Public consultation

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Myndighedsenheden

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METHODOLOGY FOR PROCUREMENT OF COUNTERTRADE ENERGY

Contents

ENERGINET
Myndighedsenheden

Annexes

ENERGINET
Myndighedsenheden

1. Summary

The Danish countertrade practice is based on Danish special regulation, which uses bids submitted to the Nordic power regulation market (NPRM). However, as part of the obligatory transition to trade balancing energy on the European balancing platform MARI from Q3 2024, an AOF will be introduced to the Nordic platform by November 2022. By that date, is will no longer be technically possible to carry out Danish special regulation. A new methodology for procurement of countertrade energy must therefore be implemented by then.

The starting point for assessing possible countertrade methodologies has been the concerns and challenges experienced by Energinet when using Danish special regulation for countertrade. Thus, even if the possibility of using bids submitted to the Nordic platform were to remain, challenges and concerns have increased in the recent past to an extent which necessitates a re-evaluation of the current practice and the search for a more sustainable methodology to be used going forward.

Fundamentally, the challenges of the current practice revolve around a small market for countertrade energy in the current Danish countertrade practice and the fact that procurement of countertrade energy is made very close to the operational hour.

Having assessed the legal requirements and considerations pertaining to TSOs' procurement of countertrade energy, it can be concluded that they commit TSOs to use marked-based solutions and enhance competition. In Energinet's assessment, an intraday-based methodology will do so. Thus, using the existing intraday market to procure countertrade energy presents itself as an obvious solution to mitigate the current challenges and ensuring regulatory compliance.

Early in the process, it was considered whether Energinet should initiate and pursue a Nordic solution, establishing a separate TSO-TSO countertrade market with the other Nordic TSOs. The idea was rejected as it did not garner support from all Nordic TSOs and considering the deadline for implementation of a new countertrade methodology. Further, it was assessed that, based on the legal requirements and the need for a new methodology, a TSO-TSO countertrade model would not be superior to an intraday-based methodology.

2. Background

2.1 Energinet's current countertrade practice

Procurement of countertrade energy is currently made in the balancing time frame, using Danish special regulation.

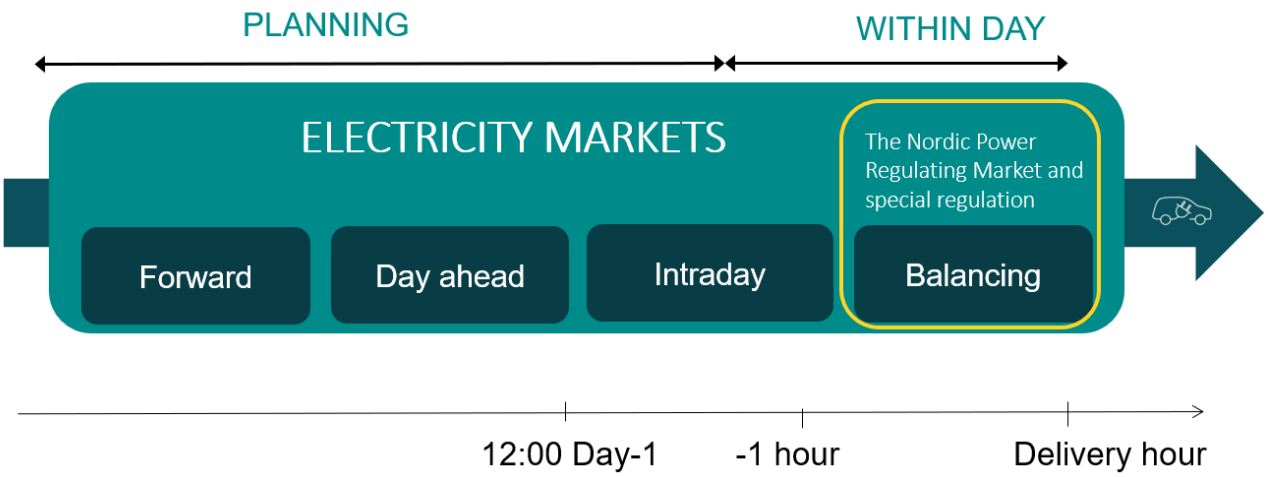

Figure 1: Time frames in the Electricity markets.

The basis for Danish special regulation is the Nordic Power Regulating Market. In brief, the Nordic Power Regulating Market (NPRM) operates on the same fundamental principles as the day-ahead market. Balance responsible parties (BRPs) in the Nordic countries submit their bids for upward and downward regulation to the Nordic TSOs on a voluntary basis and the bids are combined in a single order merit curve, which forms the basis for TSO activation.

The NPRM currently uses 60-minute market time units (MTUs) and closes for submission of regulation bids/offers 45 minutes before the operational hour. Liquidity on the market is determined close to the operational hour as market participants generally move bids not activated in the intraday market to the NPRM when the intraday market closes (one hour before the operational hour).

"Special regulation" implies that, every hour after the NPRM has closed and the marginal price of balancing has been settled, Energinet's control centre staff manually activate unused balancing bids for upward or downward regulation to cover other needs for energy than balancing. Bids used for special regulation are settled pay-as-bid above the marginal price of balancing.

The NPRM is designed with the primary purpose of ensuring TSOs a means to balance the system. Its make-up (and the time frame close to the operational hour) reflects a need to ensure that bids reflect actual physical ability. For that reason, participation in the NPRM is subject to the fulfilment of the requirements provided in chapter 2.2 of regulation C2[1]. These requirements include the ability to fully activate any bid within maximum 15 minutes from having received the activation order, and bids must include information that enables clear identification of supplier and bid reference.

