offshore wind farms.

As part of the one-stop shop concept, the Danish Energy Agency facilitated and organised public hearings regarding the selected area before deciding whether the area in the application could be developed. In the event of a positive decision, the Agency issued approval for the applicant to carry out preliminary investigations, including an Environmental Impact Assessment (EIA). If the results of the preliminary investigations showed the project could be approved, the developer could then obtain a license to establish the project. The Danish open-door procedure was one of the most developed non-pre-selected offshore wind systems in Europe, with a clear structure and organisation facilitating the process. This was largely due to Denmark having introduced a one-stop shop solution, which minimised the risk of long permitting periods, and because Denmark was a mature offshore wind market with a well-functioning system capable of supporting such a procedure.

In June 2023, the open-door procedure was finally abolished due to conflicts with EU law, after months of suspension.

BENEFITS OF A NON-AUCTION-BASED SYSTEM

Even though the offshore wind industry is experiencing a strong policy shift from non-auction-based systems to auction-based tendering systems, there are benefits to non-auction-based systems that need to be considered when deciding on future permitting procedure models. That is particularly so when considering the transition from a non-auction-based to an auction-based system.

If a non-auction-based system is well designed and structured to not imply a long and uncertain permitting process, it can be less costly for the wind developer. Auction-based systems often result in high transaction costs incurred by the bidder, as well as the auctioneer. These are costs associated with the administrative process of the auction system, which are generally high. If the transaction cost is higher than the expected profit from the development, it risks discouraging market actors from taking part of the auction. Thus, it could constitute a barrier for small developers and therefore reduce actor diversity in the market.

Moreover, looking at the experience from the Danish open-door procedure, such a system proved to be a very flexible option for developers who wish to establish their projects in areas not pre-selected by the state. It provided flexibility as developers can themselves chose the location, as well as a capacity level for the project, depending on where the developers see large potential from demand centres and possible offtakers. A setup that depends more on the developer's own prognosis and strategies could also lead to more cost-effective projects and stimulate the uptake in Power Purchase Agreements (PPA) between wind developers and end-users.

Chapter 2

Auction-based Tender Design Options

Government-led auctions for offshore wind energy are becoming the leading tender design for the roll-out of offshore wind projects not only in Europe but also worldwide.

Auction-based systems have gained momentum since governments across Europe realised that large-scale offshore wind energy deployment will be key in meeting both union-wide, but also national, climate targets. Auctions are viewed as an effective tool in meeting these targets, as they allow a flexible tender design and provide certainty for both investors and policy-makers. Auctions can, however, be structured and carried out in several ways, bringing different benefits and risks to the offshore wind developer and the government. Thus, when choosing an auction model and structure, much depends on how large a share of the project and market risk the state is willing to take, to ensure that national targets, for renewable or specifically offshore wind production, are being met. In Europe, offshore wind energy has seen its strongest growth in those markets that have chosen auction-based tendering systems and where the state, at least initially, has shared the risk with the project developer. In these more "mature" markets, such as the UK, Netherlands, and Denmark, which are leading the growth in offshore wind deployment, government entities conduct auctions to award the right to build and operate an offshore wind farm and to determine the support to be provided. In this chapter, three different models will be described:

1) Sealed Bid Auctions
2) Hybrid Auctions
3) Dynamic Auctions

Similar to all other auction models, they are either single- or multi-criterion auctions.

What are single- and multi- criterion auctions?

Single-criterion auction (price criteria): This is often referred to as an auction that awards the winner based purely on price. The main principle is that the bidder who can offer the lowest price wins the auction.

Benefits: It creates a highly competitive process that offers real price discovery and is, therefore, an effective tool for reducing costs.

Risks: Th e award price is too low compared to the actual project cost, which risks the project's realisation. To avoid this, it is important that the state introduces proportional penalties for not realising the project.

Multi-criterion auction (non-price criteria): Is apart from price criteria, also including societal values, such as local content rules and sustainability requirements. This means that the lowest bidder might not be selected as the winner.

Benefits: Renewable energy production i s included in broader climate, energy system, and economic perspectives, which could allow for increased actor diversity as the competition broadens.

Risks: Prevents real price discovery. If the non-price criteria are unclear, the risk of subjective decision-making increases since non-price criteria could be difficult to quantify.

Above criteria should not be confused with pre-qualification criteria: bidders often have to pre-qualify, but these pre- qualifications usually only include financial and technical capacity. Financial pre-qualification refers to bid-bonds proportionate to planned capacity and technical pre-qualification could refer to planning authorisations, lease agreements for site etc. For further information see: Important elements for effective auctions.

Sealed Bid Auctions

Generally, a sealed-bid auction structure refers to an auction where all bidders submit bids to the auctioneer simultaneously without knowing how much the other bidder(s) have bid. The bids are not viewed until the auction date, and unlike an open bid, where auction participants can make multiple bids and compete against each other actively, in a sealed-bid auction, the bidders usually only get one chance.

Although sealed-bid auctions offer several design structure options. In a one-unit auction, the winner can be awarded based on either a second or first price.

In a first-price sealed-bid auction, the award price is set based on the highest accepted bid, which means the winning bidder receives the highest awarded price (see number 1.1 in Figure 2.1)

In a second price sealed-bid auction, the highest bidder wins the auction, but the lowest rejected bid determines the award price (see number 1.2 in Figure 2.1)

In a several-unit auction, there are two different options for determining the winner: a pay-as-bid or uniform price-bid auction.

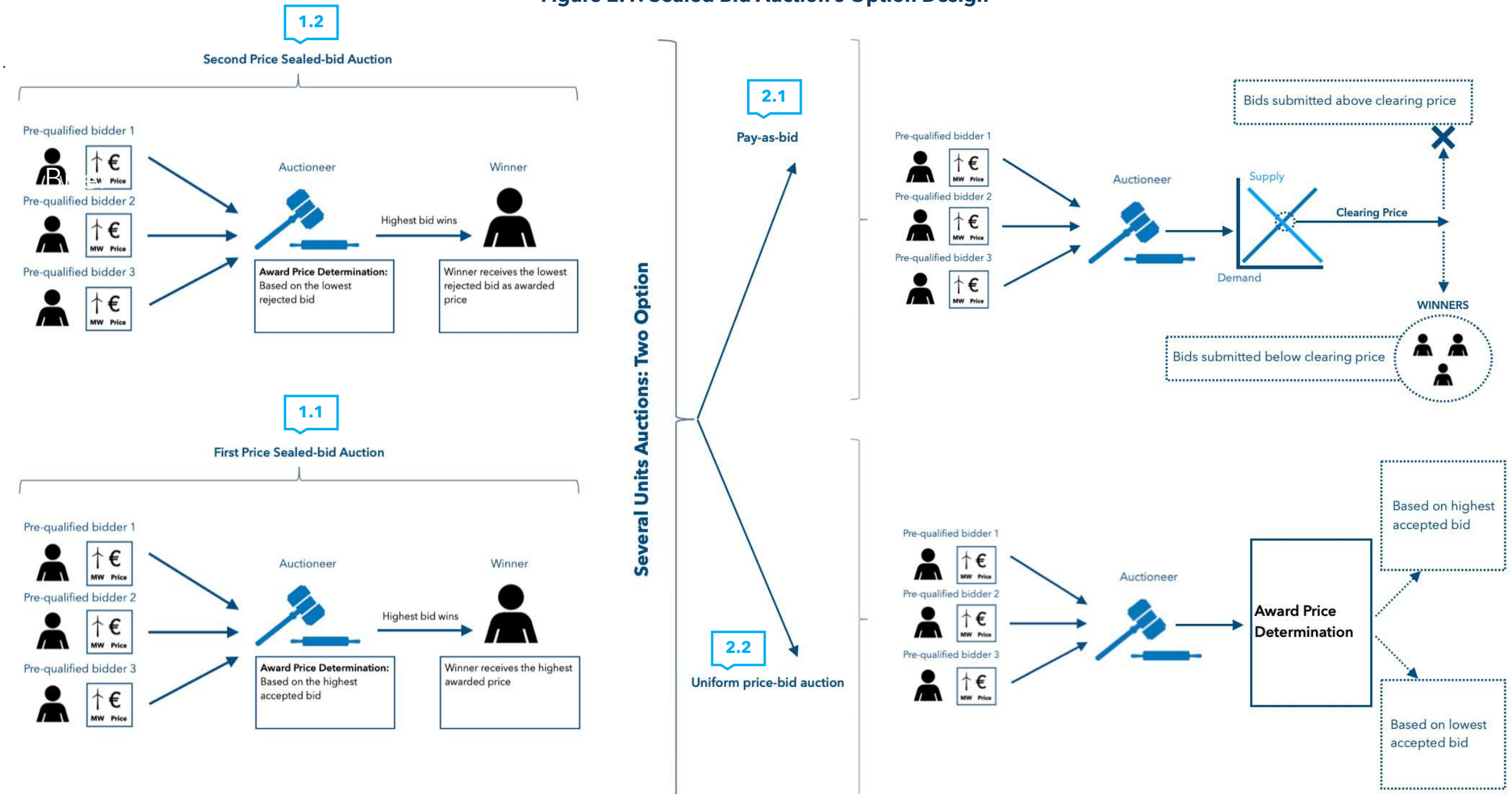
In a pay-as-bid auction, bidders include the price and quantity of the product they are willing to supply as part of their bid. Based on the bids, the auctioneer creates an aggregated supply curve and matches it to the quantity procured. At the point where supply and demand meet, the so-called "clearing price" is set. All bidders who submitted bids below the clearing price are declared winners. The winner will receive different award prices based on their financial offers (see number 2.1 in Figure 2.1)

In a uniform price-bid auction, the set award price is uniform for all bidders. The award price is based on the highest accepted bid or the lowest rejected bid (see number 2.2 in Figure 2.1)

Advantages with sealed bid auctions: it is a very easy auction design to implement and provides a simple process, reducing the participation cost for bidders. It is a good option when auctioning a single item since bidding strategies are simple, especially if a second-price auction is used. With a second-price auction the incentive to bid below one's value decreases significantly, which lowers the risk of the project not being realised.

Disadvantages with sealed bid auctions: they cannot reveal any information from the market about values and therefore expose the bidders to a greater possibility of the winner's curse, meaning the winner does not understand the actual cost of the product. This is particularly so when several units are auctioned.

Figure 2.1: Sealed Bid Auction's Option Design



Hybrid Auctions

A hybrid auction structure is a combination of the sealed-bid and dynamic "descending clock" auction systems, where benefits from both auction structures can be drawn upon.

A combination of the two is usually structured in such a way that the auction starts with a dynamic "descending clock" structure, while a sealed-bid structure is introduced in a second phase.

The benefits of such a combination is that the model allows for a price discovery process initially through the dynamic bidding rounds, which helps identify the baseline prices for products that are unknown in the market.

This price discovery process helps the bidders to lower their prices in the second phase. Given the fact that the number of bidders will most likely be reduced after the first phase, as prices decrease, it makes sense to follow up with sealed-bid auctions to avoid collusion and lower the award price as much as possible.

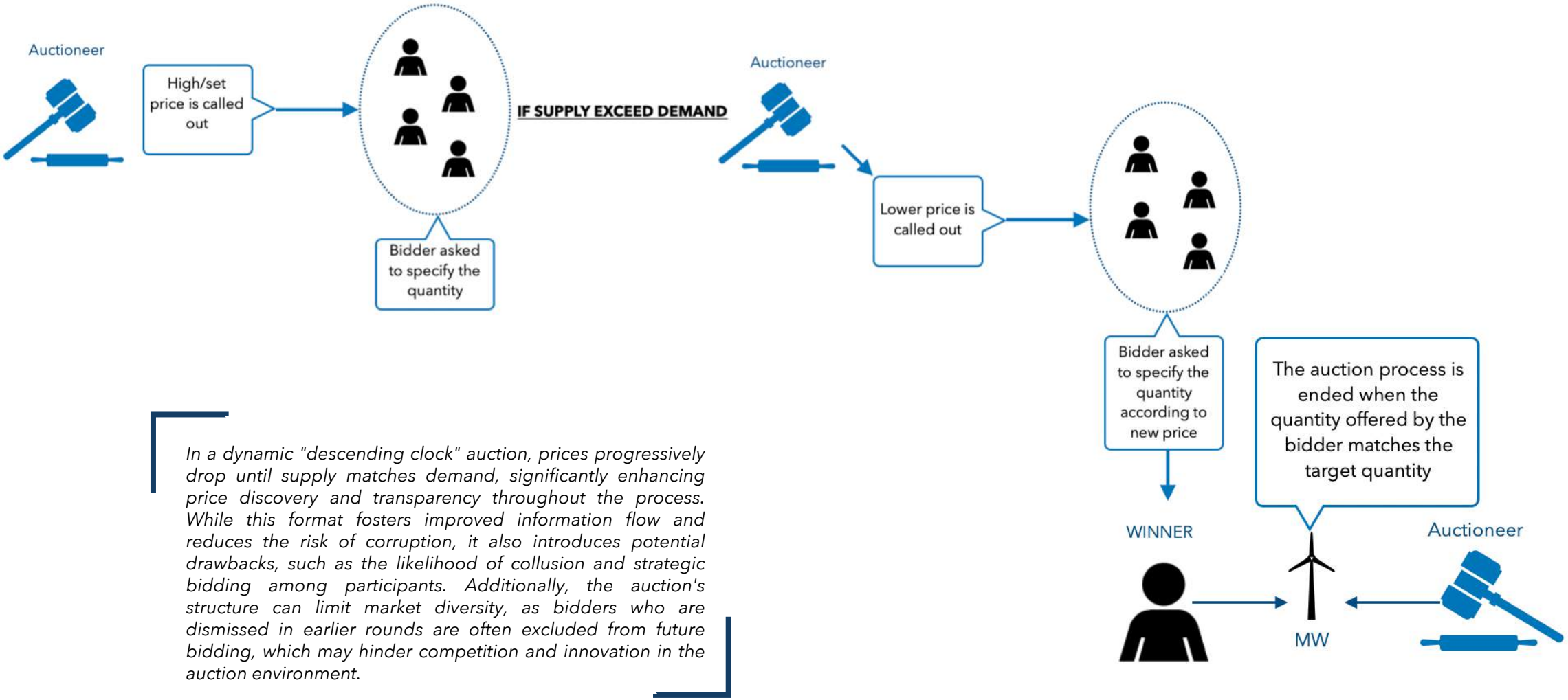
Dynamic "Descending Clock" Auctions

In a dynamic "descending clock" auction, all lots are auctioned simultaneously. In each round, the auctioneer announces the current price of each lot. Bidders respond by bidding a quantity for each lot. If the quantity is more than the set target to be procured, i.e excess demand, then the price is lowered by the auctioneer. Bidders will then again present a bid in terms of the quantity they are willing to provide at this new price. This process continues until the supplied and demanded quantities match. The price determined in this situation is the clearing price, see figure 2.2.

Advantages with dynamic "descending clock" auctions: are chiefly the transparency that the process offers through the revealing of information by bidders. Thus, the price discovery is better in a dynamic "descending clock" auction compared to other auction designs, since bidders are able to revise their bids dynamically as the auction evolves. The high level of transparency also implies lower risks of corruption.

Disadvantages with dynamic "descending clock" auctions: A dynamic revision process demands that information is disclosed by the auctioneer at every bidding round. The level of transparency needed could limit the auctioneer's ability to prevent collusion and/or strategic bidding. Thus, revealing prices when the competition is weak can lead to higher prices as bidders coordinate their bidding, which will eventually increase the final price of the auction. Another disadvantage is that the dynamic "descending clock" auction limits actor diversity in the market, since bidders that were dismissed at previous auctioning rounds are usually excluded from the auction.

Figure 2.2: Dynamic "Descending Clock" Auction's Option Design



In a dynamic "descending clock" auction, prices progressively drop until supply matches demand, significantly enhancing price discovery and transparency throughout the process. While this format fosters improved information flow and reduces the risk of corruption, it also introduces potential drawbacks, such as the likelihood of collusion and strategic bidding among participants. Additionally, the auction's structure can limit market diversity, as bidders who are dismissed in earlier rounds are often excluded from future bidding, which may hinder competition and innovation in the auction environment.

