

## Summary consultation 'Market arbitrage'

### 1. Overview of respondents

A consultation was carried out for the period of two months (4 August 2017-17 October 2017) to ask eight questions relating to market arbitrage scenario in 2030. The consultation received nine responses from 7 different countries via the website and email. Of this number, eight responses were considered complete. The respondents represent various backgrounds including research institutes, commercial companies and system operators. Figure 1 gives an overview of the respondents by country while Figure 2 gives an overview by sector.

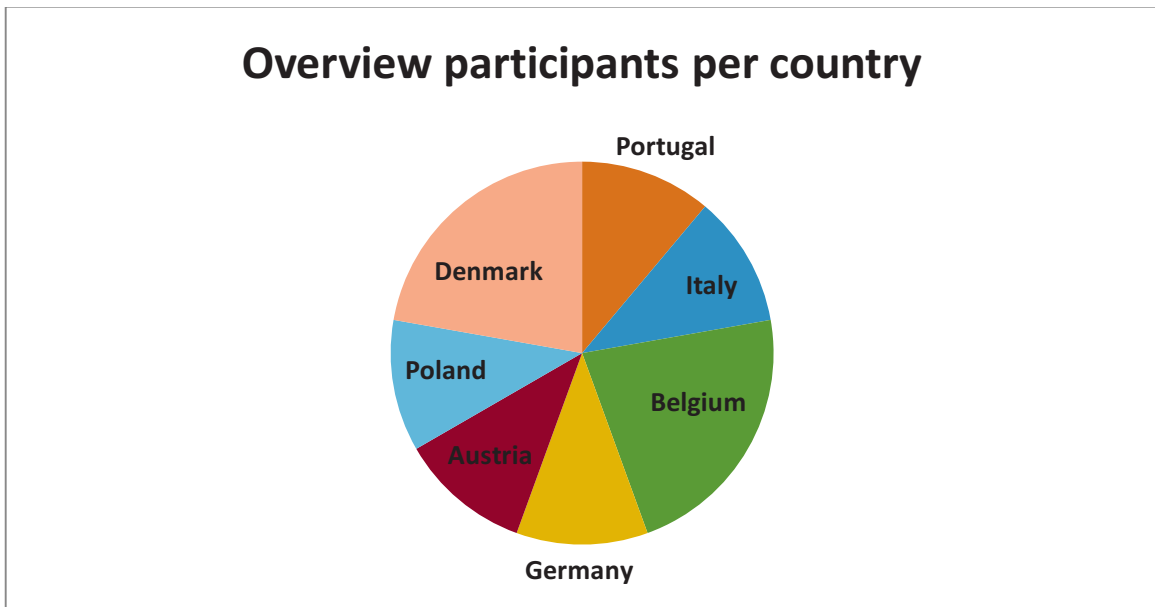


Figure 1 Overview participants per country

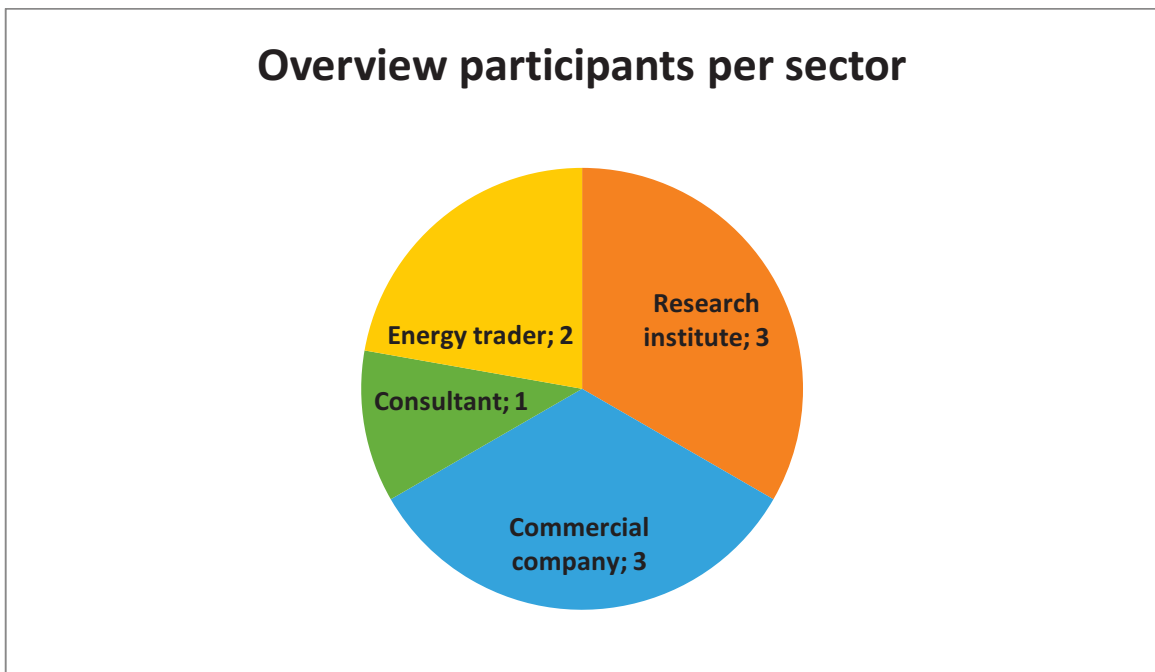


Figure 2 Overview participants per business sector

## 2. Main feedback from respondents

The consultation inquired into respondents' opinions on overlap between the intraday market and the real-time balancing market, market price signal and aggregators' behaviours. The feedback can be summarised as follows.