Alignment between the Nordic TSOs on their use of the Nordic Operational Information System (NOIS) is required to ensure sufficient liquidity for balancing purposes. Such agreements have been made between the Nordic TSOs in the System Operation Agreement (SOA)[2] and in the Nordic Balancing Philosophy[3] . Both agreements state that the activation of mFRR for reasons other than balance management needs, eg. for congestion management, must not influence

[1] Markedsforskrifter | Energinet , also translated here: Regulation C2 The balancing market and balance settlement (1).pdf, however, translations are not updated
[2] Operations Reports (entsoe.eu), Annex Electricity Balancing
[3] Nordic_Balancing_Philosophy_160616_Final_external.pdf (entsoe.eu)

the Nordic marginal prices in the NRPM, and is thus only permitted if executed as special regulation[4]. Congestion caused by a reduced transmission capacity to/from a bidding zone after day-ahead market closure is explicitly mentioned as an example of the scope of special regulation.

The public consultation on "Special regulation as countertrade model on DK1-DE/LU following Joint Declaration" in February - March 2018, states that:

"*Currently, it is neither feasible nor desirable for the other Nordic TSOs to enable the participation of these bids in the special regulation market*[5]" ["these bids" referring to bids for countertrade energy to support the JD].

Energinet can thus not use special regulation bids in the NRPM from market participants located in other countries than Denmark for structural countertrade to accommodate the Joint Declaration and TenneT Commitment[6], specifically. Energinet can only activate mFRR bids from Danish market participants for special regulation when pursuing structural countertrade ("Danish special regulation").

Danish special regulation forms the basis for the Danish countertrade practice, currently used by Energinet.

2.2 The background to the Danish countertrade practice

The primary purpose of the NRPM is to ensure TSOs sufficient energy for balancing purposes. Special regulation is permitted, however subject to agreed restriction/ limitations, to ensure the market's primary purpose remains unaffected.

Until 2017, Energinet used special regulation in line with its original purpose, eg. to remedy internal congestion. Special regulation was only used for countertrade when an interconnector tripped or if faults in the internal grid led to reduced cross-zonal transfer capacity ("unexpected countertrade"). Use of countertrade for such purposes is mentioned in SO GL where countertrade is included on the list of available remedial actions to ensure secure operation of the system[7].

In 2017, the Joint Declaration (the JD) was agreed between Germany and Denmark. This agreement is described in detail in section 2.3.2 and, therefore, it is merely mentioned here that the JD comprises (i) obligations for TenneT and Energinet to make fixed (but gradually increasing) amounts of transmission capacity on the DK1-DE/LU border available to the market in the day-ahead time frame, and (ii) an obligation to countertrade if more transmission capacity is sold than what can actually/physically be transferred.

An impact assessment[8] was made to assess different ways to procure countertrade energy necessitated by the JD. Given the urgency of its implementation and the limited duration of the JD (expected expiry in 2020), it was agreed that Energinet uses Danish special regulation to procure the countertrade energy needed for realization of the countertrade obligations pertaining to DK1-DE/LU.

[4] The use of mFRR bids outside of the merit order list is generally called "special regulation" in the Nordic countries. However, when Energinet uses the term special regulation in relation the procurement or sale of energy to ensure countertrade on Danish borders in the following, it is defined as mFRR bids which are settled "pay-as-bid" above the marginal price of balancing. Avoiding that these activations directly influence the Nordic marginal prices in the NRPM is possible by using the more expensive unused balancing bids (mFRR bids).

[5] Now in consultation: Special regulation as countertrade model on DK1-DE following Joint Declaration | Energinet

[6] Further on the Joint Declaration and TenneT Commitment, see section xx.

[7] SO GL A 22, 1. (f)a

[8] Energinet and TenneT publish final impact assessment of different countertrade models for DK1-DE | Energinet

Fact is, however, that Energinet currently procures significant amounts of energy for structural countertrade in a isolated Danish market, using a tool designed to procure smaller amounts of energy just before the operational hour.

2.3 The need for a new countertrade methodology

2.3.1 Increased countertrade volume

The obligations under the JD implied a rapid increase of countertrade on DK1-DE/LU. For the reasons explained in detail in section 2.3.2 below, the volume of countertrade has continued to increase since.

From figure 2 it may be concluded that almost all of the volumes which have been downward regulated in 2018-2021 is special regulation due to TenneTs countertrade request.

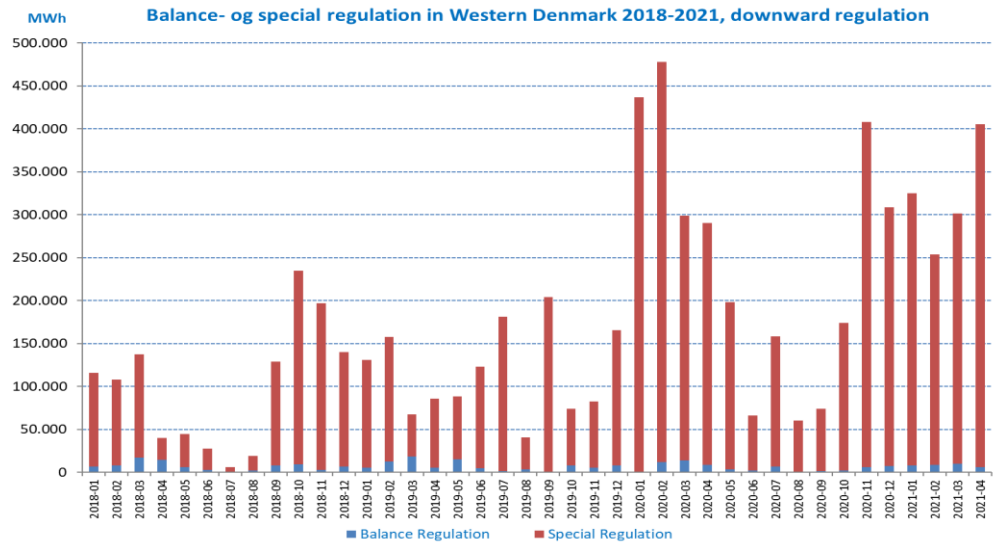

Figure 2: The use of special downward regulation in DK1 after 2017

2.3.1.1 Security of supply

Security of supply is depended on the liquidity in the market.

