

## **GREEK ELECTRICITY MARKET DESIGN**

### **SUMMARY OF FUTURE MARKET DESIGN RECOMMENDATIONS**

#### **Context**

Across Europe, electricity markets are undergoing transformation. The generation mix is changing with the growing contribution from renewable energy sources (RES), such as wind and solar. Conventional generation faces reduced operating hours and lower profitability and is seeking new sources of revenue. Meanwhile, the advance of 'smart' technologies has the potential to change patterns of demand.

The traditional model of electricity market design which was based on dispatching large scale, controllable thermal generation to meet predicted demand is becoming less relevant. Market arrangements must evolve to reflect the new order in which renewables are a mainstream component of the generation mix, conventional generation plays a supporting role and demand is flexible according to the needs of the system. Renewables and demand must be integrated into the electricity markets of the future.

The EC's 'Target Model' for cross-border electricity trading and the recently adopted EC State Aid Guidelines (SAGs) give additional impetus to this transition, requiring adaptation to the design of electricity trading arrangements (including balancing responsibility for renewables as a crucial step to their market integration) and to support mechanisms for renewable generation technologies.

The Target Model and the SAGs require revisions to the Greek electricity market and RES support arrangements. The current gross mandatory pool arrangements in place in Greece is non-compliant with the EU Target Model and is undergoing reform. Similarly, the Feed-in Tariff (FIT) support arrangements shelter RES from the wholesale market, rather than integrate RES into it. Revised arrangements are needed on both fronts and there are two intertwined objectives: to integrate renewables within the market and to make the market fit for purpose for a high RES future.

Pöyry has been working with the Hellenic Wind Energy Association to develop recommendations for electricity trading and RES support arrangements that work towards these goals for Greece. The recommendations reached are contained in this summary note.

## Recommendations

### Electricity Trading Arrangements

Our proposals regarding the electricity trading arrangements in each 'building block' of the new market design are shown in Figure 1 and summarised below.

**Figure 1 – Electricity Trading Arrangements recommendations overview**

Forward	Day-Ahead	Intraday	Balancing	Imbalance
<ul style="list-style-type: none"> <li>•Financial forward trading over a centralised platform</li> <li>•Market power mitigation: VPP contracts</li> </ul>	<ul style="list-style-type: none"> <li>•Voluntary exclusive market (collective exclusivity across Day-Ahead, Intraday and Balancing)</li> <li>•Unit bidding (portfolio for RES and demand)</li> <li>•Market power mitigation: bidding restrictions on dominant players</li> <li>•Simple and block bid structures</li> </ul>	<ul style="list-style-type: none"> <li>•Voluntary exclusive market (collective exclusivity across Day-Ahead, Intraday and Balancing)</li> <li>•Gradual move to continuous trading with auctions as transitional</li> <li>•Frequent ID auctions with last auction 2 hours ahead of real-time</li> <li>•When continuous move gate closure as close to real-time as possible</li> </ul>	<ul style="list-style-type: none"> <li>•Centralised dispatch model with market nominations (Day-Ahead, Intraday) acting as the starting point</li> <li>•Pay-as-clear for balancing energy</li> </ul>	<ul style="list-style-type: none"> <li>•Single price for imbalances</li> <li>•Imbalances calculated per unit basis but settled per portfolio</li> <li>•30min (or 60min as alternative) imbalance settlement period</li> <li>•Targeted allocation of reserve costs</li> </ul>

#### Forward

Forward trading should be based on financial products (rather than physical) to concentrate physical trade closer to real time and improve liquidity in the close to real-time markets, which will become increasingly important in a high RES future. This means the only route for nominating a physical position is through the close to real-time physical markets (Day-Ahead and Intraday) and not via a forward trade.

Forward trading of financial products is still possible and so provides a way of hedging risk in forward timescales. But there is no physical nomination linked to such trades.

#### Day-Ahead

With the restriction on physical trading in forward timescales, the Day-Ahead market is the first point at which physical trade can begin. We propose that physical trade is conducted across an organised market, without the option for bilateral trade. In this sense, the Day-Ahead market is 'exclusive' in so far as the organised market is the only route to market in this timeframe.