### 2.1 Overlap between market layers

A quarter of the respondents believed that a lead-time of **five minutes** would be a good compromise between **efficiency** and **manageability** of intraday markets in 2030, while the same number preferred **one hour lead-time** as suggested in the Commission Regulation (EU) 2015/1222. The others provided various intraday markets' lead-times of 15 minutes, 30 minutes and a couple of hours respectively with one respondent not being able to come up with a reasonable lead-time thinking that this would depend on the variability of renewables, forecasting possibilities and commitment requirements in conventional and renewable plants. One of the respondents, meanwhile, was of the opinion that **the reduction of intraday markets' lead-time would insignificantly increase market efficiency** because imbalances from day-ahead markets could be compensated in the continuous markets.

With regard to real-time balancing markets, the majority of the respondents thought a **15-minute frequency** was the most feasible choice citing the capacity of existing metering infrastructure in Europe with few respondents proposed 5 minutes like in the United States as an option.

When it comes to overlapping periods of delivery between intraday markets and real-time balancing markets, half of the respondents foresaw **possible conflicts** with one suggesting that the conflicts could be solved by fixing ex-ante the unit-commitment of the unit eligible to the ancillary services market. Those who disagreed believed arbitrage automation would ease any potential conflicts posed by overlapping operations and the overlap could open up the possibility for demand response to sell the same asset two times. A respondent also emphasised the importance of aligning market gate closures.

### 2.2 Market Price Signal

Despite the evolution of the market structure and forecasting techniques in 2030, the majority of the respondents expected that **deviations in day-ahead and intraday markets would remain** or even become stronger because there would be a **technical limit** determined by the variability of the **renewable system**, the forecast possibilities and the commitment requirements (reserve from conventional and renewable plants). In addition, non programmable sources would vary their injection continuously in a rather unpredictable way while outages would continue to affect the imbalance. Moreover, as the ancillary services markets got more efficient and transparent, the volatility of "last minute balancing" would spill over to the intraday markets. The day-ahead markets are however more fundamentally driven and therefore we would see these two markets diverging and creating volatility.

Some respondents, on the other hand, argued that 2030 would see **approximation of prices in day-ahead and intraday markets due to mature of wind and solar**. At the same time, **energy storage** would also play a role in reducing energy market imbalances, thus contributing to an approximation of spot and intraday markets.

A respondent pointed that, in technical terms, the gate closure of each market segment depends on two fundamental aspects: a) the **temporal constraints** mainly of the conventional generating units and b) the **speed** by which the System Operators can make operational **security analyses**. If

the generation fleet was very flexible, and the TSOs could make operational security analyses very fast, then the very necessity of day-ahead markets would be questionable.

All respondents agreed that **enhanced cross-border cooperation** in short-term markets would be beneficial especially for consumers. It would allow compensation of imbalances among different regions of Europe and reduce total imbalances at the European level. It would also increase the supply offer and allow most competitive aggregators to participate in short-term markets which would likely reduce prices. It was expected that, initially, there would be pressure to service providers and challenges for the secure operation of the power system. In the medium-to-long term, new opportunities for market participants would open and economic efficiency would increase. Improved cross-border cooperation would **increase liquidity** and **market opportunities**. It would also ensure **grid stability** and **reduce grid investments**. However, for **trading companies it would remove** (arbitrage) **opportunities**. Overall, in practice, it remained to be seen what would really be achieved in terms of cross-border cooperation.

Under the circumstance where the market is efficient with well-functioning intraday sessions that convey **meaningful price signal**, a quarter of the respondents expected flexibility to be **priced preferentially in the ancillary services market**. They also thought that intraday market prices would **converge** more and more to ancillary and/or imbalance settlement prices. Meanwhile, some believed intraday markets might become obsolete. One respondent suggested that **intraday markets should operate as hedging markets**. (In general all markets will compete with each other. Maybe there are no intraday markets anymore and only the balancing markets have to be organized by a MO. /depends on the source. Demand response could be last resort for ancillary services, when renewables are sold in intraday. Maybe intraday market becomes obsolete. /Markets should determine the price. It should not be regulated. /Intra-day markets should effectively operate as hedging markets (and this is why they should be organised as continuous trading markets). Hence, prices in principle should be generally lower than imbalance settlement prices.)

### 2.3 Aggregators' behavior

Most respondents foresaw various operational, technical and financial risks involving the arbitrage of flexible energy, be it in wholesale energy markets or ancillary services markets. The operational and technical risks could come from IT security, the reliance on functional data transmission and specific situations, for example, little number of participants in ancillary services causing the market to be voluntarily disturbed. In the meantime, there could be financial risks stemming from trading decisions involved in the usage of the flexibility and wrong bidding decisions associated with either non delivery (imbalance) or contractual penalty (ancillary service). One respondent highlighted a possible main risk from aggregators with market power influencing the wholesale market in one direction in order to compensate it later in ancillary markets to increase revenues. In this case, the respondent **suggested that the Project try to evaluate which coordination schemes are more robust against inefficient strategic behaviour from aggregators**. Some respondents believed that a **properly designed market would allow trading to foster efficiency** and the openness to more actors would result in better and more competitive decision making and thereby reduce reliance on individual actors. Another respondent thought, with the increasing share of batteries in all markets, the risks would not be so high as they provide very high quality of balancing requirements.

With respect to bidding strategies, apart from statistical arbitrage, the respondents had various opinions on other main elements an aggregator might consider in evaluating a **risk premium for its bidding strategy**. These included the consideration of other synergy effects with bulk energy trading, retail sale or any other services an aggregator offers; the use of option theory as well as

game theory to execute options, thereby anticipating other actors decision process; the use of different qualities of prognoses tools for different countries; and the use of agent-based models. In addition, it was also expected that most value driven **aggregators** would place options in the market at strategy times, thereby **aiming to help the system** in the most stressed scenarios in order to **harvest most value from the last-minute flexibility**.