2.3.1.1.1 Security of supply (upward regulation)

On more than one occasion after the entry into force of the JD, incidents have occurred where the liquidity of Danish mFRR bids submitted to the NPRM was insufficient to cover the need for upward regulation in Danish bidding zones[9].

The following figure shows the duration curve for upward regulation in DK1.

[9] Workshop 1 on alternative countertrade models | Energinet

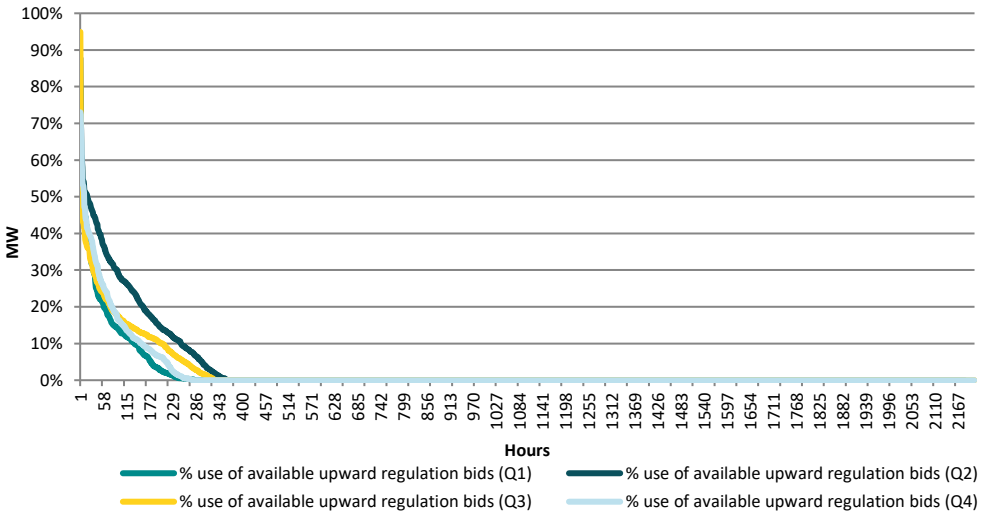

Figure 3 Duration curve of % use of offered upward regulation in DK1

From 3 July 2020 to 31 August 2020 Energinet was unable to assist Tennet with countertrade when upward regulation was needed in DK1. This was a result of many planned outages of thermal power plants and HVDC connection outages due to faults. Outages combined with the fact that countertrade is done in a Danish special regulation market led to lack of generation adequacy, ie. sufficient generation to cover consumption could not be ensured. The decision not to assist TenneT was justified by the principle of proportionality, as security of supply was deemed more important than market availability[10]. Consequently, TenneT and Energinet could not rely on countertrade when upward regulation was needed in DK1. This then had to be considered when providing capacities to the day-ahead market.

July and August 2020 were extraordinary in terms of the operating situation. The overall situation improved by September 2020. That being said, difficulties in complying with the N-1 redundancy requirements were also seen in operating situations before and after July and August 2020.

2.3.1.1.2 Security of supply (downward regulation)

The following duration curve shows the liquidity of the regulating power market in DK1, and the percentage use of offered upward and downward regulation. The curve is not split according to the use for special regulation or balancing.

[10] See Energinets notice of 1 July 2020: Upward regulation in DK1 for countertrade on DK1-Germany in July and August 2020 | Energinet

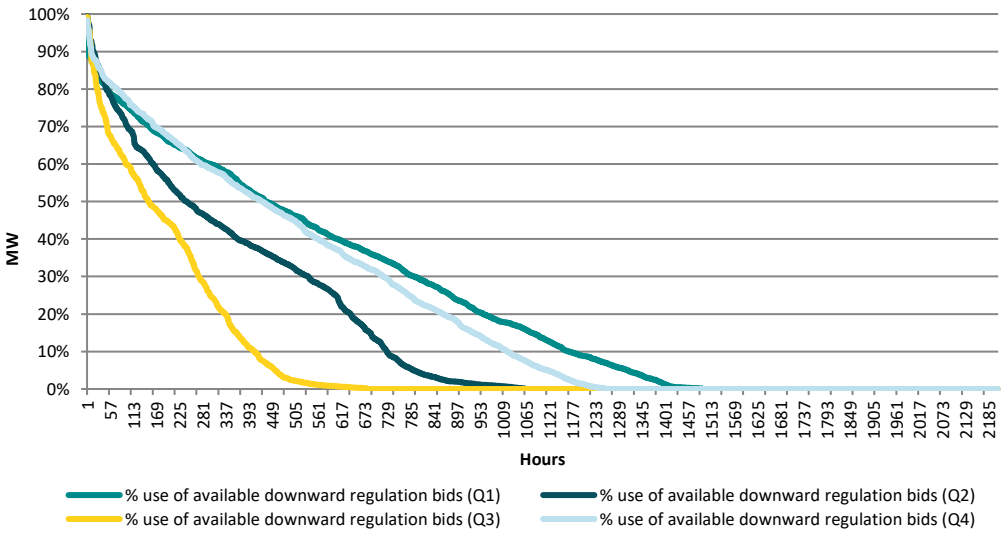

Figure 4 Duration curve of % use of offered downward regulation in DK1

The figure shows that in 49 hours in Q1, 47 hours in Q2, 25 hours in Q3 and 74 hours in Q4 Energinet activated over 80 % of all offered downward regulation in DK1, however the highest use of activated bids were 99,5 % in a single hour. The figure also shows that in almost 700 hours in Q1, more than 1100 hours in Q2, more than 1500 hours in Q3 and almost 1000 hours in Q4 none of the offered downward regulation in DK1 were used.