However, rather than making the organised Day-Ahead market the only route to market (i.e. mandatory), we propose that it is voluntary to allow parties to choose to 'by-pass' the Day-Ahead market to trade in the (again) centrally organised Intraday market or the Balancing market. These three markets have collective exclusivity and provide the only routes for physical trade. This pools physical trade close to real-time, while providing parties with flexibility to trade in the market that is best suited to their needs.

We propose unit-based bidding for the majority of generation to allow for greater transparency given the current composition of market portfolios. In the future, and assuming a less concentrated market, a move towards gross portfolio bidding could be considered. But a requirement for unit-bidding at the lowest levels would place an onerous burden on the smallest participants, and instead we propose that a de minimis level applies to ensure that the smallest generators may bid collectively.

We also propose intermediary arrangements by which agents may be appointed to interface with the market on behalf of participants (for combinations of bidding, collateral and/or settlement), with some restrictions to ensure that market power is not enhanced by these arrangements. This provides route to market options for smaller and/or independent parties, who can appoint a third party to interact with the market on their behalf. This allows for gross portfolio bidding for demand-side units, demand and some variable renewable generation.

### *Intraday*

The Intraday is a key timeframe for the Target Model. This is the market where market participants can refine their positions closer to real-time based on updated information with regards to plant availability and wind, solar and demand forecast.

We propose an exclusive centralised Intraday market in the form of either a continuous market or periodic auctions. This means market participants cannot trade Intraday bilaterally outside the organised market. Given Greece's geographical position and the adoption of auctions in the Italian market we propose to also adopt Intraday auctions as a transitional step. This will allow Greece to be aligned with neighbouring Italy. We propose that auctions are held frequently, with the last auction being as close to real-time as possible.

### *Balancing*

We propose to keep centralised dispatch arrangements in place, with the starting point for dispatch being market participants' nominations in the Day-Ahead and Intraday markets. When it comes to the nature of participation, we advocate voluntary participation as the balancing market should be attractive enough for market participants to want to participate and does not necessarily need to be mandated. We do, however, appreciate that the TSO may feel more comfortable by ensuring it has access to balancing offers, so making the balancing market mandatory may be desired. It could be that the new market design starts with mandated participation and in time moves to a voluntary regime.

We propose pay-as-cleared pricing for activated balancing energy, as already preferred by ENTSO-E. This means that all activated balancing energy is paid a uniform marginal price, based on the price of the highest activated energy balancing offer.

### *Imbalance*

We propose a single marginal pricing regime for imbalances. The Electricity Balancing Network Code developed by ENTSO-E suggests imbalance prices have to be greater than or equal to the average balancing energy price(s). Given the preferred choice of marginal pricing for balancing energy, this effectively means marginal pricing for imbalances as well. A single pricing scheme for imbalances values imbalances consistently independent of the direction. This means imbalances pay or get paid the same price, which reflects the cost of the marginal balancing energy action (assuming marginal pricing for balancing energy). The same price is applied to all imbalances irrespective of the direction.

If a single marginal pricing system is in place there is then no difference between imbalances being calculated on a unit basis or a portfolio basis. We propose that imbalance is calculated per unit but settled per portfolio with opportunities for independent companies to pool settlement to offset collateral requirements.

### RES Support

Our proposals regarding the RES Support Arrangements are shown in Figure 2 and summarised below.

**Figure 2 – RES Support Arrangements recommendations overview**

Format	Parameters	State Aid Guidelines
<ul style="list-style-type: none"> <li>•Operating aid</li> <li>•Variable Feed-in Premium</li> </ul>	<ul style="list-style-type: none"> <li>•Hourly day-ahead wholesale reference price</li> <li>•Strike price set by competitive process when conditions allow and administrative process until then</li> <li>•Negative pricing incentives to limit support</li> </ul>	<ul style="list-style-type: none"> <li>•During transition some SAG requirements apply:               <ul style="list-style-type: none"> <li>•support will be a premium to the market price; and</li> <li>•measures can be applied to avoid incentives for generation in negative priced periods.</li> </ul> </li> <li>•But some do not:               <ul style="list-style-type: none"> <li>•standard balancing responsibilities given the absence of a liquid Intraday market</li> <li>•competitive allocation process given implications of limited access to finance on its effectiveness</li> </ul> </li> </ul>

