HEINRICH BÖLL STIFTUNG
BRUSSELS
European Union

Author: Anna Weiß, Consultant, Consentec GmbH

Overview of EU electricity market design: implications of the renewable rollout

BACKGROUND OF THE ELECTRICITY MARKET DESIGN REFORM

- The gas price crisis in the second half of 2022, together with fossil-price driven inflation, has led to a sharp rise in electricity prices overall, resulting in a political urge to implement price interventions. Some political leaders consider marginal pricing (see Box 1) as problematic in this context, and the European Commission (EC) has proposed a reform in the electricity market design. Both the technical implementation of the reform and the notion that marginal pricing is to blame are contested, and have significant implications with regard to investments in renewable energy sources (RES).

Box 1: Marginal pricing

Marginal pricing is a uniform pricing mechanism, where the market clearing price is set by the marginal power plant's generation cost, i.e. the marginal cost of the most expensive plant still required to produce in order to satisfy demand, and the marginal consumer's willingness to pay. Marginal pricing is often illustrated using the merit order curve (Figure 1), a graph depicting the marginal cost of all existing generation.

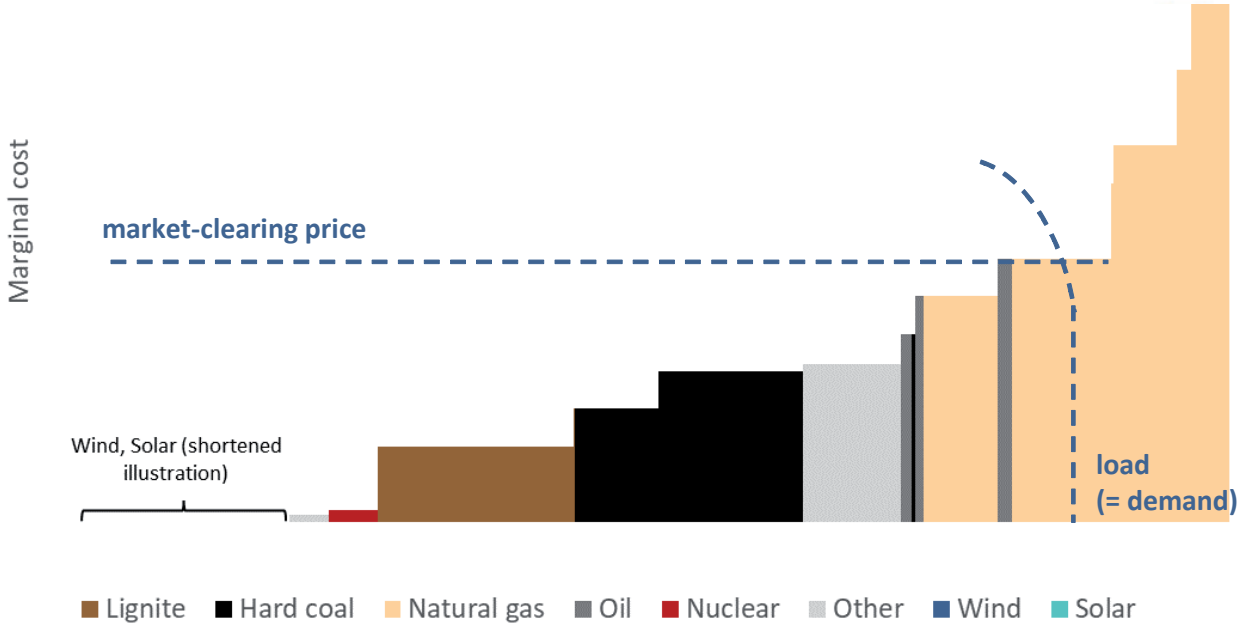

Figure 1: Merit order and marginal pricing (illustrative). Source: own illustration.

- The integration of RES is a crucial mechanism to reduce average prices (and thus achieve the goal pursued by the policy intervention). A high infeed of RES reduces the residual load to be met by fossil generation, thus shifting the merit order curve to the right and reducing the market-clearing price (Figure 1). Moreover, substantial RES investments are required to decarbonize electricity production and meet the EU's climate targets.
- This factsheet summarizes the key changes proposed in the reform,[1] whilst focusing on their effects regarding the integration of RES into the European energy system and the flexibility potential required to achieve this integration.

1 Please note that the proposal is still under revision. This factsheet is based on the revision from 5 May 2023.

FINANCING AND SUPPORT SCHEMES FOR RES

Contracts for Differences (CfDs)

EC Proposal: Direct price support schemes for new investments in RES or nuclear plants, or investments aimed at substantially repowering existing facilities, increasing their capacity or prolonging their lifetime, shall take the form of two-way **CfDs**.