Risk division between the asset owner and the government

Auction-based tendering systems for offshore wind are usually closely connected to the country's volume target for offshore wind production. The reason that the relationship between set targets and auctions is important is that they determine how large the volumes auctioned in each round should be, in order to meet the annual national production growth target. Production targets also play a crucial role in the government's ability to follow up on the national overall climate agenda and plan. Furthermore, with regards to the risk division between the asset owner and the government, the fact that the government sets a target means that a significant part of the responsibility lies with the government. This is because the government bears the responsibility for meeting national targets and hence also for providing the market with the right conditions for taking investment decisions and realising projects. Thus, the government firstly needs to facilitate auctions corresponding with the annual targets, and secondly, it needs to provide the right incentives for a commercial developer to invest in offshore wind.

There is a consensus among market participants and many policy-makers, that in order to meet the EU-wide offshore wind target of 60 GW by 2030, but also separate national targets, the project risk will have to be divided to some extent between the asset owners and the governments. Introducing a risk division between asset owner and government in the auction design has proven very effective in kick-starting the deployment of offshore wind and reaching annual production targets, where it has been attempted.

The most common public (operational) support mechanisms used are:

Feed-in Tariff (TiF): are fixed electricity prices that are paid to renewable energy (RE) producers for each unit of energy produced and injected into the electricity grid. The payment of the FiT is guaranteed for a certain period of time, often related to the economic lifetime of the respective RE project. Another option is to calculate a fixed maximum amount of full-load hours of RE electricity production for which the FiT will be paid. FiT is usually paid by the electricity grid, system or market operators and often through a Power Purchasing Agreement (PPA). The level of FiT is often based on the Levelised Cost of Electricity (LCOE) produced from RE.

The advantages with a FiT system is that it is a rather straight forward policy instrument that is both easy to implement and to facilitate. FiT, combined with long-term contracts, provide the RE producer with predictability and security which contribute to lowering investment risks and financing costs. However, the main disadvantage with FiT is the challenge of defining the right remuneration levels which are neither too low to be attractive for investments, nor too high, in order to avoid overcompensation and a market development leading to the escalation of costs of the RE support scheme or to technical imbalances within the electricity system.

Feed-in Premium (FiP): Under a FiP scheme, electricity from renewable energy sources (RES) is typically sold on the electricity spot market and RE producers receive a premium on top of the market price of their electricity production. FiP can either be fixed (i.e at a constant level independent of market prices) or sliding (i.e with variable levels depending on market price movements).

The advantages with a fixed FiP is that it is easy to implement and facilitate, but when market prices increase the state runs the risk of overcompensating the asset owner, whereas the asset owner is exposed to undercompensation when prices fall. In order to avoid such a situation, floor-and-cap levels could be introduced.

Sliding FiPs are instead calculated on a continuous basis as the difference between (technology-specific) market prices and a predefined reference tariff level. If market prices are higher than the reference tariff level, there is no compensation. The advantages with a sliding FiP is that it follows market movements and limits the potential risk for both the state and the asset owner to either overcompensate, or to be subject to undercompansation. However, this is a more complicated design that requires market knowledge so that the tariff level is rightly set. When a sliding FiP is used in an auction-based design, prices are set at regular intervals to close the gap between the average market price and the strike price in the auction.

CfD Scheme: The Contract for Difference is a contract between the electricity generator and a "Low Carbon Contracts Company (LCCC)", which is a government-owned entity that oversees the administration of the contract. For renewable projects, contracts usually last for 15 years.

Within the CfD scheme, governments can choose either a one- or double-sided CfD regime:

Double-sided CfD: Under a double-sided CfD the project developer is obligated to remunerate the state for the negative difference between the strike price and the produced electricity's market price. Consequently, the project developer will always achieve the agreed strike price regardless of the market price as the state assumes the risk of the market price falling below the strike price and the developer assumes the risk of the market price exceeding the strike price.

One-sided CfD: This CfD, on the contrary, provides the project developer with a right to keep the negative difference between the strike price and the market price. Consequently, as the developer keeps the upside potential, the strike price exclusively functions as the minimum price the RE producer can achieve from its production. Thus, the developer is shielded from any downside risk without renouncing a potential upside.

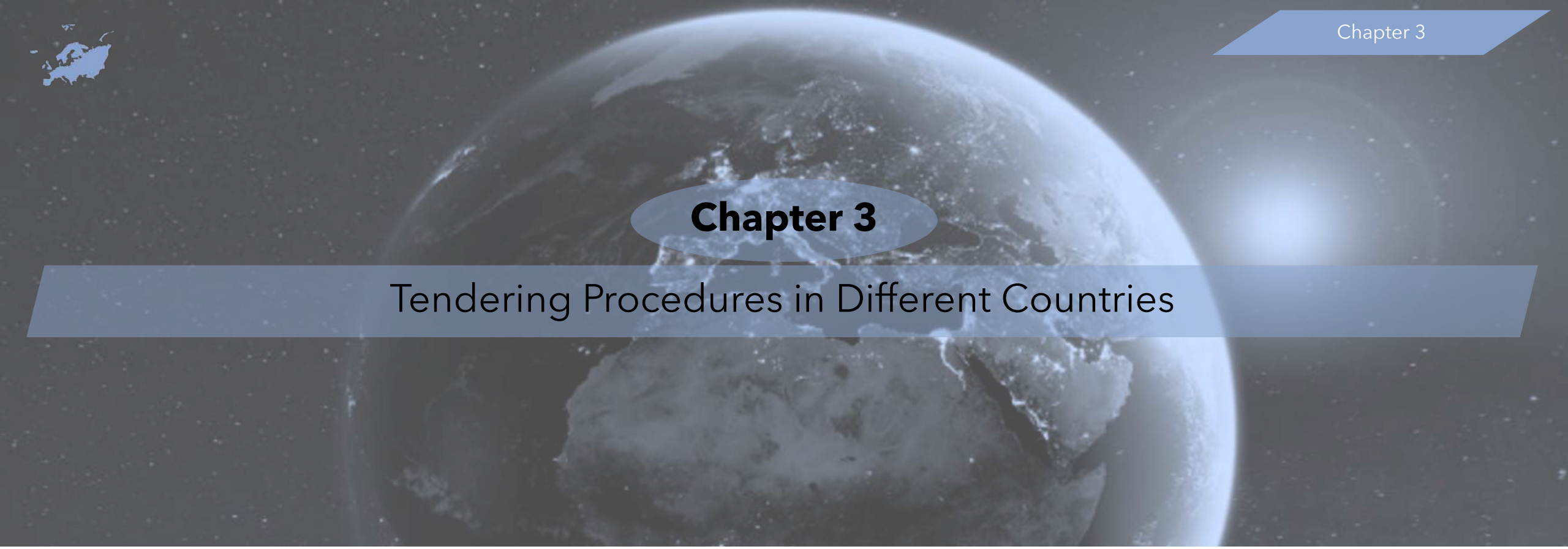
Important elements for effective auctions

In order to make sure that the auctions are fit for purpose, additional elements impacting their efficiency need to be taken into consideration:

Pre-qualification requirements: are often used in auction-based tendering systems. So far, these pre-qualifications have mainly been constituted by criteria that ensure that the bidders have the financial, technical and legal capability to develop the project. This is important, because once a winner is selected, compliance rules are important to ensure the project's realisation. Moreover, this is an important tool to reduce the risk of under bidding and speculative bidding. However, if the requirements are too strict it could also prevent small and/or new market players to gain entry to auctions. As suggested in chapter three of this report, it can be argued that the criteria used in the pre-qualification round could be developed in such a way that it takes into consideration, and even promotes, actor diversity in the market.

Penalties: are often mentioned as a pre-condition for creating effective auctions. Since the auctions are highly competitive, the risk of projects not being realised is considered high. Penalties work as a security measure and a level of guarantee to the government that the project developer will actually construct the wind site within the timeframe agreed.

Penalties can be based on the support level, support capacity, support duration and the start of the support. Imposing a penalty can be carried out in different ways, by reducing the support level, a shorter support period, termination of the contract or excluding bidders from future auctions.



Chapter 3

Tendering Procedures in Different Countries

This chapter is structured into two distinct sections, each offering a deep dive into critical aspects of offshore wind development across a selection of countries. The first section focuses on the **permitting processes for offshore wind** across eleven countries. The findings reveal that nations that have successfully advanced offshore wind deployment share a common factor: they have legally established production targets for offshore wind. These targets not only create a clear long-term vision but also drive investment and policy alignment. Moreover, the results show that countries experiencing significant growth in offshore wind production have either fully or partially transitioned from decentralised systems to centralised models. This shift streamlines approvals, reduces delays, and enhances coordination between stakeholders. An approach that has been proven instrumental in accelerating project timelines and increasing investor confidence.

The second section conducts a **comparative analysis of the most recent auction frameworks** in countries that have held national offshore wind auctions, thus excluding Sweden, Finland, and Latvia. This section provides an in-depth exploration of the unique auction designs in each country, emphasizing key variables such as auction timing, price criteria, pre-development and grid connection responsibilities. It also examines how these elements directly shape the auction outcomes. The analysis not only highlights how these mechanisms influence price discovery but also uncovers how varying levels of government intervention and market conditions impact the overall competitiveness and risk profile for developers. By comparing these auction processes, the section seeks to illustrate best practices and potential pitfalls, offering insights into how auction design can be fine-tuned to optimize both government objectives and market efficiency.

What are a centralised and a decentralised system?

Centralised System: A centralised system places a degree of emphasis on government to determine the sites to enter for tendering, i.e. pre-selected sites. Site selection should ultimately be an exercise decided by organisations best equipped to assess resources 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 solution is a way 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.

However, there are different levels of centralised systems. Some countries have just pre-selected sea areas that will be subject to auctions, whereas other countries also pre-develop sites before auction. The latter removes a lot of risk from the developer, since the process of consent is more or less handled ahead of the auction.

Decentralised System: Is the opposite to a centralised system, where the developer selects a site and applies for the permits necessary. As described in chapter one, this is the case in non-auction-based systems.

"In our discussions with investors, it's clear that a centralized permitting system with a one-stop-shop approach provides greater certainty and reduces political risk. This structured process accelerates decision-making and strengthens confidence in long-term investments."

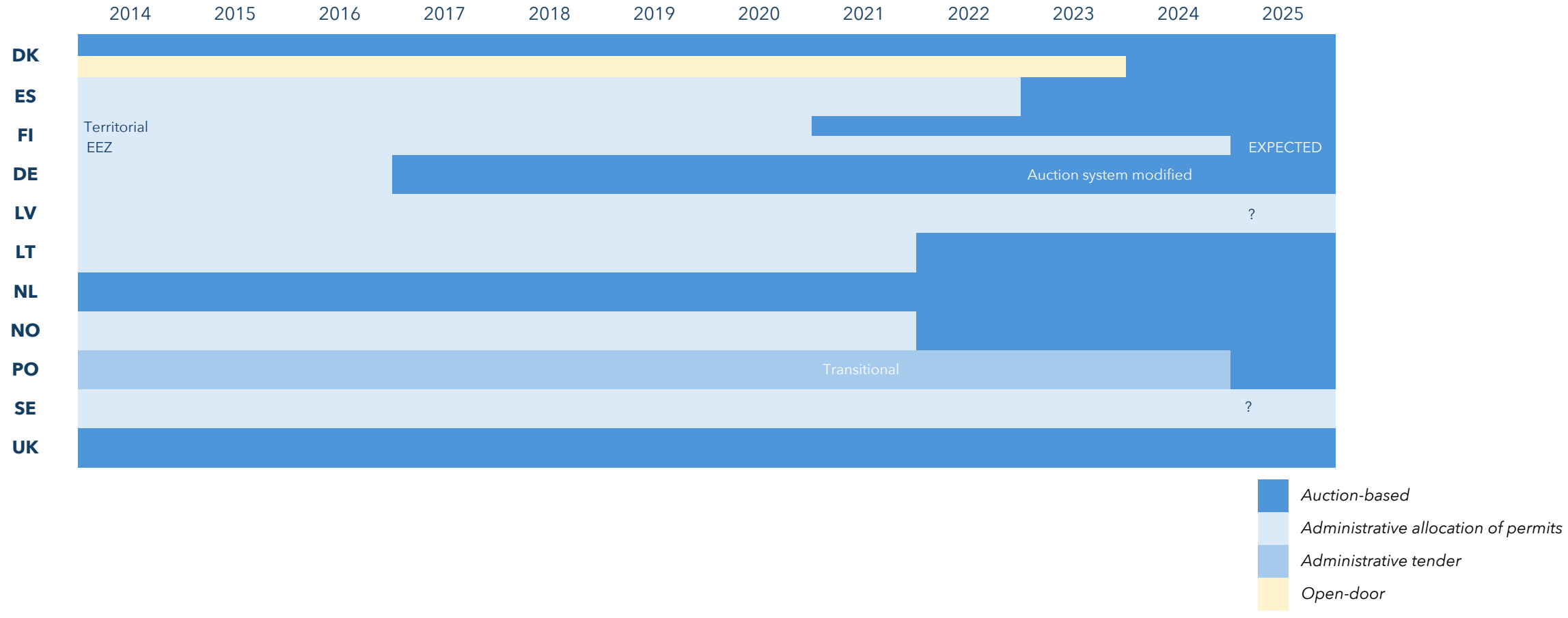
Shana Cases, Regulatory Analyst

Overview of countries' tendering processes

As introduced before, eleven countries' tendering and allocation of permits for offshore wind have been analysed from a risk allocation perspective. Out of the eleven countries analysed, only one country has not introduced an auction-based tender procedure, and two countries have a hybrid solution, combining an administrative allocation of permits, or administrative tender, with competitive auctions. In the following section a shorter description of each country's system will be presented, followed by a section on how a transition from one system to another can be carried out.

The description of each country is based on the elements shown in figures 3.2 and 3.3. Important to note is that many of the countries covered in this report currently undergo both regulatory and strategy changes with regards to their offshore wind permitting processes. This report only takes into account those changes that have been legally approved by the respective national legislature. There are for instance many countries discussing national production targets, which in principle work as set targets, but this report only takes into consideration those that are in force and legally binding. However, in those cases where an auction design model is not yet decided upon, but the decision to adopt an auction- based system has been made in-principle, this is marked as pending.

