Policy Brief
ISGAN Working Group 6: Power T & D Systems

How can aggregators improve the TSO-DSO-Customer coordination in digitalised power systems?

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What is the topic?

Utilising untapped Distributed Energy Resources (DERs) potential from customers in the distribution grid necessitates TSO-DSO-Customer coordination. Customers, who consume, store, or generate electricity, have shown attractive potential for providing ancillary services to power systems and participating in energy markets, but they still face challenges managing and marketing their flexibility. Aggregators can facilitate these flexibilities as an intermediary by providing services to different power systems participants. This poses new challenges for monitoring, controlling, and coordinating customers' and other market player's needs.

What are the challenges?

These are the technical and non-technical challenges for the implementation of aggregator services:

- Challenge 1: Interoperability between the aggregator and the grid operator coordination
- Challenge 2: Interoperability between aggregator and active customer
- Challenge 3: Degree of automation
- Challenge 4: Implementation of the independent aggregator
- Challenge 5: Energy communities and aggregator-to-aggregator communication
- Challenge 6: Cybersecurity preparedness
- Challenge 7: Societal factors for behaviour change and customer acceptance
- Challenge 8: Data privacy and building trust
- Challenge 9: Regulatory framework for increasing system value
- Challenge 10: Enhancing knowledge building

Why is policy action needed?

Accessing the flexibility is often not harmonised and lacks coordination with the grid operator. In some cases, DERs are bound to the proprietary software of the energy product manufacturers (e.g. Battery Energy Storage System (BESS), Photovoltaic (PV) or Electric Vehicle (EV)), which complicates the access for aggregators and grid operators. Instead, interoperable solutions with standardized communication protocols could enable plug-and-play solutions and also freedom of choice for the customers to access competitive services.

How was the research done?

This policy brief is based on a report prepared within the framework of ISGAN working group 6. Working group 6 focuses on establishing a long-term vision for the development of future sustainable power systems. Information and data are collected based on existing literature and a questionnaire.

Why is the current policy situation not sufficient?

Aggregator services exist with several business models based on existing regulatory frameworks in each country. The EU Directive 2019/944 defines "aggregation" (i.e. action)

and “independent aggregator” (i.e. actor) that enables new energy services and players in energy markets [1]. The EU members are mandated to transpose the directive into national law within the deadline defined in the directive, which is normally within two years [2]. A study from the Joint Research Center identifies that 22 out of 26 countries have laws related to aggregators in general, but yet still a low number of countries have a national secondary legislation for definition, market rules, roles, and responsibilities of independent aggregators [3].

What is the solution?

A regulatory framework with a clear definition of the aggregator role should be established in each country to enhance competitiveness, transparency, and societal welfare.

Policy instruments are essential to accelerate aggregator implementation, especially small entrants to lower market barriers and enhance customer engagement during an early stage of deployment. Coordination approaches have to be established among aggregators, customers and grid operators with the focus on harmonised and interoperable solutions. Moreover, innovative approaches can be tested in demonstration and R&D projects with temporary regulatory changes and experiments (e.g. regulatory sandboxes), which can help to address the technical and non-technical challenges and support needed for the real deployment.

Policymakers need to ensure that the regulatory framework supports fair competitiveness, transparency, and freedom of choice for customers toward system values as a whole.

Appendix: References

[1] European Union, “Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending directive 2012/27/EU,” Official Journal of the European Union, 2019. [Online]. Available: http://data.europa.eu/eli/dir/2019/944/2022-06-23

[2] European Union, “Consolidated version of the treaty on the functioning of the European Union part six - institutional and financial provisions title i - institutional provisions chapter 2 - legal acts of the union, adoption procedures and other provisions section 1 - the legal acts of the union article 288 (ex article 249 tec),”2012. [Online]. Available: http://data.europa.eu/eli/treaty/tfeu_2012/art_288/oj

[3] European Commission and Joint Research Centre, “Explicit demand response for small end-users and independent aggregators: status, context, enablers and barriers.” Publications Office of the European Union, 2022. [Online]. Available: https://data.europa.eu/doi/10.2760/625919