

REDUCING THE RISK OF INC-DEC GAMING IN REDISPATCH. COMPARATIVE COUNTRY ANALYSIS.

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Overview

In order to tackle the climate crisis, the implementation of the energy transition is essential. Progressive electricity market integration and growing shares of volatile renewables coming online, however, also create new system challenges, such as a growing frequency (and costs) of congestion and, consequently, a greater need for redispatch. This makes it increasingly important to design efficient ways to attract new providers of redispatch through appropriate compensation mechanisms. So far, the approaches to redispatch procurement and its compensation in Europe vary substantially.

The implementation of a market-based remuneration approach potentially bears multiple benefits. It could help attract a wider spectrum of participants, ensure a faster reaction and encourage investment in innovative technologies as well as a more efficient use of distributed energy and demand-side resources. However, the risk of market participants engaging in strategic bidding behavior must not be discounted. The most commonly cited concern linked to market-based redispatch is so-called “inc-dec gaming”, i.e. a bidder’s strategy which involves increasing the bid volume in the first market (commonly, the day-ahead market) in the expectation of congestion only to decrease it in the subsequent redispatch market, profiting in both markets as a result.

To address the risk of inc-dec gaming, some countries like e.g., Germany and Austria, therefore opted for remunerating redispatch on a cost basis. The tradeoff is that this approach is relatively complex, requires a high degree of control, and does not benefit from any potential advantages an open market would have. Yet, other countries such as Greece, Belgium, Ireland, Switzerland are currently developing new approaches towards a more competitive redispatch procurement.

In this paper, the authors present a comparative study of different measures used to tackle gaming behavior among providers of redispatch in the absence of market power. The results of this work have been compiled through a critical analysis of country best practices and are intended to provide an overview of existing approaches by categorizing and qualitatively assessing the various measures. It is important to note that the intent of this study is not to provide a fit-for-all solution to a complex problem but rather to facilitate the choice of the most appropriate measures.

Methods

By considering the key requirements for successful inc-dec gaming as well as the associated risks, we show how the implementation of market based redispatch could work using practiced models from the UK, the Netherlands and Norway. The selected countries all remunerate redispatch on a market basis and have implemented additional measures to prevent strategic bidding behavior. The general foundation for the elaborated

Table 1: Summary and categorization of analyzed measures

Categories	Measures
Increase competition	- Including demand responses
Directly influencing prices	- Caps and floors - Cost-based remuneration
Ex-ante mitigation arrangement	- Long-term contracts - Splitting bidding zones - Tariffs and taxes
Ex-post controlling measures	- Independent market monitoring - Enforcing and expanding existing legislation - Baseline and compliance methodology - Reference level prices

results is a critical literature analysis. Through its consolidation, comparison, and categorization, it is intended to provide an overview and an assessment of measures to mitigate Inc-dec gaming in market-based redispatch.

First, measures to curb Inc-dec gaming suggested by literature are summarized in four categories, as presented in Table 1. Further, the different measures are evaluated according to their level of (1) complexity to implement, the (2) simplicity of ongoing enforcement, (3) how strong its expected impact is and (4) how severe the intervention is. There is another category considering the overall implemented market design (e.g., if the redispatch market is integrated with the intraday market or the balancing market). However, to assess the impact and effectiveness of such more complex design choices in detail, separate scenario studies would be necessary and are beyond the scope of this study.

Finally, the studied countermeasures are compared with the selected country examples.

Results

Studies have shown that two variables can be decisive for successful inc-dec gaming, the degree of uncertainty and the appearance of structural congestion (the former being unlikely to occur in the case of the latter). Uncertainty refers to how great the risk is for a potential market participant to pursue an inc-dec strategy, or how likely it is to generate profits for that participant. Structural congestion refers to congestion occurring systematically and thus predictably at a given grid location.

