

TO POOL OR NOT TO POOL? LEVEL PLAYING FIELD FOR DISTRIBUTED ENERGY RESOURCES IN EUROPEAN BALANCING MARKETS

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Overview

Distributed energy resources (DER), such as distributed generation, storage and demand response, have been transforming the power sector supported by technological advances and EU policy objectives. Along with conventional generation technologies, DER can contribute to more efficient system balancing, a task that has been gaining more impetus with the growing shares of variable renewable energy sources (vRES). The recently adopted Commission Regulation establishing a guideline on electricity balancing (EBGL) strives to create a level playing field for all potential balancing market participants. However, the formal acceptance of new balancing resources does not guarantee their *de facto* entry as the actual rules can still be too restrictive or transaction costs too high. Pooling or aggregation¹ can arguably help to lift these restrictions and have been deemed key in enabling DER participation in the market (e.g. [1], [2]), yet the actual pooling requirements vary from country to country.

In this paper, we explore the value of pooling in lifting a number of barriers for DER participation in the balancing market and enhance it with a comparative analysis of the relevant market design aspects in the Austrian, German and Dutch balancing markets. Thus, we contribute to the discussion of ways to improve DER integration and to harmonize pooling requirements as these are instrumental in creating a true level playing field for all market participants.

Methods

In this paper we systematically review those aspects of market design (*see Table 1*) that can affect the position of DER in the balancing market before the actual participation. These aspects are related to the formal access to the balancing market and the pooling requirements (*first column*) subdivided into 8 design variables (*second column*) selected through a comprehensive overview of the conditions placed on participants in market environments in a number of European countries. With the help of these, we analyse how the choice of a variable (*third column*) contributes (or not) to the creation of a level playing field for DER in the balancing market and whether this choice is aligned with the current regulatory framework at the EU level (*fourth column*).

We then empirically analyze selected balancing markets of three neighboring EU countries, Austria, Germany and the Netherlands, including current regulatory and policy developments on the national level and contrast them with the requirements laid out in the EBGL. All the three countries are characterized by well-developed organized balancing markets in contrast to a number of EU countries where mandatory provision of balancing services is applied for a number of products. Furthermore, the electricity sector in the three countries is characterized by active system integration of DER and a recent entry of aggregated DER onto the balancing market. The consequences of the current market design for DER participation and possible adaptations needed to fully exploit the value of pooling are discussed in the conclusion.

Results

In this paper we show that besides the procurement of balancing services itself, requirements for formal access and aggregation play a significant role when it comes to the participation of DER. Since balancing market integration and the harmonization of rules constitutes a major policy goal, in the national balancing markets these aspects should be addressed as an integral part of harmonization efforts.

National markets in the countries of study seem to be undergoing a rapid transformation to account for the growing shares of vRES and DER and to keep pace with the EU-level policy developments. Overall, the analysis reveals that while aggregation is allowed and practiced in the three countries, the actual requirements placed on pools vary, which

¹ The two terms are used in the paper interchangeably.

may have implications specifically for those market participants that intend to expand their geographical outreach. The administrative and prequalification requirements for the balancing market have been significantly improved in the recent years to open up access for new balancing resources, especially by offering extensive pooling options, which can serve as positive lessons for other European countries. Currently, balancing services providers (BSPs) have sufficient freedom in determining the components and their number in the pool. This allows potential market participants to accommodate the technical constraints of DER as well as to ensure optimal service procurement through portfolio management. However, such aspects as the approach to prequalification of participants for the provision of frequency containment reserve (FCR) and the conditions for the participation of vRES (especially wind) still require more attention and streamlining.

Conclusions

The principle of a level playing field widely promoted in the EU energy policy refers to applying the same rules to all existing or prospective BSPs. However, allowing DER to participate on the market on the same footing with other BSPs without adapting the design currently set to the characteristics of traditional providers is likely to leave them at a competitive disadvantage undermining the underlying goal. Creating a level playing field technically does not exclude a transition period during which those technologies that were initially disadvantaged targeted support such as favorable pooling conditions are necessary as a provisional arrangement towards a “level starting point”. Later on, it is the market that should be left to decide which of the balancing resources is the most economically viable since the main yardstick is not the origin of the service but the technical capabilities and economic efficiency of its provider.

This research can help both researchers involved in innovative projects, prospective BSPs and policymakers get an in-depth understanding of the formal and pooling requirements for participation in the balancing market.

Table 1. Framework to assess formal and pooling requirements applicable to DER in the balancing market

GROUP	VARIABLE	EXAMPLES OF OPTIONS	SPECIFICATION IN EBGL OR OTHER EU LEGISLATION
FORMAL ACCESS REQUIREMENTS	1. Explicit restrictions for certain types of service providers (e.g. based on size or type of technology, connection level, or type of load)	Participation restricted to: - generators of specific size - specific types of technology - connection level (transmission, distribution) - generation only (no demand side) - generation and large industrial load / No restrictions	Non-discriminatory approach to all providers, including vRES, demand side, storage and any kind of aggregated facilities (Arts. 3.1, 5 & 18.4 EBGL)
	2. vRES access to the balancing market	Allowed / not allowed	Should be allowed (Art. 18.4d EBGL)
	3. Capacity provision	Mandatory / voluntary	Market-based procurement (Art. 3.1(e) EBGL)
	4. Specific products for DER	Yes / no	The TSO needs to justify why standard products are not sufficient and the specific products will not create market distortions (EBGL, Art. 26)
ADMINISTRATIVE: POOLING CONDITIONS	5. Pooling	Allowed / not allowed	Should be allowed (Art. 18.4b EBGL)
	6. Approach to prequalification	Unit-based / pool-based	n/a
	7. Explicit portfolio requirements	Restrictions may apply to: - number of units, - mixing different types of components (RES, conventional, flexible loads, storage, etc.)	n/a
	8. Independent aggregation ²	Allowed / not allowed	Should be allowed (COM(2016) 864, Art. 13)

References

- [1] European Commission, “Proposal for a Directive of the European Parliament and of the Council on common rules for the internal market in electricity,” Brussels, COM (2016) 864 final, 2016.
- [2] EG3 Smart Grids Task Force, “Regulatory Recommendations for the Deployment of Flexibility,” European Commission, Brussels, EG3 Report. Smart Grid Task Force, 2015.

² Pursuant to Art. 2(15) of COM(2016) 864 “independent aggregator’ means an aggregator that is not affiliated to a supplier or any other market participant” [1].