Figure 3.2: Country Comparison - Tendering & Allocation of Permits



Overview of countries' tendering processes

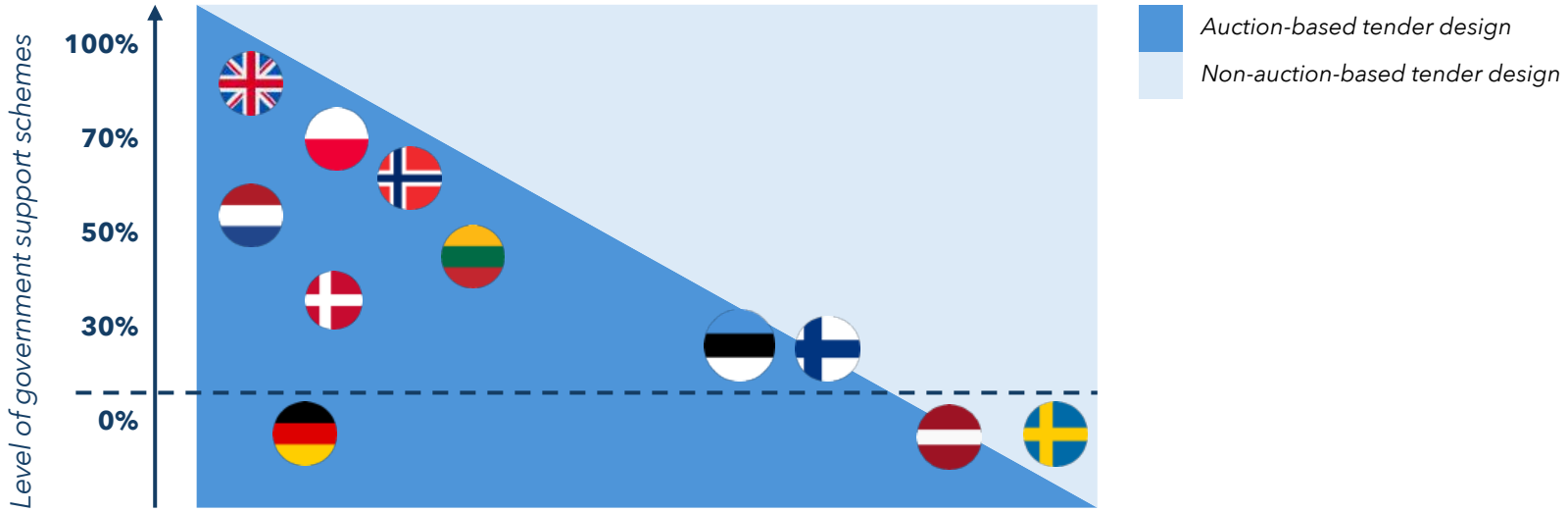
In figure 3.3, the selected countries (both those with auction-based and non-auction-based systems) are measured in relation to governments' support schemes for offshore wind deployment. Important to note is that the below figure does not illustrate support levels (in percentage) connected to the total project cost, but rather aims to illustrate the different conditions regarding risk allocation between state and asset owner based on the below components:

- Feed-in tariff
- Feed-in premium
- One- and double-sided CfD schemes - Grid Connection Support

The main take-aways from this exercise are firstly that there are significant differences when it comes to risk allocation depending on which national tendering procedures have been chosen by the countries. Secondly, it is also evident that even under auction-based systems the differences are great. Thirdly, countries using auction-based systems tend to include supporting and risk-sharing elements in their models to a greater extent than those which are not using an auction-based system. Those countries that have recently initiated an auction-based system are the only ones that position themselves on the lower level of government support, which very well could be sign of incomplete regimes, rather than an unwillingness to include such elements. The only exception is Germany, which has gone from a FiT and FiP system to an almost completely "subsidy-free" auction procedure, even to the extent of allowing negative bidding, although financial CfDs could be an alternative introduced in the short-term.

In the future this will most probably become a trend, as technology costs are reduced and the need for government support falls. However, the market is clearly indicating that we are not there yet, especially with regards to floating offshore wind technology.

Figure 3.3: Country Comparison - Government Support Level



The EU's regulatory framework and recommendations

Before diving into the comparison of the permitting processes of the chosen eleven countries, it becomes indispensable to go through the provisions, affecting the permitting processes, that come mandated by the EU.

The European Commission presented in October 2023 the **Wind Power Package**, including several measures under six different action areas: 1) faster permitting to accelerate deployment, 2) improved auction design, 3) access to finance, 4) ensuring a fair and competitive international environment, 5) skills, and 6) industry engagement and Member States' commitment. In the last action area, only one measure was included: the signing of the EU Wind Charter, through which EU offshore wind binding targets were raised from 60GW in 2030 to 111GW, and from 300GW in 2050 to 317GW. Besides, all Member States committed to following the guidelines and recommendations from the Commission, that is, to implement those measures and provisions that are not mandatory regarding offshore wind, in order to reach the forementioned targets sooner and in an efficient manner.

Before going through the actions the Wind Power Package includes, it is worth mentioning the mandatory deadlines regarding the permitting times that the revised **Renewable Energy Directive (RED III)** introduced for offshore wind, which is maximum 3 years. Besides, by November 2025, all countries must have digitalised their permitting processes.

Additionally, RED III mandates that, by February 2026, Member States define renewable acceleration areas, for at least one renewable energy technology. Hence, offshore wind may not be the technology chosen by certain countries. In the case a Member State decides to choose offshore wind, the permitting times in these renewable acceleration areas will have to be faster: 2 years maximum for new offshore wind projects, and 1 year for projects concerning the repowering of existing facilities. These deadlines may be incremented up to 6 months, but always under justified reasons that shall be communicated to the Commission. The reason behind these shorter deadlines is that there are no conflicts between renewable energy deployment and environmental protection in renewable acceleration areas, which is why preparatory works regarding environmental preliminary research are very minimised.

Besides these obligations, Member States are recommended to pre-select the areas that are suitable for offshore wind projects. This would indeed eliminate many complications regarding conflicting interests and would accelerate the deployment of projects. What is more, the Commission Recommendation on auction design for renewable energy recommends, for offshore wind auctions, that Member States auction sites that have undergone thorough pre-investigations to minimize project risks and enhance the chances of full and timely project deployment.

Indeed, Member States who follow the EU's recommendations regarding offshore wind, or any other renewable technology, become more competitive in comparison to the countries who do not, and are more likely to achieve both their national and the Union's overall targets, as is shown below.

EU Recommendations for Offshore Wind:	**DK**	**EE**	**FI**	**DE**	**LV**	**LT**	**NL**	**NO**	**PL**	**SE**	**UK**
Binding targets	✓	✓	✗	✓	✓	✗	✓	✓	✓	✗	✓
Renewable acceleration areas	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Pre-selection of areas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓
Pre-investigation of areas	✗	✗	✗	✓	✗	✓	✓	✗	✗	✗	✗

The EU's regulatory framework and recommendations

The illustration below shows the progress of various countries towards achieving their offshore wind targets (most of them set by 2030), comparing their current installed capacity to their projected goals. The graphs are arranged in descending order, from the countries that have made the most progress towards their offshore wind targets to those that are laying behind.

The countries on the top line show considerable progress towards their offshore wind targets, with the Netherlands and Germany particularly benefiting from their adherence to EU recommendations. These guidelines emphasize the importance of pre-selecting and pre-developing offshore areas, which accelerates project timelines and minimizes risk.

Although Denmark doesn't fully follow all EU recommendations, its highly mature offshore wind market ensures it remains a leader in this sector. The UK, while not bound by EU regulations, is also a significant player in offshore wind, leading the race towards meeting its targets. Finally, Estonia, Finland, Lithuania, and Sweden, are marked with a question mark in the graph, indicating they have not yet set offshore wind targets.

26,73%
UK

22,38%
NL

21,4%
DK

21,34%
DE

0,22%
NO

0%
LV

0%
PL

?
EE

?
FI

?
LT

?
SE

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **NO**
- Installed offshore wind capacity – **2.7GW**
- Offshore wind production target – **YES** (12.6GW by 2030)
- Sealed-bid auction – **YES**
- Governmental support scheme – **NO** (only Bornholm)
- Grid connection support – **NO**
- Export/Import strategy – **EXPORTER**

Denmark

For many years Denmark had been using two different schemes to issue permits for offshore wind farms, namely government auctions and an open-door procedure. In both cases the Danish Energy Agency (DEA) was the body in charge of planning and issuing licenses and production approvals. The DEA, thus, served as a "one-stop-shop" for developers, being the sole responsible authority for planning and commissioning as well as approving new grid connections. However, the Danish open-door scheme was discontinued in late 2023 due to infringement of EU state aid rules, terminating 24 out of the 33 offshore wind projects proposed under the scheme.

Looking forward, and despite the end of the open-door scheme, Denmark remains a leader in offshore wind with strong capacity and ambitious targets. Its policy is shaped by broad political consensus focused on practical results from competitive tenders rather than on ideological divides. However, this consensus may face challenges, as the Danish People's Party has threatened to withdraw from the Energiø Bornholm agreement, potentially creating uncertainty for future offshore wind development.

In April, Denmark launched its largest offshore wind auction to date, offering at least 6 GW of new capacity spread across six wind farms, with the potential to exceed 10 GW through overplanting, following a political agreement on tender frameworks from spring 2023. Unlike in the past, these projects will be developed without state subsidies, with bidders required to pay annual concession fees for 30 years, and the Danish state will co-own 20% of each wind farm. The recurring issue of escalating supply chain costs highlights the inherent risk the state assumes in such projects, particularly when opting to operate subsidy-free under state ownership. This exposes the government to market fluctuations and financial uncertainties without the cushion of public financial support. At the same time, the responsibility for managing these risks is shifted to developers, especially given the hefty delay fees tied to the 6 GW tender, which may further reduce market interest and investment appetite due to increased financial burdens.

The power generated will support domestic use, green hydrogen production, and exports. Developers must meet sustainability requirements, including using recyclable turbine blades and monitoring environmental impacts. With a 2030 commissioning deadline, this auction could triple Denmark's current 2.7 GW offshore wind capacity.

The Danish government's decision to charge for establishment rights and shift more costs to developers reflects a strategy to balance state support with market-driven growth, although this could be adapted depending on the outcome. Revenue from the 6 GW tender funds the Bornholm auctions, promoting renewable energy as economically viable. To address cost concerns, the government reduces funding for producers while allocating DKK 634 million in green investment support for manufacturers, aiming to retain investments in Denmark and prevent relocation.

Estonia

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Installed offshore wind capacity – **0MW**
- Offshore wind production target – **NO**
- Auction Design – **YES**
- Governmental support scheme – **NO**
- Grid connection support – **NO**
- Export/Import strategy – Not mentioned, but conditions suggest **EXPORTER**

In Summer 2024, the Government amended the permitting process and now, to establish offshore wind farms in a public water body, developers must first obtain a superficies licence from the Consumer Protection and Technical Regulatory Authority (CPTRA), which grants permission to use state-owned limited resources for a specified period. This licence is essential for any construction works that lack a permanent connection to the shore. Once the superficies licence is secured, developers must also apply for a building permit and a use and occupancy permit from the same authority, ensuring the construction and operation of the wind farm comply with all regulatory requirements.

Although not named as such, actually the CPTRA works as the one-stop-shop for offshore wind permits in Estonia since it is the only body in charge of all the steps in the permitting process. It is the CPTRA the one that grants the three licenses mentioned above, the one that carries out the offshore wind auctions and the one that examines whether the Environmental Impact Assessment presented by the developer fulfils all the requirements.

The process for obtaining a superficies licence for offshore wind development begins when the CPTRA publishes a notice of the application. Interested parties may submit competing applications, which are reviewed by the relevant authorities. The CPTRA then assesses all applications based on the established criteria, and those that meet the pre-qualification requirements proceed to an auction. Applicants whose proposals are accepted are invited to participate in the auction, and the winner is determined based on their bid. Once the winner is confirmed, the CPTRA initiates the superficies licence and the developer can start with the environmental impact assessment (EIA) proceedings. After the EIA is approved, the superficies licence proceedings resume, and a final decision is made regarding whether to grant or deny the superficies licence for the wind farm project.

Looking forward, while the June auctions for the Saare 2.1 and Saare 2.2 sites were successful, Saare 3 in July received no bids. While two companies qualified to participate in the auction, none of them submitted any bids. After this result, in late September, the Estonian Ministry of Climate submitted a draft amendment to the Electricity Market Act and the Energy Sector Act, including a 20-year Offshore Wind Energy Support Plan, aiming to create favourable conditions for offshore wind energy development and establish a support scheme for this sector.

The Ministry plans to conduct a reverse auction in the first half of 2025, aiming to introduce new offshore wind energy by the end of 2033. The Ministry estimates that the reverse auctions could lower electricity prices from 9 cents to 6.6 cents per kWh by 2030, a reduction of 2.4 cents per kWh, and approximately 4.5 cents per kWh by 2035. This change could save consumers in Estonia and neighbouring regions around EUR250 million annually, totalling up to EUR5 billion over two decades.

- Centralised site selection and development – **YES** (territorial waters)
- Decentralised site selection and development – **YES** (economic zone)
- Installed offshore wind capacity – **71MW**
- Offshore wind production target – **NO** (expected to be set in 2026)
- Auction Design – **YES**
- Administrative allocation of permits – **NOT ANYMORE**
- Governmental support scheme – **NO** (could change for EEZ)
- Grid connection support – **NO** (could change in 2025)
- Export/Import strategy – **EXPORTER**

Finland

In September 2024, Finland presented their Offshore Wind Action Plan, with 17 key action points for the uptake of offshore wind in the country. Among the key points, Finland aims to establish a 2035 offshore wind binding target by 2026, which is highly positive, since setting such a target paves the way for the necessary regulations, support schemes, and grid connections to advance in alignment toward achieving this important goal.

Metsähallitus oversees the leasing of water areas in **Finnish territorial waters** for offshore wind projects. In 2021, the government supported Metsähallitus' current auction model, in which Metsähallitus evaluates the suitability of the areas before auction. The State Council then decides which offshore wind power areas will be put up for auction, but still the winning developer is responsible for obtaining the necessary permits. The agreement between Metsähallitus and the offshore wind power operator is fixed term, granting the operator the right to lease and use the sea area for offshore wind power. While Metsähallitus may enter into project development cooperation or co-ownership with the winning company, it does not participate in energy production and remains solely in the role of lessor after the development phase.

It's important to consider, however, that this auction model is still relatively untested, with only one auction awarded so far and no final investment decision yet made. Hence, whether this fully market-driven approach where developers take on commercial risks in exchange for lease rights will attract sufficient investment and lead to successful project execution remains to be seen.

Metsähallitus' auction model does not apply to **Finland's exclusive economic zone** (EEZ), where different legislation governs the use of areas and Metsähallitus has no jurisdiction. In October 2023, a legislative proposal was presented to clarify the regulations concerning offshore wind in the EEZ. The new legislation, expected to take effect in early 2025, would establish a tender process organized by the Energy Agency, with the Ministry of Labor and Economic Affairs preparing the areas to be tendered. The tender winner would gain the exclusive right to apply for a utilization permit. This permit grants a temporary exclusive right to use the area for wind energy and related research, without prohibiting other uses of the area. However, the construction of wind farms or the laying of cables or pipes would require separate permits.

Looking forward, the government has approved five tenders for offshore wind power areas in regional waters and at least one farm should be operational before 2030.

Currently, no offshore wind farms have been licensed or built in Finland's economic zone. By May 2024, 17 applications for exploitation rights which had been submitted to the government seeking exclusive rights to use offshore wind power in the EEZ were rejected by the government, citing the need for clarity and fairness in the regulatory framework, which is why the new legislation will be effective from 2025. The first tender is expected to start at the end of that same year.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **YES**
- Pre-investigation of sites – **YES** (in some)
- Installed offshore wind capacity – **8.536MW**
- Offshore wind production target – **YES** (40GW by 2035, 70GW by 2045)
- Auction design – **YES**
- Dynamic auctions – **YES**
- Governmental support scheme – **NO** (could change from 2025)
- Grid connection support – **YES/NO**
- Export/Import strategy – **IMPORTER**

Germany

Germany's Offshore Wind Act used to distinguish between two different types of permitting process: an auction-based system for pre-investigated sites and another one for non-pre-investigated sites, which followed an administrative allocation of permits until last year. Since 2023, projects at sites which are not centrally pre-investigated are awarded in an auction process, but this is based on quantitative criteria alone, that is, on the lowest market premium offered. For centrally pre-investigated sites, qualitative criteria are also considered in the auction, also following EU guidelines.

In both cases, the areas are selected by the competent authorities, but in the pre-investigated sites the preliminary studies are also conducted by the state. Successful bidders can then carry out the permit process and have the right to grid capacity and grid connection, although the costs are not borne by the state.

The German Parliament rejected long ago the proposal to include a CfD scheme for offshore wind projects, however, the recent Paper for the future's national electricity market design, presented in late August 2024, opens the door to financial CfDs for offshore wind projects. However, in the case financial CfDs were introduced, a legislative proposal is not expected before 2025.

Finally, it is important to emphasize that the developer is responsible for the costs associated with the grid connection from the offshore wind farm to the corresponding sea platform, which consolidates energy from two or three distinct offshore wind farms. In contrast, the TSO assumes the costs for the connection to the mainland, thereby implementing a hybrid system.

Looking forward, it is undeniable that Germany is pushing to make offshore wind power a key source of energy in the country. In view of missing the 2030 targets (30GW), Germany has decided to look forward and include additional binding targets for the medium and long-term: 40GW by 2035 and 70GW by 2045. As known, increasing targets are key to enable a continuous grow in capacity, however, and since the 2030 targets will not be met, it is unlikely the ambitious 2035 targets can actually be reached. In any case, negative bidding continues to be the norm in the majority of German auctions, a trend also present in the Netherlands.