Considering these experiences (as well as the view to further increasing countertrade volumes, see the below analysis), whether the Danish special regulation practice offers sufficient bids to cover the actual need to procure energy for countertrade is a growing concern.

2.3.1.2 Operational security

Energinet's control centre performs a range of tasks to ensure secure operation of the Danish grid. The control centre's dedicated task is to ensure a safe operation of the grid in the current and next hour.

Manually activating bids constitutes a risk to system security. If, for example, an upward regulation bid is activated instead of a downward regulation offer, it results in an imbalance in the system. As it appears from section 2.3.1.1, there is a further risk that there are no upward or downward regulations bids available when activation is urgently needed.

In the past, Energinet's control centre has been able to downward regulate multiple GWh immediately before the operating hour without faults. Nevertheless, the current level of energy trading performed by the control centre immediately before the operating hour exceeds, in Energinet's assessment what is prudent, considering the system security risk.

To the extent possible, for secure system operating reasons, it is deemed necessary to relieve the control centre of the obligation to manually trade large volumes of energy close to the operating hour, or to, at least, reduce the scope of said task.

ENERGINET
Myndighedsenheden

2.3.2 Joint Declaration and TenneT Commitment (on DK1-DE/LU)

The JD[11] was made in 2017 between the Danish Ministry of Energy, Utilities and Climate on the one side and the Federal Ministry of Economic Affairs and Energy of the Federal Republic in Germany on the other. It expresses the parties' commitment to ensure that minimum capacities on DK1-DE/LU are made available to the day-ahead market. The political declaration took effect on 3 July 2017 and remains in effect as a political declaration between Denmark and Germany. However, on 30 April 2021, the Danish Ministry relieved Energinet of its legal obligations under the Joint Declaration.[12]

In December 2018, TenneT made commitments to the European Commission to further increase the capacity available to the market on the border (the "TC"[13]). The TC followed the Commission's initiation of proceedings based on its preliminary assessment of 19 March 2018[14] that TenneT had limited the commercial capacity on the DK1-DE/LU interconnector, resulting in a partitioning of the internal market and discrimination between grid users based on their place of residence.

Since the entry into force of the JD and the TC Energinet and TenneT have offered agreed amounts of minimum capacity on DK1-DE/LU to the day-ahead market[15]. Under the said agreements, if one of the TSOs calculate an NTC lower than the agreed minimum capacity on the border for any given hour, the TSOs shall disregard the calculated NTC for the day-ahead market and place the agreed minimum capacities at the disposal of the day-ahead market.

The current countertrade practice thus requires that capacity is made available to the market even when it is evident that the internal grid cannot physically handle the traded amount. The JD and the TC specify that such capacity, i.e., trading capacity sold on the border, which cannot physically flow due to internal grid congestions, must be countertraded by the TSOs.

As the legal obligation resting on Energinet to guarantee a certain capacity and also the obligation to assist with countertrade have been removed from JD, only the minimum capacities under the TC, see Figure 5, are relevant.

As TenneT and Energinet have now commissioned the East Coast Project, TenneT's guaranteed hourly NTC will change according to the TC as follows: Using a linear trajectory principle, the TenneT guaranteed hourly NTC will increase in annual steps of equal size, corresponding to the overall increase of the East Coast Line (575 MW)[16]. Thus, TenneT's guaranteed hourly NTC will increase as follows:

Starting date	New minimum available hourly capacity according to the TC

[11] Minimum available hourly capacities for DE-DK West according to Joint Declaration and TenneT's Commitment | Energinet

[12] As the original expiration date was prolonged.

[13] Commission decision of 7.12.2018: https://ec.europa.eu/competition/antitrust/cases/dec_docs/40461/40461_461_3.pdf

[14] https://ec.europa.eu/commission/presscorner/detail/en/IP_18_2122

[15] Tekst taget fra Minimum available hourly capacities for DE-DK West according to Joint Declaration and TenneT's Commitment | Energinet

[16] Note that the NTC used to determine capacity offered is the hourly minimum of TenneT and Energinet's individual hourly NTCs. TenneT's hourly NTC is still subject to daily capacity calculations that could result in any value between TenneT's guaranteed hourly NTC and the maximum NTC.

01/2021	1,396 MW
01/2022	1,492 MW
01/2023	1,588 MW
01/2024	1,684 MW
01/2025	1,780 MW
01/2026	1,875 MW

Figure 5: Minimum available hourly capacity due to the finalization of the East Coast Project. TenneT's guaranteed hourly NTC will increase by an additional 750 MW in a linear trajectory with the future commissioning of the West Coast Line.

The TC expires in September 2028[17].

2.3.2.1 Obligation to countertrade under TenneT Commitment

As the TC is between TenneT and the EU Commission, it does not impose an obligation on Energinet to assist TenneT with countertrade. However, the TC states that European TSOs must mutually support each other to the best of their abilities, and it is specifically mentioned that

"*The TenneT Guaranteed Hourly NTC of 1300 MW requires a Phase-in Period to allow TenneT in cooperation with Energinet to implement and apply an adequate countertrading process (…)*"

In its press release[18] pertaining to the investigation of TenneTs practices on the DK1-DE/LU border, which lead to Commission Decision of 7 February 2018 to accept TenneT's commitment proposal, the Commission stated that the investigation

"*complements the Commission's effort to address the systematic limitation of cross-border capacity on electricity interconnectors across the EU*"

and, further, that

"*the Commission has proposed to update the Electricity Regulation as part of the ´Clean Energy for All Europeans' package […]. Among other things, it aims at improving the rules on cross border capacity in order to maximise the capacity made available and to ensure that the TSOs do not unnecessarily limit the volume of cross-border capacity".*

[17] Commission decision of 7.12.2018 A1.

