REDISPATCH SERVICES: CHALLENGES AND DESIGN OPTIONS

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Overview

Redispatch services are ancillary services that are used by grid operators to control the loading of network elements or the voltage, within the quality target parameters of the applicable regulation. In unbundled electrical power systems with self-dispatch of grid users and with zonal pricing of the electricity (commodity) market, the market outcome can constitute in physical power flows that violate the quality target parameters of the network. Such *congestions*[1] can be relieved by the grid operator with (among other measures[2]) redispatch: grid users change their scheduled injection or withdraw of electrical energy to- respectively from the network according to the request of the network operator.

There are three developments that challenge the current design of redispatch services in Europe and that could lead to design adjustments in the coming years:

1. **Increasing redispatch volumes:**
   The Agency for the Cooperation of Energy Regulators (ACER) has adopted a recommendation (02/2016) which proposes as high-level principle that cross-zonal capacity calculation methodologies of the European TSO should not take into account congestions on internal network elements [1]. The application of such a principle could, also according to ACER, lead to an increasing necessity of operational measures (such as redispatch) by the network operators to accommodate the commercial flows [2]. This raises the question whether the current redispatch service designs are feasible to effectively provide the additionally required redispatch volume to the network operators.

2. **Increasing redispatch costs:**
   Increasing redispatch volumes could lead to increasing redispatch costs. The 2015 redispatch costs in Germany for instance, were 912 million EUR[3] and decreased by 34% in 2016. The redispatch costs in the Netherlands increased in the same period by more than 1000% to 65,3 million EUR [2]. It is important to examine whether the current redispatch service designs enable efficient costs, in particular when redispatch volumes further increase.

3. **New regulatory requirements for redispatch service designs:**
   In 2017 the European Commission published a package of legislative proposals to adapt the directives and regulations concerning energy. This so-called "*Clean Energy for All*" package is currently negotiated with the European Council and the Parliament. The package includes a proposal that requires a market-based pricing mechanism for redispatch service remuneration, whereby non-market-based compensation is only allowed in justified situations [3, Article 12].

In this context the present paper identifies and discusses design options for redispatch services under consideration of redispatch specific design challenges (i.e. high risk of market power abuse). From an earlier published ancillary services framework [4], we derive a set of design options for the acquisition process of redispatch services. Subsequently, the design options are qualitatively analysed on expected consequences for effectivity and cost efficiency. Of particular interest is a comparison of market-based and regulated (non-market-based) redispatch acquisition options. The result of the analysis provides an overview on redispatch design options as well as insights about their advantages, limitations and risks.

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[1] "*'physical congestion' means any network situation where forecasted or realized power flows violate the thermal limits of the elements of the grid or the voltage stability or angle stability limits of the power system"* [1, Article 2]

[2] Other measures are e.g. cancellation of planned network outages, grid topology changes and change of transformer tap position.

[3] Includes costs for counter-trading

Methods

- Application of the ancillary service framework [4] on the description and comparison of the Dutch and the German redispatch services design. The generic design variables are shown in **Error! Reference source not found.**.
- Key figures of Dutch and German redispatch based on public data.
- Literature review on redispatch service acquisition.
- Qualitative analysis of design options for redispatch services.

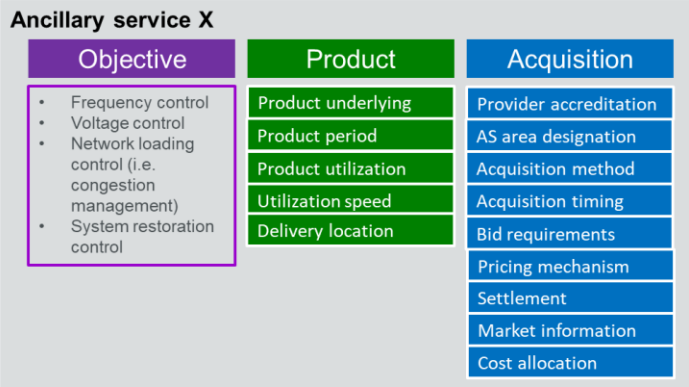

Figure 1 Generic ancillary services design variables adapted from [4]

Results

- A structured comparison of the current redispatch mechanisms in Germany and the Netherlands
- A detailed characterization of specific design challenges for redispatch services
- A set of redispatch design options (market-based and regulated remuneration) as well as insights about their advantages, limitations and risks

Conclusions (preliminary)

The analyses and comparison of the redispatch service designs in Germany and the Netherlands show that both designs most likely need to be adjusted in order to either comply with the expected EU regulation (Germany) or to be able to provide the increasing redispatch demand at efficient costs (Netherlands).

We explore that redispatch services are inherently subject to the risk of market power abuse. This is the case for market-based redispatch, but interestingly we also identify risks of market power abuse related to non-market based redispatch service designs. We discuss various options to mitigate the risk of market power abuse related to redispatch services. However, we argue that a full elimination of that risk is not desirable in an unbundled electricity system with self-dispatch. The necessary restrictions and controls would reduce the freedom for grid users to an extent that the advantages of an electricity *market* could not emerge.

Furthermore we discuss the importance of incentive consistency with other ancillary services and explore the particular importance of the incentive consistency with the imbalance pricing design: a redispatch design whereby the prices for the remuneration lie considerably below the imbalance prices can incentivise redispatch service providers to withhold (part of) agreed redispatch volumes in order to attain the higher remuneration of the imbalance mechanism.

References

[1] ACER, *Recommendation of the agency for the cooperation of energy regulators No 02/2016 of 11 November 2016 on the common capacity calculation and redispating and countertrading cost sharing methodologies*. 2016.

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[4] S. Glismann and F. Nobel, “A framework for ancillary services design,” in *International Conference on the European Energy Market, EEM*, 2017.

[5] European Commission, *COMMISSION REGULATION (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management*, no. July. EUR-lex, 2015.