Finally, it is worth mentioning that Germany has already designated renewable acceleration areas, as mandated by RED III, but has chosen onshore wind, solar and storage facilities as the technologies to be benefitted from these shortened permitting deadlines.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Installed offshore wind capacity – **0MW**
- Offshore wind production target – **YES** (400-500MW by 2030)
- Auction design – **YES**
- Governmental support scheme – **NO**
- Grid connection support – **NO** (YES, for the ELWIND project)
- Export/Import strategy – Not mentioned, but conditions suggest **EXPORTER**

Latvia

In 2022 Latvia made public its Maritime Spatial Plan (MSP), establishing five areas allocated to offshore wind development, meaning that the developer applies for an area that has been previously selected by the state for offshore wind development.

After the Ministry has accepted an application, it announces a tender for construction and submits to the Cabinet of Ministers the draft conditions to grant a permit to the winner of the tender. The Ministry and the Cabinet agree on the norms for the tender. The winner of the tender then gets a permit for maritime surveying and applies for a building permit to the Ministry. If approved, construction starts. No tenders have yet taken place in Latvia so the system and structure is not entirely clear yet. However, last year Latvia and Estonia announced a joint offshore wind project "ELWIND", which will have a capacity of between 700MW and 1000MW. The tender for the rights to develop the project is scheduled to be held in 2026, for the project to be commissioned by 2030 at the earliest.

Looking forward, even without regulatory updates since 2022, the sector is gradually laying the groundwork for future expansion. A key indicator of this is the recent agreement between Van Oord and the Liepaja Special Economic Zone (LSEZ), signed in March, for the construction of an offshore wind farm support base and an oversized cargo terminal at Latvia's Port of Liepaja. This infrastructure development could signal that key players are preparing for a surge in offshore wind activity, since investing in ports and supporting infrastructure is essential to the success of offshore wind projects.

Hence, while the regulatory framework for auctions remains stagnant, the groundwork being laid by port investments indicates that the market is quietly preparing for an offshore wind boom. With the ELWIND project scheduled for tender in 2026 and the increasing infrastructure support, Latvia's offshore wind sector could gain significant momentum in the near future, even if progress appears slow at present.

Lithuania

In 2022, the Lithuanian government adopted a resolution on the Energy Act on Renewable Resources and the Electrical Energy law introducing amendments to regulate a specific procedure for the auctioning of renewable energy projects at sea.

Since then, there have not been any regulatory amendments in Lithuanian legislation concerning the auction of offshore wind sites. However, the country has held two auctions which have been very different in conditions.

The first auction was held in Summer 2023. The 700MW offshore wind site was auctioned subsidy free, even if an analysis carried out by the government months before showed that CfDs had a positive impact on both the projects and the country's economy. The auction allowed for uncapped negative bidding and the result was EUR20 bn for the 700MW site. Finally, even if initially the government concluded in the forementioned analysis that the most effective way to implement the connection infrastructure in Lithuania was if the country's TSO Litgrid was responsible (since it had the experience in managing similar complex high-value projects and could implement projects with lower costs than a private developer), the government took another path. The connections costs for the two offshore wind parks planned (the one auctioned in Summer 2023 and the one that will take place soon, explained below) have been estimated at EUR345 million, which will not be borne by Litgrid, but by the developers themselves.

After the negative results of the first auction and the high economic impact it would have on the developers, many withdrew from the second auction, which was planned immediately after. Even if the auction was delayed, there was only one bidder in the second try, which is why the government delayed the auction a second time. The tender is finally scheduled for November 2024.

Looking forward, Lithuania has done many amendments to the upcoming auction's regulatory framework. Unlike the first auction, developers will receive the support in the form of CfD for 15 years and will be able to bid between EUR 64.31-107.18/MWh, scheme backed by the Lithuanian government with EUR193 million. Similarly to the previous tender, the developer will have to play a crucial role in environmental conservation. A unique provision mandates an annual contribution of 1EUR/MWh of electricity generated to the communities close to the wind farm. This provision not only underscores Lithuania's commitment to community welfare but sets a model for responsible corporate citizenship in the renewable energy sector that could be a precedent, especially for offshore wind. To attract even more interested developers after the issues the auctions have brought, it will be the government who will conduct the Environmental Impact Assessment, being the site pre-investigated by the state.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **YES** (for the second auction)
- Installed offshore wind capacity – **0MW**
- Offshore wind production target – **NO**
- Auction design – **YES**
- Governmental support scheme – **YES** (CfD)
- Grid connection support – **NO**
- Export/Import strategy – Not mentioned, but conditions suggest **EXPORTER**

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **YES**
- Installed offshore wind capacity – **4.7GW**
- Offshore wind production target – **YES** (21GW by 2032 – delayed 1 year)
- Sealed bid auction design – **YES**
- Governmental support scheme – **YES** (FIP/one-sided CfD)
- Grid connection support – **YES**
- Export/Import strategy – Not mentioned, but conditions suggest **EXPORTER**

Netherlands

In 2015, the government released a package of laws to fully regulate the offshore wind sector. The Offshore Wind Energy Act entered into force, after the 2023 Roadmap was adopted, and was amended in 2018 to introduce the auction system.

The country uses their own programme "Stimulation of Sustainable Energy Production" (SDE+) for the tendering and subsidies for all renewable energy technologies. Under the SDE+ for offshore wind, projects are eligible for a one-sided CfD scheme through auctions. The winner of the bid (lowest price bid) gets the SDE+ subsidy (CfD) for 15 years and a 30-year permit to build, operate and decommission the wind farm. Eligible tender applications are ranked on the basis of the tender amounts, with the subsidy awarded to the one with the lowest tender amount. The SDE+ auctions define an annual subsidy budget and operate a sealed-bid auction with ascending ceiling prices. The auction consists of two rounds each year, each round consists of three phases with ascending ceiling prices. Each phase is open for one week and the budget is auctioned on a first-come, first-served basis. On the day the budget is exhausted, all applicants from that day are ranked based on their bids and the lowest are accepted first. If there are multiple bids at the same price, a lottery will take place to decide which projects are awarded.

To reduce developers' risk during the tendering phase, the government performs and provides site assessments, including an initial environmental impact assessment, to all bidders free of charge, sharing the risk with the developers and, hence, driving down the costs.

The Dutch TSO is responsible for developing and operating offshore wind energy substations and grid connections and guarantees that the nominal power of 350 MW (per site) can be exported to the main grid. This clearly eases the way for many developers not only by removing the cost completely for them, but ensuring the grid connection is secured by the government.

Looking forward, the Netherlands is constantly updating their framework to better regulate what happens in the market. Recently, their 21GW target was delayed one year, until 2032, allegating as reasons for the delay the permissibility and lead times of grid connections, the business in the supply chain for grid connections, and the required time for connecting 2 GW of wind farms to the offshore grid. Notwithstanding this, the overall projection of the country is positive, although an additional way to de-risk projects even more and promote project realisation would be to adopt revenue-sharing mechanisms. This could be in the form of a double-sided CfD. Besides, the country has been dividing offshore wind sites into smaller projects for investment purposes, and in one of the last auctions of the year, qualitative criteria constituted 85% of the points. However, allowing for negative bidding limits the potential of non-price criteria.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **NO**
- Installed offshore wind capacity – **66MW**
- Offshore wind production target – **YES** (30GW by 2040)
- Auction design – **YES**
- Governmental support scheme – **YES** (double-sided CfD)
- Grid connection support – **NO**
- Export/Import strategy – **NONE** (Government considering tax on electricity exports to retain power for domestic consumption and control price increases)

Norway

The Norwegian Government presented at the end of 2022 its proposals for the tender framework for offshore wind, which suggested a hybrid auction design (so-called Anglo-Dutch auction).

In the first phase of the allocation, the Norwegian Ministry of Petroleum and Energy launches a pre qualification period for developers who wish to compete. The plan was for a ceiling to be set for the number of applicants who can be pre-qualified to participate in the further competition. The government further proposed a double-sided CfD support scheme, if subsidies were considered needed. There was an intention to limit the CfD through an upper ceiling. Non-price criteria were also to be used, particularly when it comes to floating technologies, innovation and technology development will be rewarded.

Finally, for the first auction which took place last November, the Norwegian Parliament officially empowered the Ministry of Energy to provide state aid via a double-sided CfD lasting for 15 years and unveiled the details. The scheme caps the total subsidy at NOK 23 billion. There is no reservation/ceiling price. However, there is a technical range of acceptable bids. This range is from 5 to 999 øre/kWh, essentially declaring the ceiling price unlimited. The winning bid determines the strike price that forms the basis of the two-way CfD. The bidding in the auction will be closed to the public.

It is worth noting that several developers pulled out from the auction stating that the tender requirements were particularly demanding, especially taking on the cost of the grid connection.

Looking forward, the political landscape regarding wind power in Norway is highly fragmented, with parties holding divergent views on offshore wind development, subsidies, and environmental protection. The success of the planned auctions is not just a matter of attracting investment, it's emblematic of the broader acceptance and viability of the government's energy strategy.

Finally, it is important to emphasize the floating offshore wind auction process, which will allocate area rights for three projects through a competitive selection based on qualitative criteria.The areas are allocated through a competitive selection based on qualitative criteria, without pre-qualification stage, and each project is ranked according to its score. The highest-scoring project will select its preferred area first, followed by the second and third best-scoring projects.

The Norwegian government postponed the planned floating offshore wind auction to 2025 primarily to establish a comprehensive state aid model for the sector. The government proposed CfDs for two of the three projects with a 15-year contract duration from production start. This delay allows the government to finalize the financial support framework, including a subsidy scheme, which is crucial for the development of floating offshore wind, given the high costs and the relatively immature state of the technology.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **NO**
- Installed offshore wind capacity – **0MW**
- Offshore wind production target – **YES** (5.9GW by 2030 and 18GW by 2040)
- Auction design – **YES**
- Governmental support scheme – **YES** (double-sided CfD)
- Grid connection support – **YES**
- Export/Import strategy – Not mentioned, but conditions suggest **IMPORTER**

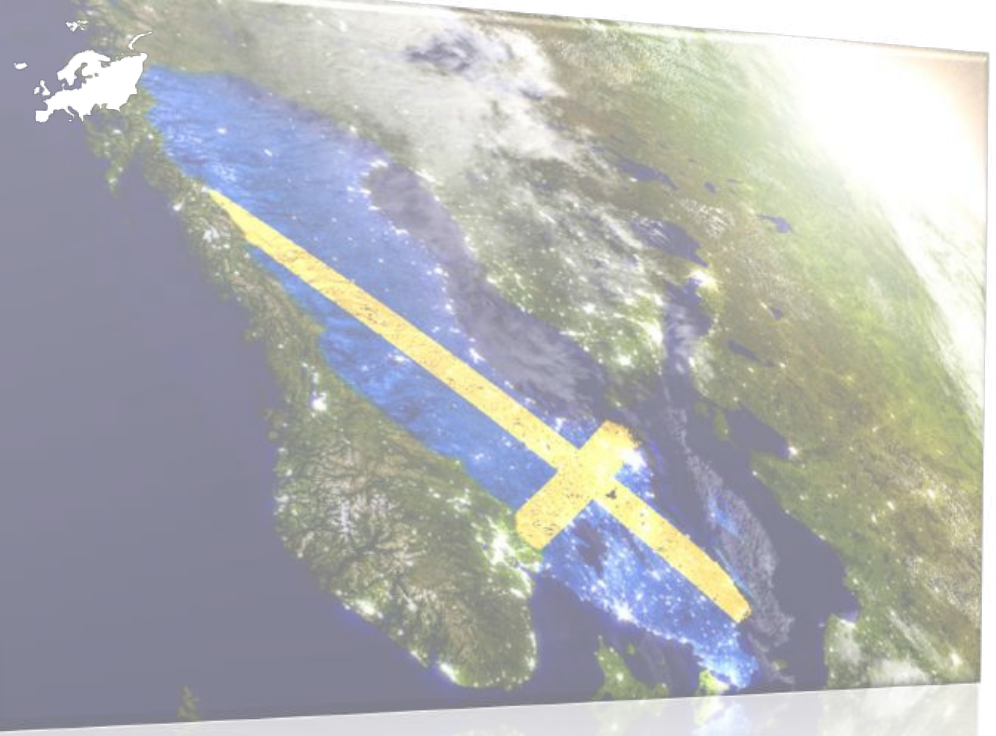
Poland

Until 2020, Poland followed an administrative tender procedure for allocating permits for offshore wind. However, in 2020 the Government approved an Offshore Wind Act, entering into force in 2021, which sets out a CfD support scheme to be awarded in two different phases.

Until 2025, offshore wind projects are being granted aid through the administrative tendering procedure already established. The second phase consists of open and competitive auctions organised from 2025. It is the Energy Regulatory Office (ERO) which is the body responsible for announcing, organising and conducting the auctions, one in 2025 and one in 2027. To participate in the 2025 and 2027 auctions, participants still need to apply for the location permit foreseen in the administrative tendering procedure for one of the eleven locations currently opened by the Ministry of Infrastructure. Additionally, developers wishing to participate in the auctions need to apply for a certificate of admission to the auction.

Looking forward, while there have not been any regulatory updates since the current system was established, offshore wind projects are progressing in Poland, which shows market development. Furthermore, notwithstanding the planned auctions, the country decided to auction additional capacity in 2029: 2GW more.

Besides the CfD scheme approved by the Government, Polish offshore wind farms are being backed by several EU instruments. The European Bank for Reconstruction and Development confirmed an EUR300 million non-recourse long-term senior loan to back 1.5GW Baltica 2 wind farm, and the European Investment Bank recently confirmed it will be lending EUR1.4bn for the Baltica 2 and Baltica 3 projects.



- Decentralised site selection and development - **YES**
- Installed Offshore Wind Capacity - **192 MW**
- Pre-investigation of sites – **NO**
- Offshore wind production target – **NO**
- Auction Design – **YES**
- Administrative allocation of permits - **YES**
- Governmental support scheme - **NO**
- Grid connection support – **NO**
- Export/import strategy - Export

Sweden

Sweden has not introduced a specific offshore wind strategy with a set national target for production growth. The lack of a long-term plan for the country's offshore wind deployment, together with an undeveloped permitting procedure that does not offer any state support is creating an uncertain investment climate for market actors. The country has only 192 MW of installed offshore wind capacity and nothing has been built since 2013.

The lack of a unified framework results in a complex and fragmented permitting process, requiring engagement with numerous state agencies, each overseeing distinct permits. With localisation being applicant-led, the site selection plays a central part in a permit process. If an establishment is planned within Sweden's territorial waters, the municipality shall approve the establishment in accordance with the Environmental Code, before the wind power operator can obtain a permit. Permission is then applied for from the Land and Environmental Court. If a wind farm is to be built within Sweden's economic zone, it is the Swedish government that approves or declines a permit based on the law on Sweden's economic zone. Exclusivity is provided first after the permit for the wind farm is granted.

Looking forward, despite the Swedish government's introduction of a new energy proposal and the parliament's approval of updated energy targets, several ongoing inquiries concerning offshore wind remain in the pipeline. Of note are the offshore wind inquiry expected in November 2024 and the electricity market inquiry scheduled for April 2025.

Although the outlook for offshore wind in Sweden remains tentative, even minor policy adjustments by the government could have significant impacts, especially given the strong market interest. However, if further political risks are introduced, increasing the already elevated risk premium, this enthusiasm could fade.

With several inquiries underway, the Swedish government is well-positioned to not only make positive strides but also to act swiftly, seizing the opportunity to leverage and build upon the existing market interest in offshore wind.