Compensation payments from or to the RES or nuclear project ensure that the energy generated is always remunerated at the agreed strike price, independent of the current market price. Contrary to first proposals during the consultation process, **CfDs remain voluntary** for RES outside of support schemes.

Box 2: Contract for Differences vs Floating Market Premium

The remuneration of RES assets within a support scheme depends on the design of such a scheme (see Figure 2). For instance, assets under a Floating Market Premium (fMP) receive a compensation payment from the support fund whenever the market price is below the contractually agreed strike price. During hours with higher market prices, they benefit from the high market values. Also, RES assets under a CfD receive a compensation payment in low-price hours. However, when prices are above the strike price, the asset owner must pay the difference to the support fund.

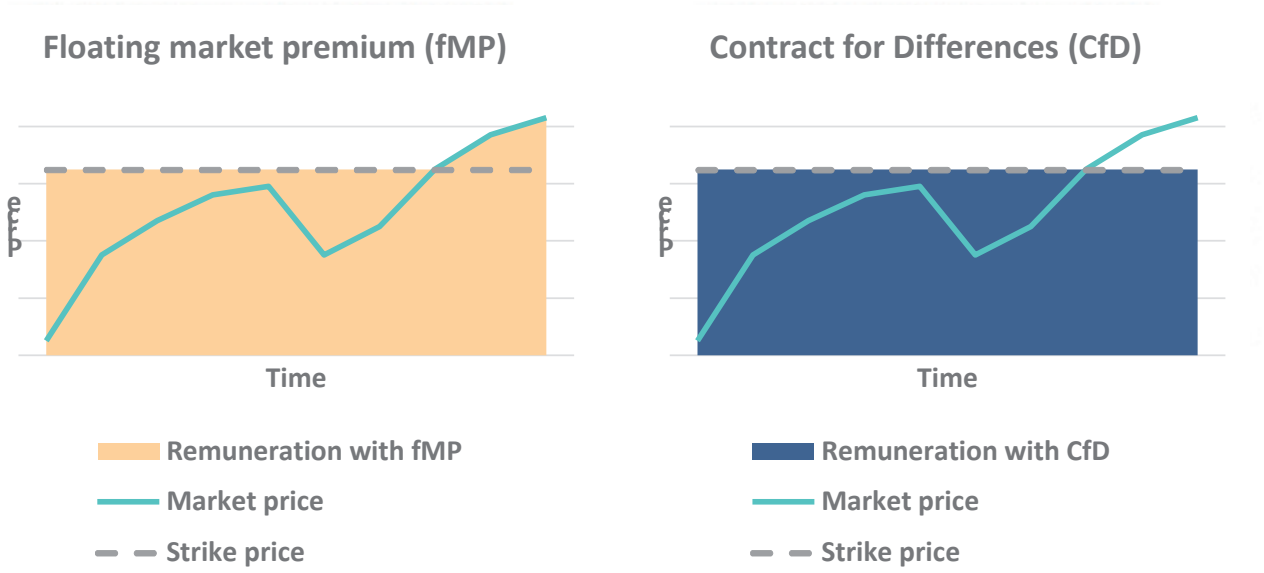

Figure 2: Remuneration of RES assets in different support schemes. Source: own illustration.

- **When designed sensibly, CfDs can be an impactful tool for the support of RES.** With an ideal design, CfDs help de-risk RES investments and the reaching of a predefined capacity level of targeted technologies at relatively low cost
- **However, not all CfD designs set the right incentives.** The primary incentive of existing CfD regimes is to maximise energy production, not energy value. By tying CfD payments to actual generation, they remove incentives for system-friendly dimensioning and operation, and thus hinder a price-driven expansion of the most cost-efficient RES technologies.
- **CfDs reduce an RES investor's degree of freedom.** Once bound within such a support scheme, an investor cannot switch back into the market. Compared to a floating market premium (see Box 2), CfDs are often considered less attractive, as developers cannot benefit from high market values and are exposed to a higher weather risk. On the other hand, in highly competitive tenders for an fMP, the investors must consider the potential of high market values in their bid, and thus run the risk of overestimating this potential.

Power Purchasing Agreements (PPAs)

EC Proposal: Member States shall promote the uptake of **PPAs**. A PPA (Box 3) in this context is broadly defined as a contract under which a person agrees to purchase electricity from an electricity producer. For PPAs with non-fossil generation facilities, Member States shall ensure that instruments to reduce the risks of off-taker payment default in the framework of PPAs are in place, such as state-backed or private **guarantee schemes**, for example.

