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Executive summary

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An innovative and efficient solution for TSO-DSO cooperation in congestion management

It is generally expected that the transition to a zero emission power system will significantly increase the need for flexibility, and that much of this in the future will come from small and medium size resources in the distribution grids. These resources are needed by the Distribution System Operator (DSO) for congestion management and by the TSO for balancing, and also congestion management in the transmission grid. Flexibility providers, e.g. buildings, factories, EV chargers, want access to all markets to improve their business case. Which arrangements are needed to make these resources available to DSO and TSO (and the upcoming European balancing platforms) when needed, without causing congestion in the DSO grid?

Several projects have explored coordination schemes between TSO and DSO by means of so-called flexibility platforms. Most of these projects are looking at balancing and congestion management as separate processes. However, handling balancing and congestion management as one integrated process, also is more efficient, because resources are available for whatever they are needed for.

In this project, an innovative coordination scheme for the TSO and DSO, is explored. It is called the hierarchical approach and uses an “aggregation-disaggregation service” (ADS) for each DSO, which collects the grid constraints as well as the flexibility bids of the distribution grid. The ADS then computes a so-called Residual Supply Function (RSF) which describes the least-cost way in which the given distribution subsystem can deliver – while respecting all the provided grid constraints. The RSF is either used by the TSO directly or transferred to the European platform for manual FRR. When activations are known, they are sent back to the ADS, who disaggregates the RSF and sends the resulting physical activations to the DSO for forwarding to the flexibility providers.

Although apparently complex at first sight, the scheme is relatively easy to implement technically. Regulatory aspects and roles will have to further explored.