#### Format

We propose the introduction of a variable Feed-in premium ('FiP') as the basis for new renewables support scheme in Greece. This model has been approved by the EC under the current SAGs for GB. This can take either the form of a one-way or a two-way contract for difference ('CfD'). A variable FiP limits the exposure of RES generators to movements in the wholesale price, which is determined by drivers beyond the control of RES generators. If such exposure is not limited, this may result in increased associated risk and increase the cost of projects. A variable FiP on the other hand should provide for greater investor certainty and ultimately deliver efficiency gains in the form of lower cost of capital. The variable FiP still creates a need for wholesale market interaction as RES generators still need to secure revenue streams from wholesale markets in order to secure sufficient revenue in aggregate.

#### Parameters

The choice of the reference price and the strike price are important design factors under a variable FiP.

In terms of the reference price, the Day-Ahead market appears to be the most attractive choice as a starting point, as the Day-Ahead market will deliver a clear price and is expected to have sufficient liquidity. Difference payments should be calculated at half-hourly or hourly granularity depending on the granularity of day-ahead traded products. This approach, as opposed to using an average of day-ahead prices, is more reflective of the likely capture price for a wind farm given the variability of production and prices throughout a day. If a liquid Intraday market develops in time, then an Intraday reference becomes a possibility.

As well as being influenced by whether the variable FiP is one-way or two-way, the strike price is dependent on the allocation process, which, based on the SAGs, should be determined by a competitive process when conditions for such a process are in place. However, administered allocation is appropriate in the transitional phase as the conditions for competitive allocation are not in place.

The SAGs require that support does not give incentives to run when wholesale prices are negative. To manage this and mitigate the potential for supported generators to run when the reference price is negative, we suggest the approach recently approved by the European Commission for GB. This has two features; it caps support at the strike price (which means that the supported generator still has an incentive to run until reference price equals inverse of support value) and it stops support payments if the reference price is negative for more than 6 hours.

#### *Meeting State Aid Guidelines requirements*

The SAGs set out conditions that apply to all new aid schemes and measures in order to incentivise integration of renewables into the market. These requirements are that:

- aid should be granted as a premium in addition to the market price, with generators selling electricity directly into the market;
- beneficiaries are subject to standard balancing responsibilities, unless:
  - no liquid Intraday markets exist;
- generators should have no incentive to generate electricity under negative prices;
- allocation of aid should be via auctioning or competitive bidding processes open to all generators, unless:
  - only one or a very limited number of projects or sites are eligible;
  - competitive bidding is expected to lead to higher support levels; and
  - competitive bidding is expected to lead to low project realisation rates.

However, not all of the stated requirements of the SAGs need to be followed from the outset, as the exception criteria specified within the SAGs are applicable given conditions in Greece. During a transitional period, the following SAG requirements apply and are consistent with application of a variable FiP as outlined above:

- support will be a premium to the market price; and
- measures can be applied to avoid incentives for generation in negative priced periods.

But the following SAG requirements do not:

- standard balancing responsibilities given the absence of a liquid Intraday market; and
- competitive allocation process given implications of limited access to finance on its effectiveness.

The absence of a liquid Intraday market means that standard balancing responsibilities should not apply as generators do not have the tools to manage their position. The case for prospective application of standard balancing responsibilities in the future is linked to development of an effective Intraday market over time.

A transition to competitive allocation of RES support needs to be linked to improved access to finance and greater certainty amongst the finance community surrounding

competitive allocation. Access to finance and the sentiment of the finance community need to be monitored to inform this.

## Summary

Our recommendations for future electricity trading arrangements and RES support design in Greece seek to integrate renewables within the market and to make the market fit for purpose for a high RES future. They take account of today's starting point and deliver a transition to the long-term goal that is compliant with the Target Model and SAGs.

The recommendations are market-oriented. They aim to foster competition in the Greek electricity market and to create an environment that supports investment in pursuit of energy policy goals.