Box 3: Power Purchasing Agreements

PPAs are private long-term delivery contracts between a power plant operator and a consumer. The agreement fixes the delivery price and amount for the duration of the agreement. PPAs are most common between large RES plants and either industrial consumers or electricity retailers. In 2022, an estimated 9.5 GW of PPA volumes were contracted in Europe.[2]

2 https://pexapark.com/european-ppa-market/

- **A simultaneous provision of PPAs and CfDs can lead to strategic behaviour and a stronger market segmentation.** CfDs represent a fall-back option for investors seeking a PPA. This could lead to projects with low wind yields being financed via the CfD support scheme, while projects at locations with high wind yields will seek to conclude PPAs. That way, high-yield projects gain inframarginal rents, for instance by sidestepping the reference yield model (a price discrimination mechanism in the German support scheme to limit inframarginal revenues of generators at sites with better wind yield). With guarantee schemes, PPAs could become even more attractive.

- **Guarantee schemes can serve different purposes and therefore need to be designed carefully.** Guarantee schemes can be focused on either of the following purposes: facilitating additional market-driven RES investments beyond Member States' targets or supporting specific consumer groups seeking long-term delivery contracts at low cost without benefitting RES investments.

- **If the aim is to de-risk investments and facilitate market-based RES capacity expansion, the PPA provisions need to be more targeted than in the current proposal.** Most importantly, a clear focus on investments in new assets (with an exclusive focus on RES) and a minimum contract period would be required. In addition, it should be clarified whether the provisions are also applicable to financial PPA settlements.

SYSTEM INTEGRATION OF RES AND DEMAND RESPONSE

Dedicated measuring devices

EC Proposal: Transmission system operators (TSOs) and distribution system operators (DSOs) may use data from **dedicated measurement devices** for the observability and settlement of demand response and flexibility services.

- **Dedicated measurement devices have the potential to accelerate** smart meter rollout, as well as the use of demand response and flexibility.

Peak shaving products and flexibility support schemes

EC Proposal: TSOs may procure a **peak shaving product** in order to achieve a reduction of electricity demand during peak hours. Member States may introduce **flexibility support schemes** consisting of payments for available capacity of non-fossil flexibility.

- **The purpose of introducing dedicated peak shaving and flexibility products is unclear,** as peak shaving and flexibility are already available, primarily through the response to price signals (in day-ahead, intraday, balancing, imbalance settlement and grid fees).

- **Dedicated peak shaving products are an impediment to both flexibility and RES integration.** Peak shaving products, as defined in the proposal, are aimed only at demand, whereas other sources of peak shaving potential, such as generation (including renewables), battery storage, imports and exports, are excluded. Moreover, they might incentivize consumers to keep their baseline demand high, such that they can offer a demand reduction in peak hours.

- **Flexibility support schemes are inefficient.** They are based on centrally defined demand response targets, which requires a perfect forecast of the actual demand for flexibility.

- **Peak shaving and flexibility should be provided by the market.** Support should focus on reducing market barriers to provide demand response triggered by price signals, which can react dynamically to demand for flexibility. Providing efficient levels of flexibility is crucial to the integration of RES.

Compensating offshore wind farm operators

EC Proposal: TSOs shall **compensate offshore wind farm operators** in offshore bidding zones OBZs (see Box 4) if one or more TSOs have not made enough capacity available on the interconnector. This compensation mechanism is called the Transmission Access Guarantee (TAG).

REGULATIONS OF RETAIL PRICES IN THE EUROPEAN COMMISSION PROPOSAL

EC Proposal: Member States shall ensure that all final customers can request to conclude a fixed-price **fixed-term electricity price contract.**

- **Fixed-price contracts for all consumers are a step back and jeopardize demand response and RES integration.** The intention of offering such contracts to all consumers is presumably to hedge them against price risks, for instance in times of crises. However, this can also be achieved in a less distortive way, for instance by entitling consumers to conclude hedged contracts instead of fixed-price contracts.

- **Necessity of price interventions dubious.** The proposal aims at perpetuating retail price interventions as a stand-by instrument, which could kick-in during future crises. This, together with the risk of a heterogeneous implementation of the measure, is a source of regulatory uncertainty, which might hamper investments in the energy system and thus lead to higher electricity prices. More important, however, is the question of how costs for such interventions could be recovered. In cases where the measure also affects energy sold forward, they can negatively affect the liquidity and reliability of forward markets.

Box 4: Hybrid assets and offshore bidding zones

A hybrid asset fulfills two functions: it combines the connection of offshore wind farms with a cross-border interconnector between two bidding zones. A commonly considered model for the market integration of hybrid assets is the connection of the offshore wind farm(s) within a separate offshore bidding zone (OBZ).

