



The ideal market design for offshore grids

- A Nordic TSO perspective

The Nordic TSOs are of the opinion that new offshore grids need to be built on the principles of offshore bidding zones which can be both connected to each other and to more than one onshore bidding zone. There is, in terms of market functioning, no difference between onshore and offshore bidding zones, in both cases congestions are efficiently handled by the bidding zones. Applying offshore bidding zones means that current electricity market regulations can be applied.

Introduction of offshore bidding zones

Harnessing the enormous potential of Europe's offshore wind resources is key if the EU is to obtain the goal of carbon neutrality by 2050. Massive offshore deployment will involve an offshore grid, connecting wind farms to hubs that are connected to several countries. One of many questions to be answered is what market design is ideal for such offshore hubs.

The overall market setup in Europe is that of zonal market, in which each bidding zone is assumed to contain no significant grid constraints, while the borders between the different zones constitute structural grid constraints.

When introducing a new generator, it is the point of connection that determines the bidding zone to which the generator will belong. If a generator introduces a new structural congestion in the system, the underlying logic of the market setup is that this should trigger a new bidding zone or a redefinition of the current bidding zones. Whether or not a part of the grid is offshore makes no difference. As such, the introduction of offshore wind farms connected to multiple bidding zones should be seen in the light of the current European market setup. If the combination of offshore wind farms connected to multiple bidding zones creates new congestions in the system, bidding zones should be created in a way that the bidding zone borders reflect the congestions. The market coupling will then facilitate a cost-effective dispatch ensuring that the use of renewable energy is maximised, and thereby replacing more expensive generation resources and reducing emissions.

A balance responsible party will, on behalf of a windfarm, bid offshore generation into the bidding zone to which the windfarm is connected, and will be able to bid into all market timeframes. TSOs will be able to handle deviations from the market result in the offshore bidding zones by making use of the new pan-European balancing platforms, just as it is expected today in the current bidding zone setup. All in all, this supports a fast, green transition.

An operational advantage

An often not recognised fact when discussing bidding zone configurations, is that a proper configuration supports a safer and simpler system operation. The division of Sweden into bidding zones, for example, led to a more efficient operation as the description of the physical grid was more accurately reflected in the market. Also, managing the Norwegian physical grid would be very cumbersome without bidding zones that facilitate alignment between physical flows and market activity. Similarly, offshore bidding zones will provide an accurate link between physical flows and market activity. The market clearing with offshore bidding zones will represent the most efficient use of the resources and energy flows will align with the market outcome.

Regulatory compliance

In a regulatory context, the application of offshore bidding zones ensures full compliance with some of the most important rules for the functioning of the internal market. The bidding zones guarantee that all market parties, including windfarms connected directly on an interconnector, are treated equally in the market. It is purely the willingness to pay/sell which determines the dispatch in the market, and all parties may fully participate in all markets.

Additionally, the offshore bidding zone solution ensures compliance with article 16.8 of EU (REG) 2019/943, the so called 70% rule. With the small offshore bidding zones, there are no internal constraints nor any possibility for loop flows in the HVDC grid, thus the full capacity on the interconnectors can be allocated to the markets.

Congestion income

With the application of offshore bidding zones, the wind farm owners will either gain less revenue than in cases where they are radially connected to higher-priced onshore bidding zones, or will gain more if radially connected to a lower priced onshore bidding zone. Wind farm owners are also less exposed to volatility of power prices. The income they potentially lose, will result in additional congestion revenue for the transmission owners. The Nordic TSOs will investigate if this additional revenue for transmission owners could and should, be redistributed back to windfarm owners as a component in financing the green transition. In the analysis the Nordic TSOs will take into account the equal treatment of market participants as well as other relevant factors such as connection fees, network tariffs and national subsidy schemes as these are contextual matters for this topic.