- Centralised site selection and development – **YES**
- Decentralised site selection and development – **NO**
- Pre-investigation of sites – **NO**
- Installed offshore wind capacity – **14.7GW**
- Offshore wind production target – **YES** (55GW by 2030)
- Sealed-bid auction design – **YES**
- Governmental support scheme – **YES** (double-sided CfD)
- Grid connection support – **NO** (included in the CfD)
- Export/Import strategy – **EXPORTER**

United Kingdom

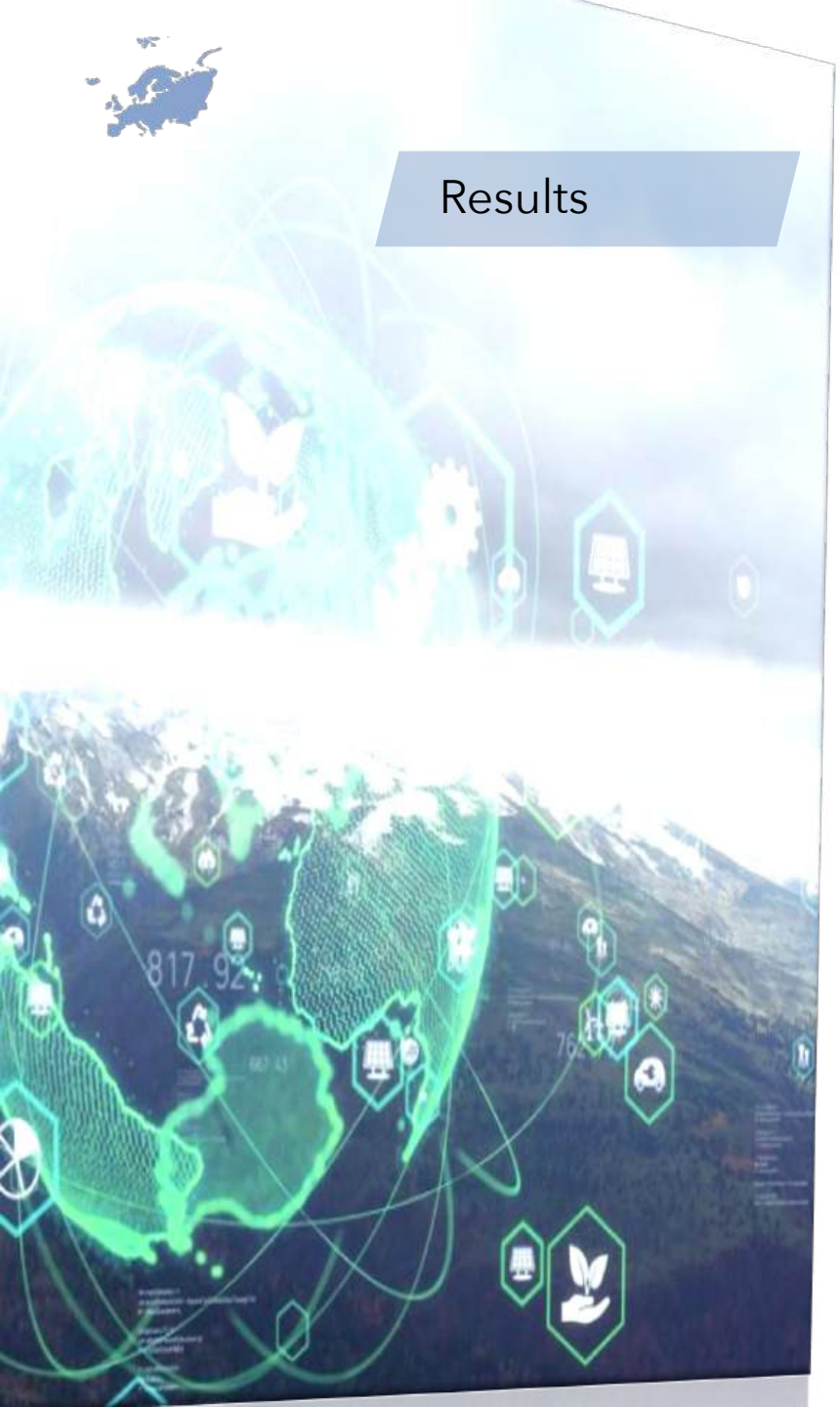
In 2019, the UK government set a target of 50 GW of offshore wind capacity by 2030, including up to 5 GW from floating offshore wind. Labour has signaled an intention to raise this target to 55 GW, plus 5 GW of floating wind. While undeniably ambitious, the current installed capacity leaves a significant gap to be filled by the end of the decade. Offshore wind saw rapid growth after 2017, however, development has slowed in recent years as policy direction became less clear. In the UK, each bidder can submit up to four bids in the sealed-bid auction with different combinations for strike price, capacity and delivery year. The successful bidders and the government agree to a two-sided CfD for 15 years. Seabed leases must be acquired prior to CfD auction participation, which are tendered separately by the Crown Estate.

The cost of the offshore grid connection is initially covered by the developer and factored into the Contract for Difference (CfD), while the onshore integration is carried out by the grid operator. Any delays in grid readiness may result in CfD cancellation, which poses significant financial risk given the upfront investment required for project development, including seabed lease costs. Under the Offshore Transmission Owner (OFTO) regime, offshore transmission assets are built by wind farm developers and then transferred to OFTOs through a competitive tender. This model provides investors with stable, long-term returns through regulated revenue streams over 20 years, while also promoting efficiency in connecting offshore wind energy to the grid.

It is worth noting that right before the AR6 commenced in August, the CfD budget was increased by £500 million to £1.555 billion for the whole of the auction, with £1.1 billion being earmarked for offshore wind. The maximum strike prices for CfDs in the AR6 auction were set at £73/MWh for offshore wind and £176/MWh for floating offshore wind.

Looking forward to the upcoming AR7 in March 2025, the UK Government published a new CfD framework in January 2024, introducing Sustainability Industry Rewards (SIR). These criteria aim to encourage investments in shortening supply chains in deprived UK areas and promoting sustainable global production, or a combination of both. Proposals must meet minimum expenditure standards for sustainable supply chains, with specific targets set for fixed-bottom and floating offshore wind projects before each AR, as a requirement to enter the CfD auction. The government, however, decided in the end to remove the requirement for new facilities supported by SIRs to be created within five years before an allocation round or in the future, allowing all listed facilities in the draft allocation framework to be eligible.

However, the government will need to increase the offshore wind budget to at least £2.5 billion in the next CfD auction for AR7 in order to have any chance of meeting its 2030 deployment target, an industry analyst has warned. Despite being a critical component in the UK's plans for decarbonizing its energy system, the latest auction secured less than 3.4GW of new offshore wind capacity, far below the levels required to achieve the government's target of deploying 55GW of fixed foundation offshore wind by 2030.



Results

Evaluating the results from the above comparison of the eleven countries chosen for this report, the countries' tendering and permitting procedures can be divided into three groups:

- **Immature markets** - these are defined by the lack of an offshore wind strategy (including production targets), and a specific offshore wind tendering and/or permitting procedure (including public support schemes and offshore wind development criteria).

- **Transitioning markets** - are defined by the introduction of an offshore wind strategy and tendering and/or permitting procedure, but that has not yet been tested and perhaps fully implemented into national laws.

- **Mature markets** - are defined by existing offshore wind strategies and already implemented tendering and/or permitting procedures.

Permitting procedures, to some extent, exist in all countries covered in this report, but when dividing the selected countries into the above categories, the national permitting processes are assessed on the basis that the respective country has a permitting process that considers the special characteristics of offshore wind projects. This is based on the proven strong correlation between technology-specific permitting procedures and production growth in offshore wind.

The majority of the countries analysed is this report are going through a transitional period with regards to implementing legislative procedures and national strategies. Nevertheless, there are many examples of mature markets to be inspired by. In the group of mature markets, the set-ups look rather different from one another and the speed of growth has also developed in different ways. What mature countries have in common, however, is that they have all kick-started their offshore wind industry and all of them have very ambitious production targets for 2030, see figure 3.5. As shown in figure 3.4, there are just a couple of countries that fall under the category of immature markets. Surprisingly, Sweden is one of those two. This is remarkable, because Sweden has for a long time been one of the forerunners in European renewable energy production growth, with for instance a total capacity of onshore wind power reaching 14,393MW in 2022, corresponding to around 25% of the country's total installed power mix.

Further take-aways from the above results are that there is a strong correlation between public support and production growth, but that a discerning trend among mature markets is to cut back on the level of support as the technology cost falls and governments are looking to cut spending.
As has been mentioned earlier in the report, there is a clear trend towards auction-based systems among the transitioning markets and among all the mature markets an auction-based system is in place. The results, however, show that auction-based systems can vary a lot and so too the risk allocation between state and asset owner. However, there seems to be a preference for sealed-bid auctions so far.

Figure 3.4: Selected Countries Grouped in Categories - Level of Market Maturity

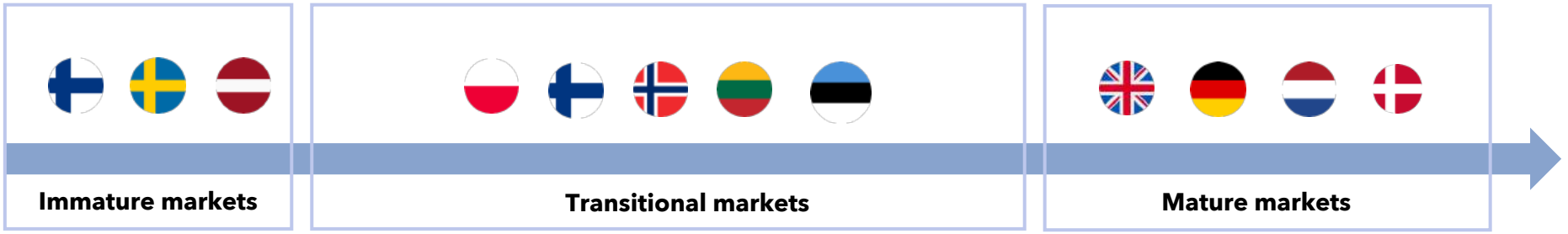
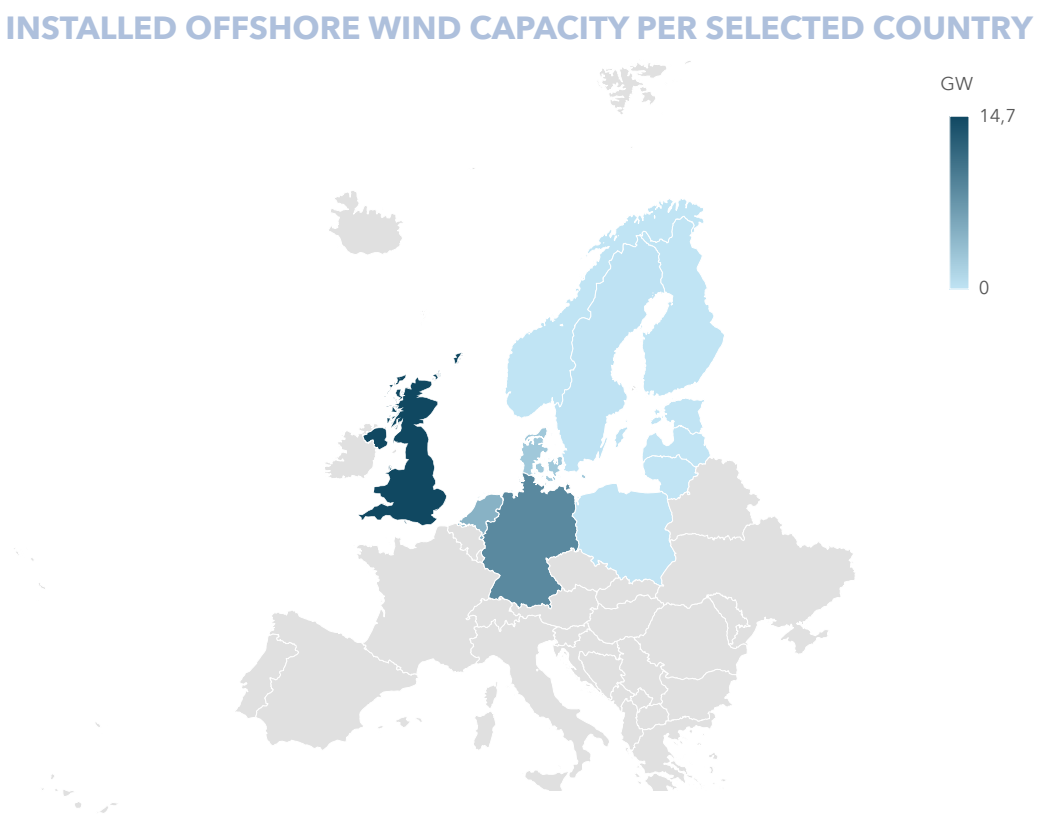
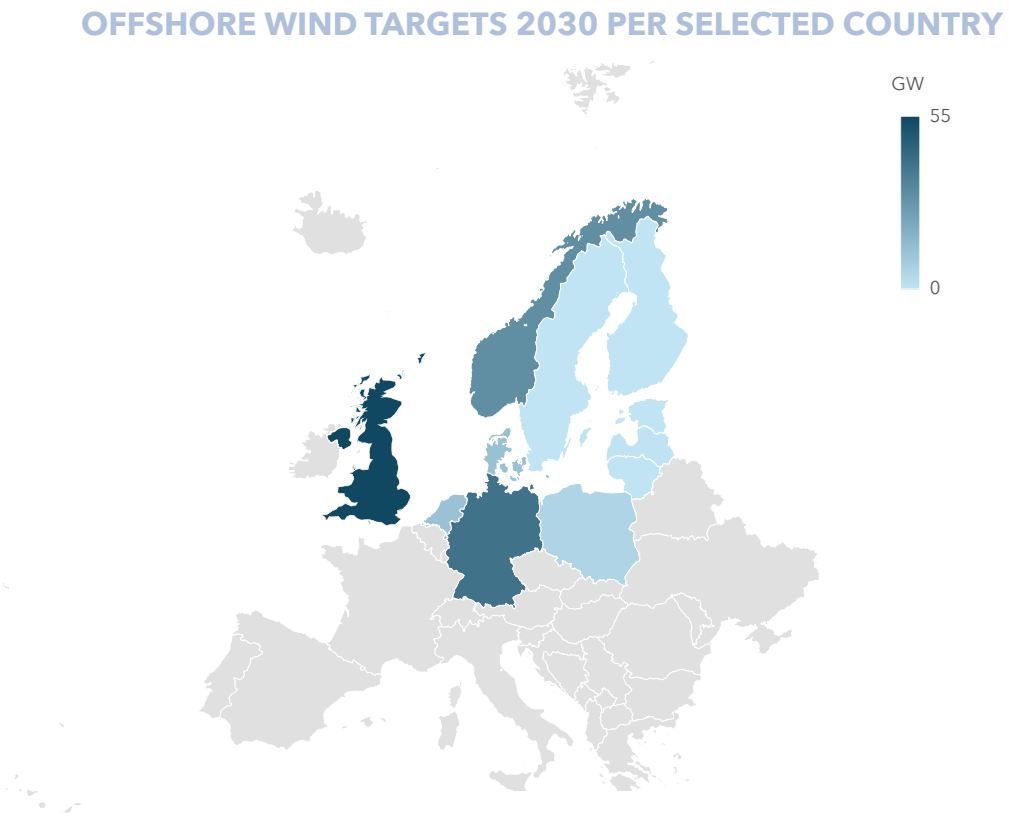


Figure 3.5: Installed Capacity & Offshore Wind Targets per Selected Country





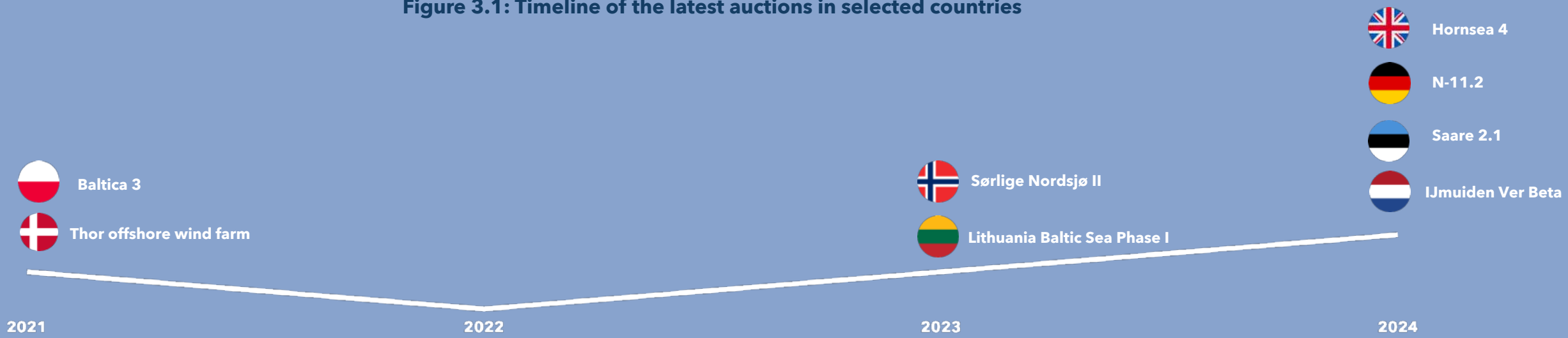
Country comparison of latest auction conditions

As offshore wind markets evolve, auction designs have become a critical tool for balancing risk and encouraging investment. Different countries adopt distinct approaches, from negative bidding in highly competitive markets like Germany and the Netherlands, to more traditional auction models in less mature markets such as Norway, which prioritize higher strike prices and reduced developer risk. Poland provides a notable example, where auction competitiveness was deliberately reduced to ensure the realization of projects. However, this approach is unconventional and should be viewed within the context of Poland's pressing need to reduce its reliance on Russian energy, where energy security has taken precedence.