In such a configuration, the average prices within the OBZ typically come at the lower end of the price range of the connected onshore bidding zones. In the example below (Figure 3), the price in the OBZ corresponds to the price of low-price bidding zone A (20 EUR/MWh).

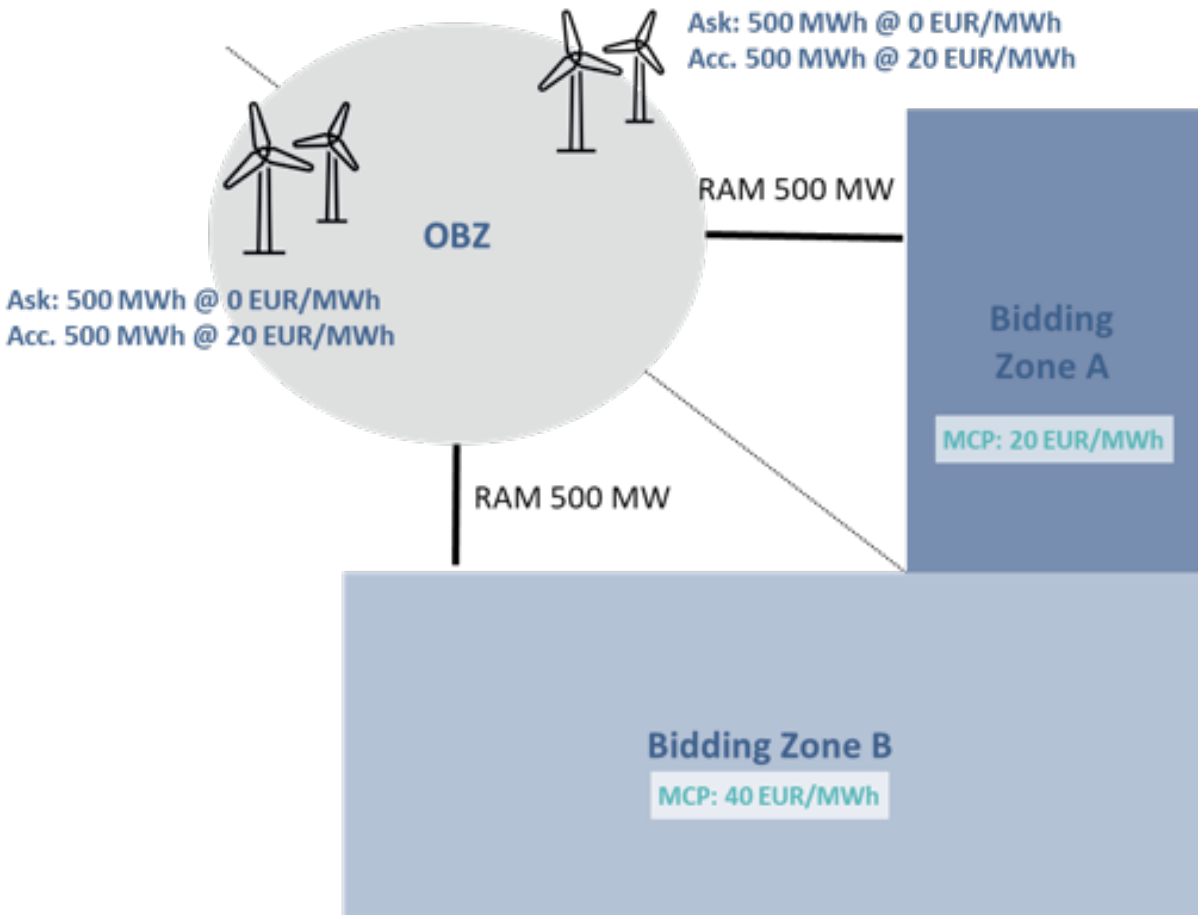

Figure 3: Equilibrium in a simple OBZ case. Source: own illustration.

- **The TAG is not targeted at the main source of unequal treatment for wind farms in OBZ.** Wind farm operators connected to OBZ may incur revenue losses compared to a radial connection in their 'home' bidding zone in two different cases

  a) Because average prices within the OBZ typically range at the lower end of the price range of the connected onshore bidding zones.
  b) Because market access is restricted due to limited capacity on the interconnector to adjacent bidding zones or relevant critical network elements.

  Generally, compensating offshore wind farms for revenue losses incurred due to the specific setup of OBZ increases incentives for investments in offshore wind. However, the effect of the TAG may be small, because the main source of unequal treatment arises from the aforementioned case a) rather than case b), which is not addressed in the mechanism. It might be sensible to address such an issue within the RES support scheme rather than a dedicated compensation mechanism.

- **The aim of the TAG is not clearly defined.** It is thus hard to predict the consequences of implementing the measure.