[18] Antitrust: Commission accepts Tennet commitments (europa.eu)

The press release suggests the TC is closely connected to the obligation imposed in general on TSOs under the Electricity Market Regulation from 2019 (in article 16), ie. the "70% rule".

The link to the 70% rule implies that Energinet's obligation to assist TenneT with countertrade under the TC is similar to the general obligation on TSOs to assist each other with countertrade pursuant to the 70% rule.

2.3.2.2 Nature of countertrade under Joint Declaration and TenneT Commitment

As established in section 2.2, historically, Energinet has primarily procured energy for countertrade purposes due to faults and other unexpected incidents/ special situations in the system.

Countertrade conducted to comply with the JD and the TC is different, by nature, as the need occurs even when the transmission system is in normal state and becomes known when the day-ahead market closes. On DK1-DE/LU requests for structural countertrade are communicated around 15:30 p.m. on the day before the operational hour (for all hours after).

The above-mentioned type of countertrade, which occurs even when the transmission system is in normal state and becomes known when the day-ahead market closes, is hereinafter referred to as structural countertrade; whereas countertrade needs that arise due to unexpected events/ special situations in the grid, as mentioned in section 2.2, is referred to as unexpected countertrade.

For the sake of clarity, it must be noted that EU regulation and national Danish law does not distinguish between these categories of countertrade.

2.3.3 The "70% rule"

In line with the Commission's press release accompanying the announcement of the TC[19], the Electricity Market Regulation introduced the "70% rule". Article 16 reads in excerpt:

4. The maximum level of capacity of the interconnectors and the transmission networks affected by cross- border capacity shall be made available to market participants complying with the safety standards of secure network operation. Countertrading and redispatch, including cross border redispatch, shall be used to maximise available capacities to reach the minimum capacity provided for in paragraph 8. […]

8. Transmission System Operators shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. Without prejudice to […] this paragraph shall be considered to be complied with where the following minimum levels of available capacity for cross -zonal trade are reached:

(a) For borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70% of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of article 18(5) of Regulation (EC) no 714/2009;

[19] See section 2.3.2

ENERGINET
Myndighedsenheden

(b) *For borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross- zonal exchange. The margin shall be 70% of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) no. 714/2019.* [underlines are added by Energinet].

The regulation thus commits all European TSOs, effective from 1 January 2020, to ensure a certain amount of commercially available transmission capacity on all national borders; and an obligation to use countertrade to maximise available capacities to reach minimum capacity.

2.3.3.1 Consequences of the 70% rule for Energinet countertrade

As a consequence of the 70% rule, Energinet is committed to enable structural countertrade on all of Energinet's national borders, if requested to do so by neighbouring TSOs.

The future volumes, which can be expected to be requested by neighbouring TSOs because of the 70% rule, are difficult to predict. As indicated above in section 2.3.1, volumes depend on grid development, the interpretation of the 70% rule, and the extent to which derogations are granted. The following derogations have been granted to Energinets neighbouring TSOs:

- Sweden was granted a derogation from the 70% rule for 2021 for their interconnectors: DE/LU, DK1, DK2, LT, NO1 and PL.

- TenneT (Netherlands) has a derogation from the 70% rule for 2021, applicable to all Dutch CNECs (Critical Network Elements) included in the CWE and Core day-ahead capacity calculation processes and for all cross-border HVDC cables.

- The Electricity Market Regulation does not apply to Norway (yet).

Derogations are granted for one year at the time, cf. Electricity Market Regulation article 16, 9. This indicates that new countertrade requests may come from Svenska kraftnät and Tennet B.V. (the Netherlands) if said TSOs are not granted derogations for 2022 or 2023.

The TC formally expires in 2028. The 70% rule, however, implies a legal obligation for TenneT to maintain 70% commercial availability on DK1-DE/LU after the expiry of the commitment. All else being equal[20], this means that Energinet expects the need for downward regulation in DK1 as a result of structural countertrade requests to be at similar levels on DK1-DE/LU even after 2028, but to decrease when the grid is reinforced further, or increase if the volume of renewable energy exceeds the capacity of planned grid expansions.

Applying also to Energinet, Energinet may have structural countertrade needs which need be solved by countertrading with its neighbour TSOs. In the 2020 ACER MACZT report, which monitors the margin available for cress-zonal electricity trade in the EU, it is stated that: "*Low levels of relative MACZT are also observed in Denmark (see Figure 15); however,*

[20] Implying that grid reinforcement projects are disregarded in this context.

issues with the quality of the data provided by the TSO and in the calculation may have led to underestimate the MACZT levels for this country"

In general, Energinet expects volumes of structural countertrade to increase as a consequence of the 70% rule.

2.3.3.2 Time frame/markets to apply the 70% rule

The Electricity Market Regulation does not explicitly establish for which time frames/markets TSOs are obliged to make commercial capacity available to comply with the 70% rule.

On the basis presented later in this section, Energinet assesses that making the 70% capacity available in the day-ahead market is regulation compliant and, in any event, the optimal solution for supporting the aim of the regulation and the 70% rule itself, ie. to maximize cross-zonal trading opportunities as a core element in ensuring an efficient internal electricity market[21].

In its Recommendation No. 01/2019 of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to article 16(8) of Regulation (EU) 2019 and pursuant to ACER Regulation article 16(2), ACER established guidance for TSOs on implementing minimum capacity and for regulatory authorities on methods to monitor TSOs' implementation[22].