These variations reflect not only differing levels of market maturity but also how governments choose to share financial risks and incentivize long-term project viability. For emerging markets like Sweden, which have yet to implement an auction framework, understanding these dynamics is essential. The challenge is to design a system that fosters healthy competition while ensuring that projects align with national energy objectives. Key questions arise in this context: How much risk should the state bear, and how can a balance be struck that fosters innovation without excluding smaller developers?

It is important to recognize that auction frameworks are continuously evolving in both emerging and mature markets. This evolution is shaped not only by changing national policy goals but also by broader EU objectives, particularly in response to the current geopolitical and macroeconomic landscape.

Figure 3.1: Timeline of the latest auctions in selected countries



Country comparison of latest auction conditions

AUCTION CONDITIONS	DK	EE	DE	LT	NL	NO	PL	UK
Date of Auction	2021	2024	2024	2023	2024	2023	2021	2024
Wind farm capacity	1000 MW	1560 MW	1500 MW	700 MW	2000 MW	1500 MW	1000 MW	2400 MW
State's Price Reference#	4,26öre/kWh neg. bid cap##	0,019 öre/kWh neg. bid floor	✗	✗	28.07 öre/kWh neg. bid cap	4.8 öre/kWh CfD floor	81.6 öre/kWh CfD floor	95.4 öre/kWh CfD maximum
Negative Bid for Area Rights	! *	✓	! *	✓	✓	✗	✗	✗
Negative Bid Fee (conv. to öre/kWh)#	4,26 öre/kWh##	0,019 öre/kWh	14,82 öre/kWh	0,189 öre/kWh	2,67 öre/kWh	✗	✗	✗
CfD Strike Price (conv. to öre/kWh)	0.015 öre/kWh	✗	✗	✗	✗	112,73 öre/kWh	71.82 öre/kWh	67.70 öre/kWh
Number of bidders	6	1	9	2	2	5	1	✗ **
Length of Contract	20 years	✗	20 years	41 years	40 years	15	25	15 years
Pre-selected	✓	✓	✓	✓	✓	✓	✓	✓
Pre-investigated	✗	✗	✗	✗	✓	✗	✗	✗
Non- price criteria: Societal Requirements	✗	✗	✗	✗	✓	✓	✗	✗
Non- price criteria: Environmental Requirements	✗	✗	✗	✗	✓	✗	✗	✗
Bidder Qualifications	✓	✓	✓	✓	✓	✓	✓	✓
Inflation Adjustment	✗	✗	✗	✗	✗	✓	✓	✓
Subsidised Grid Connection	✗	✗	! ***	✗	✓	✗	✗	✗
Guaranteed Grid Connection	✓	✗	✓	✓	✓	✓	✓	✓

*** Germany and Denmark included negative bidding in their auction frameworks but did not to mandate its implementation.**

**** The number of bidders in the Hornsea 4 auction remains confidential.**

***** While the developer covers the costs of connecting the offshore wind farm to the sea platform, the TSO covers the connection to the mainland, creating a hybrid system.**

 # Negative bid is assumed paid equally each year in the contract period. (20 years for EE).

In Denmark, the developer will pay the state all income from the Thor offshore wind farm for 2-3 years, until DKK 2.8 billion is reached.

Country comparison of latest auction conditions

How do bidding structures and risk allocation shape bid levels in offshore wind auctions?

The price spectrum in offshore wind auctions is shaped by a combination of market maturity, developer confidence, and policy frameworks, with auction prices ranging from negative bids in highly competitive markets to higher guaranteed CfD prices in nascent ones.

Denmark's capped negative bid of 4.26 öre/kWh exemplifies a mature offshore wind market where developers pay for project rights while absorbing limited financial risk. The cap ensures that developers remain competitive without inflating costs, maintaining a balance between government revenue and market incentives. With six bidders, Denmark's auction reflects a strong, stable market where project risks are well understood, and developers have confidence in long-term profitability.

Estonia's Saare 2.1 auction presents a contrast, with a single bidder and a much lower negative bid than seen in mature markets. Developer caution stems from high perceived risks, including undeveloped infrastructure, limited grid capacity and offtake uncertainty. The absence of competition and low negative bids highlight the constraints of a market still in its infancy. Without substantial investments in export capacity or alternative offtake solutions like hydrogen, Estonia's price spectrum remains on the lower end, reflecting the uncertainty and risk developers face.

In Lithuania, a negative bid of 0.189 öre/kWh and participation by only two bidders, similarly point to a market still grappling with the transition to offshore wind. Lithuania's relatively low negative bid, compared to more established markets like the Netherlands or Germany, highlights the country's challenges. These include limited infrastructure, a lack of pre-development support, and the absence of financial risk-sharing mechanisms in its initial auction. The absence of pre-auction site assessments and environmental surveys forces developers to absorb greater risk, which is reflected in their cautious bidding. This positions Lithuania at the lower end of the price spectrum, with developers uncertain about long-term returns.

Germany's offshore wind auctions stand at the opposite end of the spectrum, with a negative bid reaching 14.82 öre/kWh. This reflects the high competition level and confidence in the market's regulatory and demand stability. The nine bidders vying for project rights demonstrate how developers in Germany are willing to absorb significant upfront costs due to the long-term security provided by the country's mature market conditions.

The high bids in Germany showcase a market where offshore wind has become integral to energy transition strategies, and developers are confident that future returns justify the higher financial commitments.

With a negative bid of 2.67 öre/kWh, the Netherlands finds itself in the middle of the price spectrum, reflecting a balance between competition and financial risk. The Dutch market is mature, focusing on integration with other renewable energy sources like solar and hydrogen. Stringent non-price criteria, such as sustainability commitments, reduce the number of bidders compared to more price-focused markets like Germany, but the regulatory stability ensures that developers remain confident. This stability keeps the Dutch price spectrum competitive while managing financial risk effectively.

Norway's CfD floor of 4.8 öre/kWh provides developers with moderate revenue protection, balancing risk and reward. The five bidders in Norway's auction signal a healthy level of competition, but political uncertainties around export policies may have constrained participation. Nonetheless, the CfD model's guaranteed price floor ensures that developers can secure a minimum level of revenue, positioning Norway within a mid-range of the price spectrum.

This allows Norway to maintain developer interest despite the challenges posed by policy volatility. Poland's offshore wind auction, with a CfD floor of 81.6 öre/kWh, reflects a market still in the early stages of development. The high guaranteed price compensates for the lack of competition (only one bidder) and the risks inherent in an undeveloped market. This high CfD floor ensures minimal financial risk for developers, positioning Poland on the higher end of the price spectrum despite its nascent market status. The high floor reflects the need to attract investment in a market that is still building the necessary infrastructure for large-scale offshore wind development.

The UK's CfD cap of 95.4 öre/kWh represents the highest level of price protection, providing developers with strong revenue certainty. The results of AR6 show that the UK has recovered from the challenges of AR5, with industry-government collaboration ensuring private-sector investment in offshore wind. The awarded projects under AR6 prevent further delays that would have disrupted the supply chain, reinforcing the UK's position as a leader in offshore wind development. The strong CfD price protection places the UK at the upper end of the price spectrum, attracting significant developer interest despite higher upfront costs.

The offshore wind auction price spectrum reveals strategic shifts in how countries manage competition, infrastructure readiness, and long-term energy goals. High negative bids in mature markets like Germany and Denmark signal more than confidence—they reflect robust regulatory frameworks, supply chains, and grid integration, allowing developers to absorb higher upfront costs with confidence in future returns.

Country comparison of latest auction conditions

In emerging markets like Estonia and Lithuania, lower bids stem from structural constraints, such as limited grid capacity and policy uncertainty, reflecting developers' strategic caution in regions where infrastructure is not yet equipped for large-scale offshore wind.

CfD mechanisms in countries like Norway, Poland, and the UK offer varying levels of price protection, signalling government efforts to attract long-term investment by de-risking projects. The spectrum shows that auction design now extends beyond competition management, aligning financial incentives with broader goals like grid stability and cross-border energy integration, shaping the future of offshore wind deployment.

How does negative bidding impact offshore wind auctions?

Negative bidding is most prominent in markets like Germany and the Netherlands, where developers pay for the right to build, shifting financial risk to the private sector while reducing government expenditure. Large energy companies, focused on capturing market shares, have accepted the prevalence of negative bidding as a strategic move to secure early market entry, despite the significant upfront costs involved. As a result, this auction structure continues to persist, even in the face of substantial criticism from both developers and regulators across the industry.

Both Germany and the Netherlands initially provided significant subsidies, such as feed-in tariffs and CfD, to support offshore wind development. These subsidies offered financial stability, encouraging early investments that helped scale the offshore wind industry. As a result of these state-backed initiatives, both countries have evolved into mature markets, characterized by established infrastructure and streamlined permitting processes. Developers in these regions can now capitalize on the advantages of these past investments, enabling more competitive auction systems, including the introduction of negative bidding models.

In Germany, the continued use of negative bidding reflects a strategic response to long-term market conditions. Prior to the war in Ukraine, these bids were largely driven by opportunistic views of future market conditions, with developers betting on favourable trends. Post-war, the trend has persisted, suggesting that developers view the political certainty surrounding offshore wind's expanding role in Germany's energy mix as a critical factor. As traditional energy sources are phased out, the sustained demand for offshore wind provides a level of assurance that may justify the risks associated with negative bidding.

However, concerns are growing that this approach could exacerbate supply chain pressures. The financial strain caused by negative bids is being passed down to suppliers, already grappling with inflation and material shortages. This could impact project quality and timelines, leading to potential delays and cost overruns. Additionally, by favouring larger players with deep financial reserves, the model risks reducing competition, concentrating market power, and shutting out smaller or mid-sized developers. While the strategy may pay off in securing early market positions, the sustainability of such an approach remains uncertain.

What key factors drive the variation in strike prices across auction outcomes?

The outcomes of offshore wind auctions across Europe reveal how market maturity, regulatory frameworks, and political stability shape the pricing and participation dynamics in each country. A comparative look at key markets like the United Kingdom, Germany, the Netherlands, Denmark, and Norway highlights the distinct factors influencing auction results, ranging from the design of financial support mechanisms to broader economic and geopolitical pressures.

In the Netherlands, recent offshore wind auctions have shifted away from traditional subsidy models, adopting negative bidding and prioritizing non-price criteria. This change reflects the maturity of the Dutch market, where factors such as environmental sustainability now take precedence over purely financial competitiveness. Notably, only 15% of the evaluation points in these tenders are awarded for financial bids, with the bulk of the weight given to qualitative criteria like biodiversity and ecosystem contributions. While this focus on sustainability aligns with the Netherlands' long-term climate goals, it introduces significant challenges for developers, which may help explain why Dutch negative bids do not reach the levels observed in Germany.

Additionally, the Beta site includes a specific focus on specifically looks at the integration of the wind farm into the Dutch energy system, which includes renewable hydrogen and solar, further raising the financial stakes for participants.

Norway's offshore wind auction landscape has faced significant delays, primarily due to political and regulatory uncertainties surrounding EU state aid rules and national export policies. The key issue, whether offshore wind power should prioritize domestic use or allow for exports, has deepened political divisions. This resulted in a two-phase solution for the Sørlige Nordsjø II offshore wind auction: the first phase focuses on delivering electricity to the Norwegian grid, while the second phase enables the option to export power abroad. These debates stalled the auction process, deterred developers and reduced bidder participation. Despite Norway's vast offshore wind potential, these delays risk leaving the country behind other European markets with more established and stable regulatory frameworks. While it is common for auction frameworks to evolve between rounds, Norway's challenge stems from a lack of a clear and consistent political direction for offshore wind policy.

Country comparison of latest auction conditions

In Germany, negative bidding has become a central feature of recent offshore wind auctions, with bids reaching as high as €1.3m per MW (14,82 öre/kWh), as seen from BP and TotalEnergies. This auction model shifts significant financial risk to developers, offering no guaranteed revenue support, unlike the CfD systems in countries like the UK and Norway.

Despite this, Germany's auctions drew significantly higher bids than recent tenders in the Netherlands, with successful bidders in the Netherlands offering around €400,000 per MW (2,67 öre/kWh), though these projects also included additional infrastructure costs like solar power installations and artificial reefs, as mentioned above.

The high level of competition in Germany, evidenced by multiple zero bids, contrasts with other markets. However, competition faded during the bidding process, with only two bidders left fighting over the top sites in the final rounds, underscoring the steep financial stakes of the German system. Notably, the oil majors made a comeback after RWE pulled out, citing unsustainable bid levels.

The sustained interest in Germany's auctions can be attributed to the country's clear political commitment to offshore wind as a key pillar of its clean energy strategy, with plans to increase capacity from 8.5 GW in 2023 to 70 GW by 2045. This political certainty, despite the high costs, continues to attract major players. Furthermore, Germany's reputation as Europe's industrial powerhouse, coupled with its high electricity prices and strong energy demand, makes it an attractive market for renewable energy development. Oil majors are willing to take risks in this space, seeing Germany as a prime opportunity for long-term returns, particularly as the country seeks to transition away from fossil and nuclear power.
This combination of high demand and the push for offshore wind creates a favourable environment for bold investment decisions.

Denmark's subsidy-free auction for the Thor offshore wind project marks a key moment in the country's gradual shift as a mature market. Denmark continues to carefully balance risk-sharing with a market-driven approach, aiming to maintain competitiveness while minimizing state intervention. The concession went to RWE after a drawing of lots, as five out of six bidders offered the minimum price of 0.015 öre/kWh. With this bid, no subsidies will be paid; instead, RWE will pay the Danish state the difference for the first 2–3 years, until SEK 4.9 billion is reached.

The Thor auction for offshore wind can be considered a major success, as demonstrated by the high number of bidders vying for the project. However, the outcome was somewhat constrained by state intervention. From the state's perspective, with five bidders still in the running, they likely would have been willing to offer more if not limited by the revenue cap. This cap limited the financial upside for the state, despite the strong competition. As previously mentioned, in terms of energy deployment whilst preserving market-oriented conditions, this approach should be regarded as an effective method of achieving a balanced outcome.

However, introducing a lottery element into an auction process undermines its core purpose: ensuring that competitive pricing accurately reflects market conditions. When randomness replaces price-based competition, it distorts the critical market signals that auctions are designed to reveal. Moreover, it introduces an arbitrary mechanism to settle the distribution of large-scale infrastructure projects.

When selection is left to random chance, the state forfeits its ability to guarantee that the most efficient or deserving bidder is chosen, thereby potentially diminishing the overall effectiveness and credibility of the tender process.

Yet, Thor's success has driven Denmark to overhaul its auction approach, integrating a new framework that emphasizes societal benefits and mandating a 20% state co-ownership in offshore wind projects. Revenues from subsidy-free auctions are expected to finance future subsidy-based auctions, such as for the Bornholm energy island. However, it is important to recognise that market conditions have deteriorated since the Thor auction, with capital expenditures rising in recent years. This has led to expectations that auction structures would adapt to reflect these increased costs. Despite this, Denmark has opted not to use CfDs in its upcoming 6 GW auction. This introduces uncertainty around the auction's outcome, and a suboptimal result in the tender could force reassessment.

