

Media release
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Pilot project to integrate decentralised energy resources in grid and system services completed

Swissgrid and ewz successfully completed a pilot project on coordination between transmission and distribution system operators in collaboration with Equigy.

In December 2022, Swissgrid and ewz successfully completed a pilot project on the coordination between a transmission system operator and distribution system operators regarding the use of distributed energy resources such as batteries, heat pumps, and charging stations for power system services. A rule-based transmission system operator- distribution system operators coordination approach was developed and implemented on the Crowd Balancing Platform of Equigy. The concept and its implementation were tested with a battery connected to the distribution grid of ewz.

Increasing numbers of distributed energy resources are connected to the power system, especially at the lower grid levels. Typically, such resources are controlled by third-party aggregators (individually or in aggregation) to provide services either to the transmission system operator or the local distribution system operator, but not both, and without considering potential side effects to neighboring, upstream or downstream grids. For these reasons, it is becoming increasingly important to establish effective coordination procedures between the transmission system operator and distribution system operators.

Swissgrid and ewz have recognized the importance of the transmission system operator- distribution system operator coordination topic and started a common pilot project in the second quarter of 2021. The overall objective was to develop a coordination approach that enables the efficient utilization of distributed energy resources for transmission and distribution grid services and brings the greatest benefit to the security of the overall electricity system.

The project was realized in collaboration with Equigy, a joint venture founded in December 2020 with Swissgrid, TenneT (Germany / Netherlands) and Terna (Italy) as transmission system operator shareholders. In 2022, the Austrian transmission system operator APG and the German transmission system operator TransnetBW joined the joint venture. Equigy is developing the Crowd Balancing Platform technology to facilitate the use of distributed energy resources in the power grid for system ancillary services. Crowd Balancing Platform uses blockchain technology to ensure secure and transparent data exchange among the participants (transmission system operators, distribution system operators, and aggregators) and it offers the possibility of automating the transmission system operator- distribution system operator coordination processes to a considerable extent.

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Key achievements of the project are the conceptualization of a coordination mechanism accepted by both the Swiss transmission system operator and a large Swiss distribution system operator and aggregator, as well as the further development of the Crowd Balancing Platform to support the transmission system operator- distribution system operator coordination approach. The concept is based on a so-called traffic light model and defines all required data exchanges among the transmission system operators, distribution system operators, and aggregators.

Important features of the concept are the consideration of distinct aggregator and distribution system operator roles (even if taken over by the same entity, as was done by ewz in this pilot project) and the multi-purpose use of flexibility which allows aggregators to provide both transmission system operator and distribution system operator services through the same interface. Furthermore, the concept allows distribution system operators to perform grid security analysis with their own tools outside of the Crowd Balancing Platform, thereby minimizing integration effort.

The concept and its Crowd Balancing Platform implementation were tested with a battery connected to the distribution grid of ewz. The battery was controlled by ewz as an aggregator to provide local congestion management services to ewz as distribution system operator and tertiary reserve energy to Swissgrid, while considering and respecting distribution grid constraints. ewz collaborated with Venios for the implementation of grid analysis and distributed energy resources control.

The project is a success story of productive collaboration across multiple organizations and countries. With proper consideration of the needs and preferences of each stakeholder, a simple and customizable coordination scheme was developed. Swissgrid, ewz and Equigy are convinced about the high importance of transmission system operator- distribution system operator coordination and will make further considerations about the future development of the activities in this area.

Powering the future

Swissgrid is the national grid company. As the owner of Switzerland's extra-high-voltage grid, it is responsible for operating the grid safely and without discrimination and for maintaining, modernising and expanding the grid efficiently and with respect for the environment. Swissgrid has more than 600 highly qualified people from 28 countries at its sites in Aarau, Prilly, Castione, Landquart, Laufenburg, Ostermundigen and Uznach. As a member of the European Network of Transmission System Operators for Electricity (ENTSO-E), it is also responsible for grid planning, system management and market design in the European exchange of electricity. The majority of Swissgrid's share capital is jointly held by various Swiss electricity companies.

ewz – new energy for a better tomorrow

ewz is a leading company with pioneering energy and communication solutions. Throughout Switzerland, ewz works to implement environmentally and economically sound energy supply installations for complex site and large-scale projects as well as energy networks for neighbourhoods and communities throughout Switzerland. ewz is responsible for the supply of electricity in the city of Zurich and parts of Grisons Canton. In the city of Zurich, ewz provides a comprehensive, non-discriminatory and usable fibre-optic network. In its own power plants at home and abroad, ewz

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produces 100% green electricity from water, wind and solar radiation. Furthermore, ewz offers energy consultancy services and individual electricity supply as well as tailor-made telecom solutions to companies with market rights.

Equigy – crowd balancing platform

Equigy plays a key role in the acceleration of the energy transition and the integration of the energy system. With the European crowd balancing platform, Equigy creates a trusted data exchange to enable aggregators to participate with smaller flexibility devices, such as home batteries and electric vehicles, in electricity balancing markets, turning consumers into prosumers. Owned by leading European transmission system operators, Equigy aims to set cross-industry standards throughout Europe, to support a future-proof, reliable and cost-effective power system that is independent of fossil fuel-based flexibility sources.