It follows from the recommendation[23] that ACER monitors TSOs compliance with the 70% rule, in so far, only in the day-ahead time frame. This, in turn, indicates that ACER find that the 70% rule is complied with if 70% commercial capacity is made available to the market in the day-ahead time frame (and only the day-ahead time frame).

This finding is further supported by the content of the CCR Core CCM, which was finalized by ACER[24] and only applies the 70% rule to the day-ahead time frame, and not the intraday CCM[25].

Further, in light of the Commission's acceptance of the TC to increase minimum capacities in day-ahead only, Energinet currently has no valid grounds to contest an interpretation of the rule where TSOs comply with the 70% rule if the 70% requirement is applied in the day-ahead time frame and in the day-ahead time frame only.

Consequently, the present intraday methodology is based on that interpretation[26].

2.3.3.3 Legal nature of TSOs' countertrade

Pursuant to article 16, 4. of the Electricity Market Regulation,

"[…] Countertrade and redispatch, including cross-border redispatch, shall be used to maximize available capacities to reach the minimum capacity provided for in paragraph 8 […]"

21 Cross-zonal capacity - 70% target (europa.eu)

22 Recital (4)

23 Relevant excert from the recommendation provided in Annex 1.

24 Annexes to the DECISION OF THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS No 02/2019 (europa.eu)

25 Capacity Calculation Regions (entsoe.eu)

26 See section 4.6.4 for remarks to ACER's CACM 2,0-proposal.

The regulation does not detail or specify further the obligation imposed on TSOs to assist one another with structural countertrade or cross-border redispatch. In these circumstances, the nature of the obligation imposed on TSOs must be interpreted in view of the treaty, committing member states to

"[..] take any appropriate measure, general or particular, to ensure fulfilment of the obligations arising out of the Treaties or resulting from the acts of the institutions of the Union" and

[…] facilitate the achievement of the Union's tasks and refrain from any measure which could jeopardise the attainment of the Union's objectives."

Thus, the treaty states that Energinet shall apply an appropriate methodology for the procurement of energy for countertrade which reduces the need for Energinet to reject structural countertrade requests.

Even if the principle of proportionality may, in certain circumstances, justify the rejection of countertrade, for example if security of supply or system security is threatened, TSOs shall be committed to, in general, apply a methodology to procure energy for structural countertrade purposes which reduces the risk of having to reject countertrade in normal circumstances.

2.3.4 Prices

The price of downward regulation to accommodate TenneT's countertrade request has increased significantly (negatively) since 2017:

	2020	2019	2018	2017
Countertrade (downward) requested from TenneT (GWh)	3.901	1.914	1.598	1.210
Netted with Nordic upward balancing need => netting (GWh)	853	602	484	429
Downward regulated by Danish market participants (GWh)	3.048	1.312	1.114	781
Avg. price for all danish downward regulation (Euro/MWh)	-23	-12	-9	-8
Avg. price for netting in the balancing market (Euro/MWh)	17	38	37	27
Avg. Spot price/day ahead market price in DK1/ (Euro/MWh)	25	38	44	30

Figure 6: Increasing negative price of Danish downward regulation.

The negative price means that producers are paid not to produce energy.

When considering section 2.3.1.1. on the shortage of upward regulation bids in the current Danish special regulation practice, this price development gives rise to consider whether prices would decrease if procurement of energy for countertrade purposes were to take place in a more extensive market. Generally speaking, the expectation is that more market participation means more producers willing to pay not to produce, as that would save expenses for fuel while earnings from selling energy in the day-ahead market would still ensure positive revenue, which again would decrease prices. This, in turn, should lead to a positive price for the generation of energy.

The annual average spot price and the annual average price of netting in the balancing market are inserted in Figure 6 as reference prices. If there were more participants in the market, a price convergence, as seen between the balancing price and spot prices, would have occurred with the price of downward regulation as well.

The significant negative price increase indicates that it would be appropriate to look into whether it is possible to include more market participants in the competition for countertrade energy to ensure a more cost-efficient handling of the large volumes of downward regulation due to structural countertrade.

2.3.5 Platform alterations

2.3.5.1 The Nordic platform for balancing energy

As established in section 2.1, the Nordic TSOs have already established a joint market for balancing energy. The prior existence of a joint Nordic balancing model implies that the transition process to the MARI platform needs be coordinated between the Nordic TSOs.

The Nordic TSOs have agreed a transition process which implies that changes are made to the current Nordic platform which reflects or equals MARI features and operational rules applicable to MARI, to support a swift transition to the European platform and thus the harmonised European balancing market.

Agreed changes include the introduction to the Nordic platform of an Activation Optimisation Function (AOF), which is currently scheduled November 2022, and the introduction of 15-minute market time units (MTUs), currently scheduled May 2023.

From go-live of the AOF, the selection and activation of mFRR energy bids will happen automatically in the Nordic countries. After implementation of the AOF in the Nordic platform, operators at Energinet's control centre no longer have the possibility to manually activate unused mFRR energy bids for special regulation.

From the implementation date of the 15-minute MTU, the time span between activation platform results and sending activation orders to BRPs will be reduced to only 5.5 minutes.

2.3.5.2 MARI platform

Article 20 EB GL establishes the procedure for European TSOs' joint development of a European platform for the exchange of mFRR balancing energy, the Manually Activated Reserves Initiative (the MARI platform). Once established, all EU TSOs are obliged to

- *submit all balancing energy bids from all standard products for mFRR;*
- *exchange all balancing energy bids from all standard products for mFRR, except unavailable bids pursuant to Article 29(14);*
- *strive to fulfil their need for balancing from the frequency restoration reserves with manual activation,*

cf. EBGL article 20(6).