Looking ahead, the success of these models will ultimately depend on attracting investment while ensuring projects are financially viable and delivered on schedule. As auction volumes grow and supply chain bottlenecks intensify, countries must carefully navigate these challenges to avoid delays and sustain progress in offshore wind development.

What's behind the rise of non-price criteria, and what are its impacts?

The growing use of non-price criteria in offshore wind auctions signals a broader shift in environmental policy and the economic landscape across Europe. Traditionally, tenders focused on financial competitiveness, with bidders vying for the lowest strike prices. However, this is changing, especially in markets like the Netherlands and Norway, where factors like environmental impact, system integration, and local content are becoming key to auction outcomes. This shift reflects a growing recognition that financial bids alone often fall short of aligning with long-term sustainability goals at both national and EU levels.

Country comparison of latest auction conditions

As previously mentioned, recent tenders in the Netherlands have included factors like marine biodiversity protection and renewable hydrogen integration in selecting the winning bids. As a result, non-price criteria often outweigh financial considerations, shifting the focus toward broader societal and environmental goals. While this strategy aligns with the Dutch government's objective of embedding climate policies into energy projects, it introduces significant challenges for developers.

Navigating a more complex tender process with a greater emphasis on non-financial factors demands a higher level of expertise and resources, potentially increasing project costs and risks.

One of the key issues that is likely to gain even more prominence in future tenders is system integration, as renewable energy projects are increasingly expected to support grid stability. The slow expansion of European grids presents a significant challenge: 40% of Europe's distribution networks are over 40 years old, creating bottlenecks that hinder efficient energy deployment. The current lack of investment and lengthy permitting processes for grid upgrades further complicate the situation, raising the stakes for developers who must now consider grid resilience as part of their bids.

Norway takes a slightly different approach but similarly emphasizes non-price criteria. In Norwegian auctions, pre-qualification scores based on these criteria become decisive in the event of a tie, making them a critical aspect of competitive bids.

Developers must pay close attention to environmental and technical considerations, as these factors can often tip the balance in their favour.

Beyond the Netherlands and Norway, this trend is gaining momentum elsewhere. For instance, France plans to introduce Net-Zero Industry Act criteria by 2025, which will incorporate pre-qualification requirements for cybersecurity, data security, responsible business conduct, and supply chain resilience. This framework is part of a broader European strategy to integrate offshore wind more deeply into national security and economic resilience goals. By embedding these criteria, France aims to future-proof its renewable energy projects while aligning with EU-wide regulations.

The rising focus on non-price criteria reflects a deeper understanding that offshore wind projects are not merely about energy production but delivering wider societal and environmental benefits. This evolution in auction design, however, introduces new complexities. Developers face additional pressure to meet a growing list of non-financial requirements, potentially affecting their ability to participate in multiple tenders. This has led to concerns over whether the approach can maintain a high level of bidder participation, especially as macroeconomic conditions, including inflation and supply chain disruptions, compound the challenges already present in the offshore wind sector.

In mature markets like the Netherlands, splitting large offshore sites into smaller zones has made projects more accessible to a broader range of developers by reducing financial risks. However, this strategy has also constrained opportunities for large-scale profits, raising questions about long-term market sustainability.

Meanwhile, in less mature markets, increasing CfD budgets may provide a more viable path forward by offering developers more financial security and encouraging broader participation. In summary, the increasing use of non-price criteria in offshore wind auctions represents a fundamental shift in how projects are evaluated, placing greater emphasis on long-term sustainability and societal impact.

These criteria can be applied in two ways: either in combination with financial bids to determine the overall winner, or as a decisive factor in cases where financial bids are equal. While this approach aligns with broader policy objectives at both national and EU levels, it also introduces new risks and complexities for developers. Markets will need to find the right balance between financial competitiveness and non-financial obligations to ensure continued investment and participation in offshore wind projects.

What role do pre-investigated sites play in auctions?

Germany's offshore wind auction system offers a clear comparison between pre-investigated and non-pre-investigated sites, revealing stark differences in auction outcomes, developer participation, and project timelines. Pre-investigated sites, where the state conducts essential environmental and technical assessments before the auction, significantly reduce the risks for developers.

However, while offering more certainty and lower initial risk, pre-investigated sites do not generate the same level of fierce competition, as the financial returns are clearer and more predictable. Developers may also assume that pre-investigated sites will have lower overall margins, leading to less aggressive bidding behaviour. Nevertheless, since much of the groundwork is already completed, this leads to faster project timelines, ensuring a smoother and more efficient path from construction to grid connection.

At first glance, it may seem counterintuitive that non-pre-investigated sites in Germany are attracting higher negative bids than pre-investigated ones, given the additional risks developers face with the former. However, several key factors explain this phenomenon.

Country comparison of latest auction conditions

Firstly, non-pre-investigated sites may hold greater strategic value, such as prime locations near existing infrastructure or favourable wind conditions. This drives competition, as developers are willing to accept more risk to secure these highly coveted sites. The scarcity of such high-potential locations can trigger aggressive bidding, leading to higher negative bids.

Secondly, large, well-capitalized companies like BP and TotalEnergies are well-equipped to handle the risks associated with non-pre-investigated sites. They see these bids as long-term investments, banking on future profitability in Germany's rapidly expanding offshore wind market.

These developers are willing to take on short-term risks in anticipation of long-term gains, particularly given their confidence in the stability of Germany's renewable energy policies.

Thus, the higher negative bids for non-pre-investigated sites are driven by a combination of market scarcity, strategic positioning, and long-term confidence in Germany's offshore wind potential.

However, the slower timelines for non-pre-investigated sites further compound these challenges. Without the preparatory work done by the state, developers must spend additional time securing permits and conducting assessments, which may lead to delays in project completion and grid connection.

The potential for a slower pace threatens Germany's ambitious offshore wind targets, as the lag in project development reduces the speed at which new renewable capacity can be brought online.

Germany's experience illustrates the clear advantages of pre-investigated sites, which lower costs, encourages more competition throughout the bidding process, and enable faster development. Non-pre-investigated sites, while still drawing large interest, come with higher costs, fewer participants in the latter stages of the bidding process, and the potential longer project timelines due to the increased risks developers face.

As Germany looks to expand its offshore wind capacity, it will be critical to strike the right balance between these models to ensure both competitive pricing and the timely realization of projects.

What role does state involvement play in grid connection within auctions?

In offshore wind development, grid connection is a critical factor influencing both developer confidence and the financial feasibility of projects. In countries like the Netherlands, where the state subsidises grid connection, developers are relieved from the substantial costs of linking wind farms to the grid. This state-backed model not only lightens the financial load but also promotes broader participation and more competitive bidding by reducing risk and uncertainty for developers.

In Denmark, among others, the state guarantees grid connection, offering developers a predictable and coordinated approach during both the permitting and planning phases. This assurance means developers can confidently plan their projects, knowing that the necessary infrastructure will be in place when needed, thus avoiding costly delays and uncertainties.

This contrasts with countries like Sweden, where the absence of a state-guaranteed grid framework leaves developers facing significant uncertainty. This unpredictability adds complexity to the permitting process, complicating financial planning and raising the overall risk of offshore wind projects.

Ultimately, predictable and reliable grid connection models, whether through subsidies or state-guarantees, are key to fostering developer confidence and ensuring successful offshore wind deployment. In markets like Sweden, the lack of such certainty poses significant barriers, deterring developer interest and heightening financial risk, thereby slowing progress in the sector.

Conclusion

The evolution of offshore wind auctions in Europe highlights an increasing tension between market-driven approaches and the infrastructure realities that underpin them. As countries move away from subsidy-backed models and adopt competitive bidding, the financial burden shifts heavily to developers, forcing them to absorb greater risks. While this fosters competition and innovation, it also introduces significant challenges, particularly as supply chains face rising costs and material shortages, compounded by new resilience criteria. This trend risks narrowing the field to large, well-capitalized players, reducing market diversity and threatening to delay project timelines.

At the heart of this challenge is the need to strike a balance. As auctions become more complex with the addition of non-price criteria, it's crucial for frameworks to remain accessible to a range of developers while ensuring projects are financially viable and timely. The future of Europe's offshore wind market hinges on how well these auction models can retain competitiveness without side-lining smaller players. Predictable elements, such as pre-investigation with grid connection guarantees, and careful adjustments to auction structures, will be key to sustaining progress in offshore wind deployment across Europe.

Transitional systems

The findings in this report show that national strategies and legal procedures for offshore wind vary a lot between countries and that the transition from one permitting system to another also pose different risks and opportunities. Thus, the transitional processes are, and have to be, carried out in different ways.

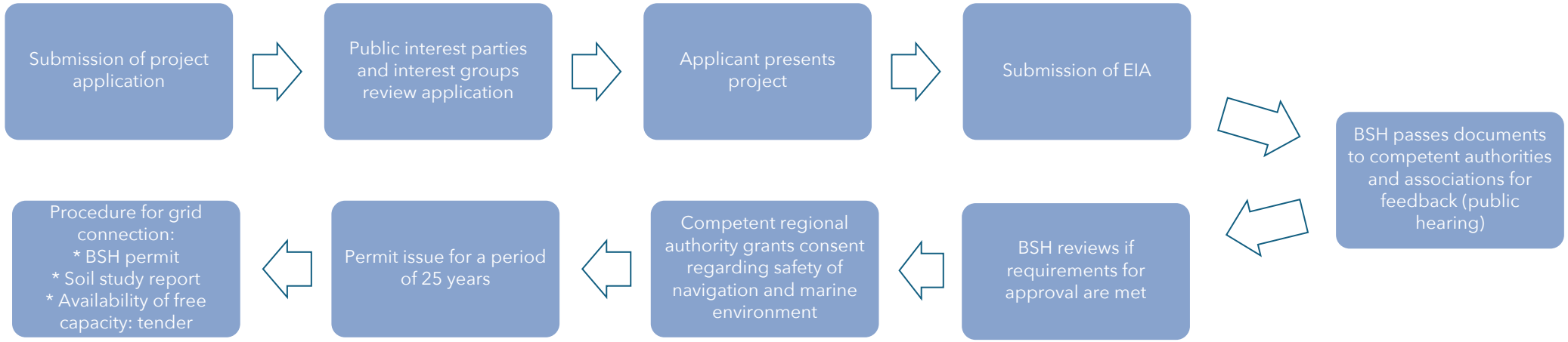
This section of the report will firstly focus on how Germany has developed its tendering and permitting procedure. Germany is a good example because the country has through a step-by-step development gone through several design models and could therefore give some insight into the process of transitioning. Secondly, a discussion about a possible way of transitioning from a market which lacks a clear permitting process for offshore wind, but at the same time has a strong presence of wind developers, will be carried out. This discussion will be centred around Sweden and how the Swedish system possibly could benefit from its current market situation, but at the same time develop it's permitting procedure by taking advantage of current trends in offshore wind markets and policies.

Germany's transitional process

2008-2017 - Initially, offshore wind developers had to identify and investigate potential suitable sites and apply for a permit for that chosen site. This mechanism resulted in suboptimal site allocation, sometimes partially overlapping projects and insufficient coordination with regards to grid connections. These outcomes prompted the adoption of the first Spatial Offshore Grid Plan in 2014 and, eventually, as will be detailed below, led to the introduction of a centralised model for planning and commissioning.

Before the 2017 reform, Germany followed an administrative allocation of permits procedure for offshore wind projects. The Federal Maritime and Hydrographic Agency (BSH) was in charge of the application procedure for wind farms located in the German EEZ. The approval and permit process was structured as shown in Figure 3.6.

Figure 3.6: Germany's Administrative Allocation of Permits Procedure < 2017



Transitional systems

The administrative allocation of permits before the reform in Germany, was mostly centralised on the BSH, but the participation of the competent regional authority was necessary.

Until 2012, a fixed FiT of up to 15€ct/kWh (in some cases up to 19.4€ct) was the support scheme that proved effective for the initial phase of wind deployment. In 2012, one-way FiP was introduced.

2017-2020 - From 2017, the FiP is determined in course of a competitive tender process run by the German Federal Network Agency (Bundesnetzagentur - BnetzA) under the German Wind Energy at Sea Act (Windenergie auf See Gesetz - WindSeeG). The government no longer established the market premium, but bidders had to indicate in their bid a minimum guaranteed price for the electricity produced, in €ct/kWh, which they require to realise the project. The lowest bid wins the tender and sole right to conduct a planning approval procedure for the site, the right to receive the subsidy and the entitlement to connect to the grid.

In this tendering process, the sea sites auctioned were pre-analysed and pre-developed by the BSH to prepare the tendering of the site and provide additional information to potential bidders, following a centralised design.

Offshore wind sites which received grid access before 2017, under the administrative allocation of permit procedure, were exempted from the auction system and continued to benefit from the FiP system, following 2014 legislation.

2021-2022 - Based on the experience from auctions in 2017, where several market participants started to bid a reference value of zero, a mechanism to cope with zero subsidy bids was introduced. The option of introducing a CfD regime and negative bidding was discussed, but the government decided to stay with the FiP scheme and add a mechanism on top. The solution chosen was a lottery mechanism, meaning that in case of several zero subsidy bids being presented for the same offshore wind site, the winner will be picked through a lottery process run by BNetzA.

2023 – In 2023, non-pre-developed sites were introduced as an option to the centralised model. The Site Development Plan, from 2023, also defined sites that are not part of the pre-developed sites that had been auctioned until then. For these sites the support-schemes have been removed and the award of these will take place in parallel to the pre-developed ones in order to speed up offshore wind development.

Figure 3.7: Germany's Permitting and Tendering System Development

Sweden's need for a new permitting system: discussion

When comparing the Swedish permitting system for offshore wind with neighbouring countries, Sweden stands out. Not necessarily in terms of installed capacity, since there are a number of countries that still have no installed offshore wind, but certainly when it comes to the level of ambition to promote growth in offshore wind production. This statement is solely based on how far Sweden has come with including offshore wind in the legal framework and strategies and not based on the perception that there is not a political or public will to increase the share of offshore wind in the power mix.

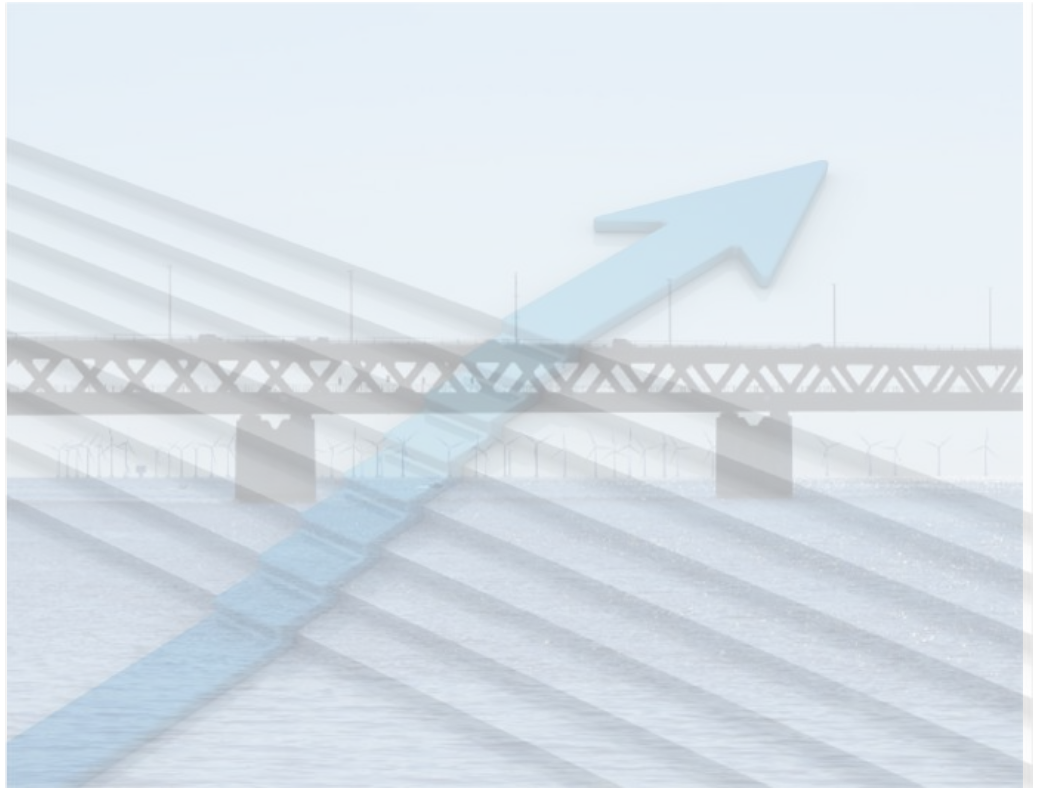
Lessons learned from those countries that have been successful in introducing offshore wind in their countries' energy mix, but also from the above-described transition period in Germany are:

- A critical driver for successful offshore wind and broader energy deployment is clear, legally embedded government policy. Without legal foundation, there is no guarantee of capacity delivery or reliable progress measurement. Legally binding production targets ensure accountability by tracking and evaluating outcomes. This approach compels public actors to define a long-term trajectory, reducing political risk and fostering favourable investment conditions. A well-defined policy framework not only enhances investor confidence, but drives greater risk appetite, accelerating the energy transition across technologies.