An overview of the identified measures that could counteract structural congestion as well as to increase uncertainty regarding expected profits from gaming is presented in Table 1. *Ex-post* controlling measures refer to market monitoring, which assesses whether unauthorized bidding behaviour was observed. *Ex-ante* measures aim to reduce the incentive for inc-dec gaming in advance. The most widely advocated measure is to increase the level of competition by including demand response. This not only could increase the uncertainty for the incumbent participants but also support the positive effects from a market in terms of price reduction or technical innovation. Although appealing, this approach might create a circular problem: to incentivize more participants to enter the market, a new market design is needed, which may be exposed to strategic behavior before the actual entry of new participants. This in turn is likely to make system operators hesitate to implement it in the first place. In addition, the danger remains that in some locations there would still be too few participants or their size cannot provide sufficient flexibility on par with traditional providers, which would require additional measures. Another possibility is to monitor unauthorized strategic behavior and, in the event of violations, to sanction it (see Table 1 *ex-post* controlling measures).

The choice of measures implemented in the selected countries is relatively similar, even if their implementation is more varied. This shows, on the one hand, that the right measure must always be individually adapted and, on the other hand, that many different implementations can lead to the desired goal.

In the UK, the so-called Transmission Constraint License Condition (TCLC) mechanism aims to detect excessive pricing by comparing to pre-determined reference prices. If such actions are disclosed, a financial penalty gets applied by the authority. In addition, the British transmission system operator (TSO) contracts ahead of anticipated congestion (up to 9 weeks before delivery), similar to the approach of signing long-term contracts.

In Norway, the TSO is, under specific conditions, entitled to accept a bid without paying the related offered price. Those conditions are met if there is only one or few relevant assets that resolve the constraint and that the offers are clearly not reflecting true costs. In that case, the bid gets remunerated by the prevailing price from the day-ahead market or, if this occurs frequently, it is up to the TSO to charge additional fines. The approaches of the two countries are comparable to the *ex-post* controlling measures in Table 1.

The Dutch TSO engages in a slightly different approach. It analyzes the market situation in advance by applying a cost-benefit analysis assessing whether a risk of strategic behaviour by market participants has to be expected. In such a case, the following requirements are introduced: (1) a minimum of three competing market participants (including the participation of demand response and storage) and (2) additional interventions in the case of suspicious bids (this may result in splitting up bidding-zones or the enforcement of fine). In addition, the Dutch TSO tends to preempt unwanted behavior by *ex-ante* mitigation and the other two countries - through *ex-post* controls, as is summarized in Table 2.

Table 2: Summary of applied measures of the example countries

United Kingdom	The Netherlands	Norway
<ul style="list-style-type: none"> - Transmission Constraint License Condition (TCLC) mechanism (to detect excessive pricing by comparing to reference prices) - "Long-term contracts" (up to nine weeks before delivery) to obtain better prices 	<ul style="list-style-type: none"> - Cost-benefit analysis in order to apply further measures if necessary - A minimum of three competing market participants, including demand and storage - Intervention in case of suspicious bids which may result in bidding-zone splitting or the imposition of fines 	<ul style="list-style-type: none"> - In the event of suspicion of over proportionally high prices offers the TSO compares them with reference prices based on historical data and may only pay the current day-ahead price or charge a fine

Conclusions

Based on the conducted survey there is no single solution to prevent inc-dec gaming but rather a mix of complementary measures. Knowing which conditions increase the likelihood of inc-dec gaming is crucial for the choice of an appropriate countermeasure. Further, there is a trade-off between the expected effectiveness and the difficulty of implementing an approach. For instance, whereas a cost-based compensation is easier to introduce, it is prone to information asymmetries, requires more control by the system operator and less likely to create a sufficient incentive for new participants to provide the redispatch service.

Nevertheless, this research identified a broad scope of viable empirically supported measures that allow market-based redispatch remuneration while keeping the risk of inc-dec gaming manageable. This is supported by the provided country examples as well as by the fact that similar instruments are used in different markets to prevent strategic behaviour. Model-based simulations could help to provide further insights into and quantify the effectiveness and efficiency of the identified measures. Altogether, it can be stated that the categorisation and analytical assessment of the discussed measures in this paper, present a valuable basis for further in-depth research in this field.