Having applied for a derogation from the deadline for the transition on to MARI set forth in EBGL article 20(6), the Nordic TSOs will replace the Nordic platform with the MARI platform by Q2 2024 at the latest[27]. The Nordic TSOs' derogation request is justified by the initiatives launched to prepare for the transition from trading on the Nordic platform to trading on MARI, as set out in section 2.3.5.1.

[27] Roadmap and projects – nordicbalancingmodel

ENERGINET
Myndighedsenheden

The use and detailed design of MARI is influenced by agreements and legislation, hereunder the All TSOs' Proposal for pricing method for all products developed pursuant to EB GL article 30 (1) [28] and the EB GL proposal on the implementation framework for a European platform[29] (IF) including annexes[30]. Further, it is influenced by decisions adopted by the MARI Steering Committee, i.e. representatives from all EU TSOs, within the applicable legal framework.

Using ACER's draft of a recommendation in 01/2020, the MARI Steering Committee discussed whether, and to what extent, TSOs should be allowed to use MARI for system constraint purposes.

The Steering Committee decided to exclude energy procured to accommodate structural countertrade from being traded on the platform. It is currently being discussed if MARI will be available to accommodate unforeseen incidents, eg. interconnector faults.

It has been agreed by the MARI Steering Committee that the use of MARI for structural countertrade, restrictions and limitations, will be codified in a set of operational rules. Content-wise, it is therefore expected that the Steering Committee's above-mentioned decision(s) will be included in a set of operation rules, and that TSOs are thus excluded, by agreement, from using MARI for structural countertrade.

In practice, the MARI interface will work as follows: First, the TSOs collect bids from the BSPs and estimate their need for mFRR. Bids and needs are then sent to the platform where the AOF matches bids and needs, taking into account available cross-zonal transmission capacities. All mFRR product bids in the common merit order list are activated according to merit order. The AOF result is sent back to the TSOs. Based on the results, the TSOs activate the BSP bids.

Both scheduled activations based on estimated imbalances and direct activations due to unforeseen incidents are done based on bids submitted to MARI and settled at the marginal price of balancing. The MTU in MARI is 15 minutes.

2.3.5.2.1 Challenges of using Danish special regulation after MARI

Once the Nordic TSOs join MARI, the time span from results being received from the AOF to actual activation will be reduced to only 0.5 minutes, and the MTU will be 15 minutes, meaning that the process will take place four times every hour. Already for technical/ practical purposes, it is not possible to execute Danish special regulation in these circumstances.

Danish special regulation means that bids used for upward or downward regulation for countertrade are the surplus bids after balancing bids have been chosen and the balancing price fixed. Thus, bids used for Danish special regulation do not influence the marginal price for balancing (and are settled pay-as-bid above the marginal price).

The original TSO's proposal submitted to ACER to comply with […] included a similar option – ie. an option to allow the harvest of surplus bids after an MTU and settle them pay-as bid. This option was rejected by ACER, underlining that bids submitted to MARI must be activated following the merit order and must be settled at the marginal price.

[28] Microsoft Word - ACER Decision on the Methodology for pricing balancing energy (europa.eu)

[29] All TSOs' proposal for the implementation framework for a European platform for the exchange of balancing energy from frequency restoration reserves with manual activation in accordance with Article 20 of Commission Regulation (EU) 2017/2195 establishing a guideline on electricity balancing of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (entsoe.eu)

[30] Annexes to the DECISION OF THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS No 03-2020 (europa.eu)

ENERGINET
Myndighedsenheden

ACER's decision does not rule out that procurement of countertrade energy takes place on MARI (if activated at the marginal price for balancing). However, such a decision has been taken by the MARI Steering Committee.

As stated in section 2.3.5.2, mFRR bids cannot be withheld etc. for the purpose of use for structural countertrade.

2.4 Environment and climate

In general, thermal power stations have the highest marginal production costs as they use coal, gas or biomass to produce power. By contrast, wind turbines have the lowest marginal production costs as wind does not cost anything.

In big competitive market with many different production types, wind turbines are therefore usually not competitive when it comes to downward regulation, as producers with a marginal cost of production would be willing to pay not to produce (keeping in mind that they would earn the profit between the day-ahead market price and the saved cost of not actually delivering). Also, hydropower is expected to be willing to stop production at a price below the day-ahead price, as that would ensure earnings, while saving the water for days with more attractive power prices (low wind production), thereby reducing the need for thermal power on these days.

However, the limited competition in the Danish countertrade practice has led to high, negative prices, which has made it attractive for wind turbines also to stop production.

	2020	2019	2018	2017
Countertrade (downward) requested from TenneT (GWh)	3.901	1.914	1.598	1.210
Netted with Nordic upward balancing need => netting (GWh)	853	602	484	429
Downward regulated by Danish market participants (GWh)	3.048	1.312	1.114	781
- Reduced production from thermalpower	35%	46%	53%	64%
- Consumption increase by electric boilers	17%	22%	21%	22%
- Reduced production from wind turbines	48%	32%	26%	14%

Figure 7: Share of production type regulated downward in the Danish bidding zones to cover requests for countertrade.

Whether wind turbines produce power or not does not directly affect CO_2 emissions, as wind turbines do not emit CO_2. However, if hydropower stopped instead, then the water could be saved for less windy days, thereby reducing the need for generation based on fossil fuels.

Against that background, it should be examined whether the concentrated market in the current Danish countertrade practice may have resulted in an increase in curtailment of wind to cover the increasing need for downward regulation in DK1 and whether the intraday methodology to procure countertrade energy can reduces the European CO-emissions. This assessed in Annex 3.

2.5 Preliminary conclusion

Due to alterations to the Nordic platform owing to the implementation of AOF, the Danish countertrade practice cannot continue after November 2022. By then, it will no longer be technically possible to activate mFRR bids for Danish special

regulation after the AOF has run. Thus, November 2022 is the deadline for the full implementation of a new methodology for procurement of countertrade energy.