- It is vital to provide clarity and fair conditions to relevant decision-making bodies and project developers with regards to the process. In immature markets, this is pre-dominantly done by introducing a centralised site selection and possibly also development system. This could be done through the establishment of a central facilitator and/or centralised decision-making body (one-stop-shop solution) that handles the permitting process. A centralised system does also take into consideration the country's whole electricity system and, thus, plans the offshore wind site developments in line with onshore grid and demand conditions.

- All transitional countries identified in this report are moving from an administrative allocation of permit system to a fully or partly auction-based system. For a country such as Sweden, such a move does not only come with benefits, but the risks could also be managed if the transition is well handled. This will be discussed in more detail below.

- The majority of countries in this report also recognize the need for a risk-sharing mechanism between the developer and the state. These mechanisms, as described in previous chapters, are structured in such a way that they follow market movements and therefore minimise risks of over-subsidising projects. In many cases, such as the double-sided CfD, the government can even generate revenue depending on auction outcomes and market movements.



"With its extensive coastlines and strong industrial demand, Sweden is well-situated to tap into the growing potential of offshore wind. As a nation with a long-standing history of leading in green transitions, Sweden has the opportunity to continue that leadership by shaping policy responses to meet the increasing offshore wind market interest."

Carl Rosenberg, Policy Analyst

Sweden's need for a new permitting system: discussion

For a more detailed overview of CfDs, please refer to the ELS Analysis report *Navigating Support Schemes: Contracts for Difference in Perspective*.

Given the fact that Sweden currently has none of the above factors in place, a lot of legal and policy changes will most likely be needed in Sweden. Germany, as a comparison, had both a more centralised system with BSH in charge of facilitating the process, as well as both FiT and FiP instruments during the transitional period. The Swedish system is not unique in any sense, but rather very common, as just about all countries have come from either an administrative allocation of permit or administrative tender system before they included offshore wind targets in their legal systems and policy strategies.

However, a rather special, albeit not unique, situation in Sweden is that many wind developers have already established themselves in both Swedish territorial waters and in the Exclusive Economic Zone under the current legal framework. They have done so without being granted any exclusivity right to their chosen sites, which has resulted in many overlapping applications. As described above, the same problem existed in Germany, even if on a much smaller scale. A main difference between the erstwhile situation in Germany and the current situation in Sweden is, however, that Germany could deal with this problem at a time when the offshore wind industry was in an earlier expansion phase and the interest therefore was lower. This generated fewer overlapping applications and a smaller number of developers entering the fray.

How to handle existing applications and to delineate overlapping applications will be challenging regardless of whether Sweden were to transition into a new permitting procedure, or not. It will be extremely important to consider the developers already in place if wind areas are to be subject to a competitive tendering and/or auction process. However, this report suggests evaluating the potential of introducing a pre-qualification process, that takes into consideration pre-existing wind developers in the maritime areas that are potentially up for auctioning.

Building on this, the Swedish offshore wind inquiry is currently working to update the Swedish regulatory framework to better support energy project deployment. By revising existing legislation and moving decision-making to earlier stages in the project lifecycle, the inquiry seeks to enhance predictability and operational efficiency for developers. Part of the inquiry's scope includes the potential introduction of an auction-based system.

As previously noted, the system's implementational success hinges on how effectively advanced projects under the current regime are grandfathered into the new framework. Failure to carefully manage this process could heighten political uncertainties and jeopardize already invested capital. The destruction of capital already invested would likely raise risk premiums, further intensifying Sweden's already high-risk perception. This increased financial uncertainty could ultimately undermine the goals of the regulatory overhaul.

It is also worth mentioning that the inquiry does not include risk-sharing mechanisms and will therefore not result in a comprehensive regulatory overhaul. Meanwhile, the Swedish electricity market inquiry is considering integrating CfDs, which could complement the offshore wind inquiry by offering long-term investment certainty and reinforcing overall market stability.

This report highlights the wide range of auction-based design options available. Whichever option is chosen, it is essential that the offshore wind strategy is seamlessly woven into the broader energy policy framework to ensure both strategic coherence and long-term impact.

Rather than crafting fragmented policies, that seek to patch and mend, focus needs to be placed on long-term planning that addresses the entire energy system as a whole. This would allow for identifying the most cost-effective and time-sensitive strategies across various sectors and technologies, ensuring that both market and energy system needs are met.

The UK employs a technology-neutral planning and allocation system, integrating all energy sources based on comprehensive planning data. This system is based on a carefully developed framework, ensuring inclusivity and alignment with broader policy objectives.

Sweden could leverage such an approach to not only encourage investment in new capacity, but also addressing the country's concerns about grid reliability and evolving consumer needs, all without compromising market balance.

Within this system, auctions are conducted in allocation rounds, organized into specific technology categories, each with their own designated budget. This approach allows for a systematic grouping of applications and efficient evaluation and management of the total CfD- budget.

Sweden’s need for a new permitting system: discussion

To qualify for the auctions, projects must meet specific technical and financial criteria. This ensures that all projects compete on a level playing field within their respective technology categories. These criteria are determined during the planning phase, aligned with the needs of the energy system and direction of the government's energy policy strategy.

It's important to differentiate between the planning phase, which encompasses all technologies, and the auctions themselves, which remain technology-specific to accurately assess cost levels, encourage technological advancements, and ensure balanced participation.

The inclusion of all technologies in the planning phase ensures that the state can plan for and support a broad range of system capabilities, even if some do not currently require financial backing. This holistic approach simplifies the permitting process for developers, offering a faster and more transparent pathway for project approval.

In terms of technology-specific auctions, the design can accommodate varying needs and requirements, ensuring that even high-cost technologies are given a fair opportunity to compete, driving both innovation and market participation.

The interplay between the planning phase and the auction process, as illustrated in figure 3.8 and 3.9 below, guarantees that the overall system remains inclusive and technology-neutral. Each technology, even those requiring minimal support, undergoes a competitive and transparent procedure. This ensures that the energy system's requirements—considering cost, capacity, and delivery timelines—are balanced, all while aligning with national production and electrification targets.

The allocation system establishes a level playing field where various energy sources can compete based on pre-determined reference prices. A key factor in its success lies in the comprehensive planning stage. Here, critical parameters such as budget limits, cost estimates, and capacity thresholds are defined, ensuring that each technology is well-positioned to meet the energy system's broader goals while adhering to a competitive and transparent framework.

Within this broader system, the report proposes implementing a two-step auction process for offshore wind projects. This process consists of a pre-qualification stage where pre-existing developers are grandfathered into the new system, followed by a second stage, the site auction that determines factors such as cost, volume, and delivery time. Functioning as part of a technology-specific auction approach, this method ensures that offshore wind developments are carried out in a structured and competitive manner.

While pre-qualification auctions already exist, they currently do not include criteria addressing the issue of pre-existing developers. The report recommends investigating how the pre-qualification auction system could incorporate criteria that provide benefits to wind developers who have already assumed financial risks under the current legal framework.

Even though there are a lot of risks associated with transitioning the current Swedish system into an auction-based system, the lack of options leaves little room for considering other alternatives and therefore points towards instead finding a suitable transition model. Transiting into an at least partly auction-based tendering system seems inevitable given the current market developments and global trends, particularly in Europe.

Setting aside the technical details and the system-wide perspective, focusing specifically on offshore wind, this report’s prime recommendation is to form a national offshore wind strategy and set a legally binding national offshore wind production target, before formalising a new permitting procedure. This could form the basis for the Swedish government to plan for its national wind production at sea, as well as giving it an effective tool to follow-up and evaluate its plans and thus provide a higher degree of certainty to the industry.

Figure 3.8: Technology Neutral Allocations System

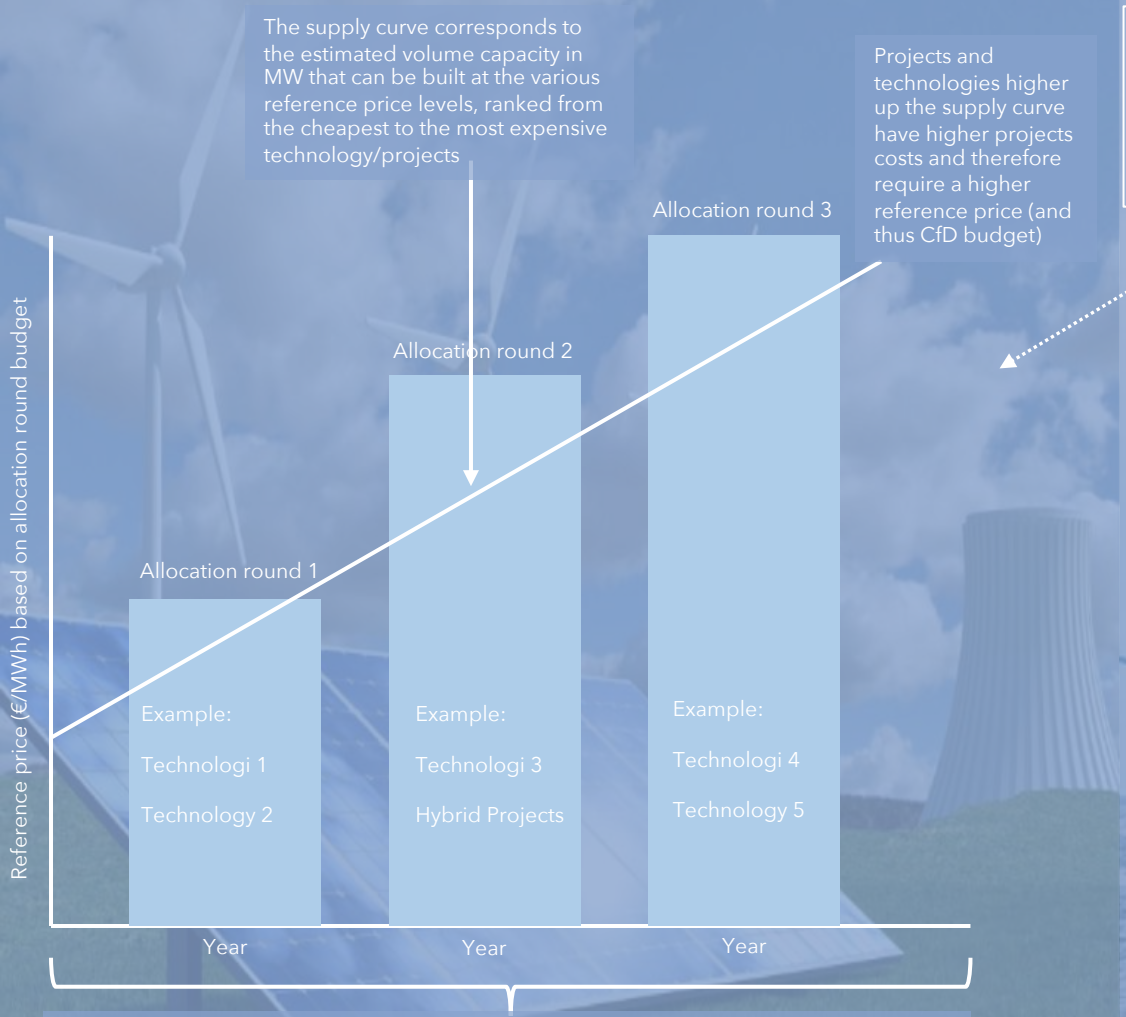
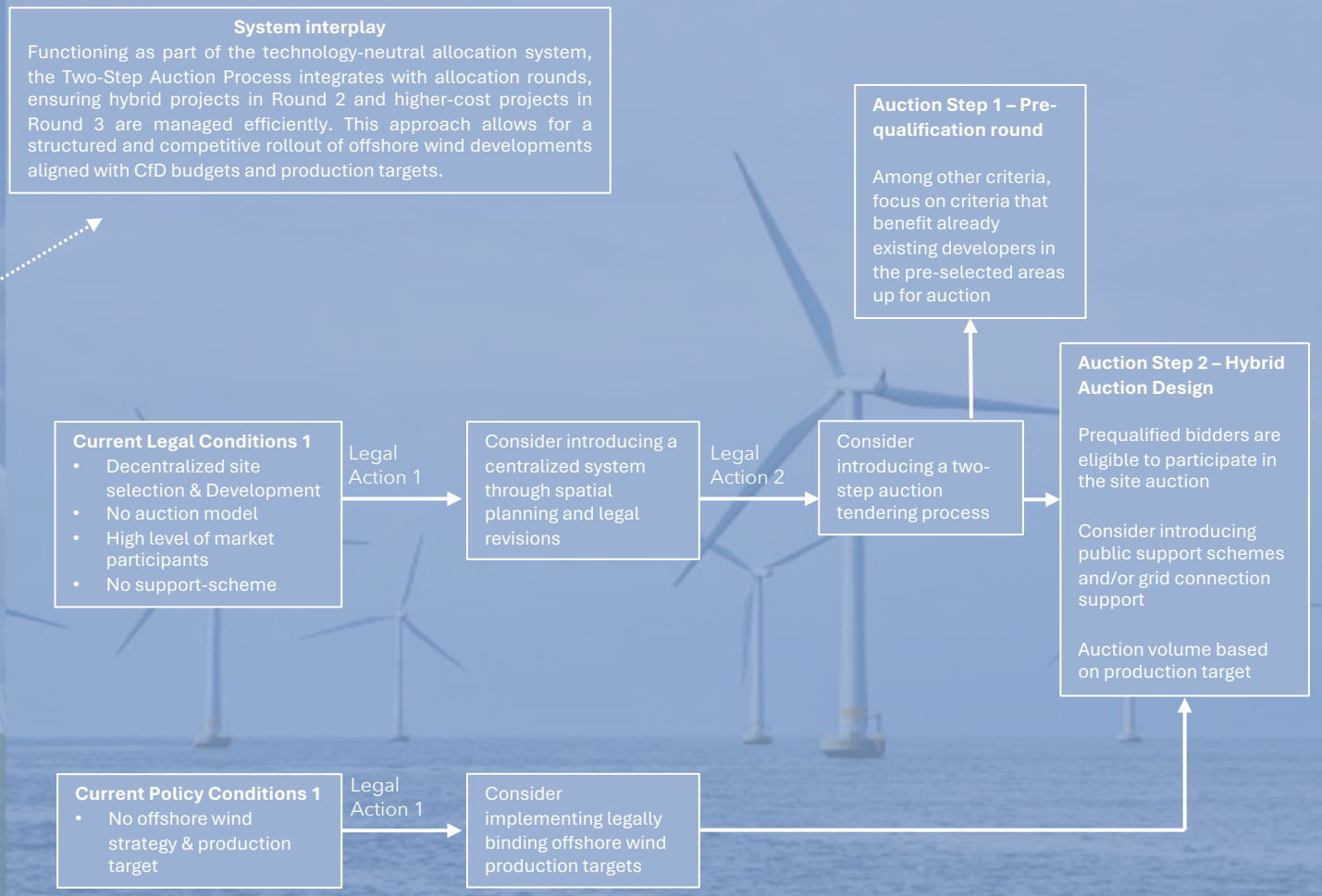


Figure 3.9: Two Step Auction System for Offshore Wind



Disclaimer