As current countertrade volumes will not decrease in the near future and procuring said volume applying the Danish countertrade practice has become increasingly difficult, the problems must be addressed and solved (or at least reduced) in the new methodology for procurement of countertrade energy.

The problems may be grouped as follows:

- The current market for structural countertrade energy is small; liquidity is a growing concern and prices are increasing, suggesting that more market participation and more competition would be desirable
- Climate and environmental concerns
- Pressure on the control centre has increased, leading to a growing acknowledgement of the fact that measures are necessary to reduce the risk of errors[31].

The methodology for procurement of countertrade energy must also take into account the "new" basis for countertrade which the 70% rule constitutes, which means that

- Most countertrade will be structural in nature, ie. it can be identified well before the operational hour;
- Energinet must be able to receive and handle requests for structural countertrade from all neighbouring TSOs.

3. Legal basis for the countertrade methodology

3.1 Legal basis for the countertrade methodology

3.1.1 EU law

The Lisbon Treaty article 4, 3. reads:

"Pursuant to the principle of sincere cooperation, the Union and the Member States shall, in full mutual respect, assist each other in carrying out tasks which flow from the Treaties.

The Member States shall take any appropriate measure, general or particular, to ensure fulfilment of the obligations arising out of the Treaties or resulting from the acts of the institutions of the Union.

The Member States shall facilitate the achievement of the Union's tasks and refrain from any measure which could jeopardise the attainment of the Union's objectives." [underlines added by Energinet].

Recital (2) of the Electricity Market Regulation reads:

"The Energy Union aims to provide final customers – household and businesses – with safe, secure sustainable, competitive and affordable energy [..]"

Article 2 no. 27 of the Electricity Market Regulation defines countertrade as

[31] As the relief immediately offered by implementation of the AOF in the Nordic Balancing Platform will not become effective since the Nordic Balancing Platform cannot be used for structural countertrade.

"a cross-zonal exchange initiated by system operators between two bidding zones to relieve physical congestion"

It follows from article 16 1-2, 4 and 8 of the Electricity Market Regulation that

"1. Network congestion problems shall be addressed with non-discriminatory market-based solutions which give efficient economic signals to the market participants and transmission system operators involved. Network congestion problems shall be solved by means of non-transaction-based methods, namely methods that do not involve a selection between the contracts of individual market participants. When taking operational measures to ensure that its transmission system remains in the normal state, the transmission system operator shall take into account the effect of those measures on neighbouring control areas and coordinate such measures with other affected transmission system operators as provided for in Regulation (EU) 2015/1222.

2. Transaction curtailment procedures shall be used only in emergency situations, namely where the transmission system operator must act in an expeditious manner and redispatching or countertrading is not possible. Any such procedure shall be applied in a non-discriminatory manner. Except in cases of force majeure, market participants that have been allocated capacity shall be compensated for any such curtailment.

[…]

4. The maximum level of capacity of the interconnections and the transmission networks affected by cross-border capacity shall be made available to market participants complying with the safety standards of secure network operation. Countertrading and redispatch, including cross-border redispatch, shall be used to maximise available capacities to reach the minimum capacity provided for in paragraph 8. A coordinated and non-discriminatory process for cross-border remedial actions shall be applied to enable such maximisation, following the implementation of a redispatching and counter-trading cost-sharing methodology.

[…]

8. Transmission system operators shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. Without prejudice to the application of the derogations under paragraphs 3 and 9 of this Article and to the application of Article 15(2), this paragraph shall be considered to be complied with where the following minimum levels of available capacity for cross-zonal trade are reached:

(a)for borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70% of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009;

(b)for borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross-zonal exchange. The margin shall be 70% of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009.

ENERGINET
Myndighedsenheden

The total amount of 30% can be used for the reliability margins, loop flows and internal flows on each critical network element." [underlines added by Energinet].

Further, it follows from the Electricity Market Regulation article 59, 1. and 1.b) that

"*The Commission is empowered to adopt implementing acts in order to ensure uniform conditions for the implementation of this Regulation by establishing network codes in the following areas:*

[…]

b) capacity-allocation and congestion-management rules implementing Article 6 of Directive (EU) 2019/944 and Article 7 to 10, Articles 13 to 17 and Articles 35 to 37 of this Regulation, including rules on day-ahead, intraday and forward capacity calculation methodologies and processes, grid models, bidding zone configuration, redispatching and countertrading, trading algorithms, single day-ahead and intraday coupling, the firmness of allocated cross-zonal capacity, congestion income distribution, cross-zonal transmission risk hedging, nomination procedures, and capacity allocation and congestion management cost recovery;" [Underlines added by Energinet]

It thus follows explicitly from the Electricity Market Regulation, which is directly applicable in Denmark and which imposes obligations on Energinet as designated Danish TSO, that capacity constraints, including congestion, must be handled by non-discriminatory market-based solutions and must be solved by means of non-transaction-based methods, i.e. methods that do not involve a selection between the contracts of individual market participants.

Further, Energinet shall ensure a maximum level of capacity of the interconnections and the transmission grids affected by cross-border capacity and said capacity must be made available to market participants. Redispatch and countertrade, including cross-border redispatch, must be used to maximise available capacities to reach the minimum capacity (70%).

To enable such maximization, a coordinated and non-discriminatory procedure must be applied. Reference is also made to Article 1 on the subject matter and scope of the Electricity Market Regulation, establishing the aim of the Regulation as setting the basis for an efficient achievement of the objectives of the Energy Union and, in particular, the climate and energy framework for 2030 and fundamental principles for well-functioning integrated electricity markets which allow all resource providers and electricity consumers non-discriminatory market access, empower consumers, ensure competitiveness on the global market as well as demand response etc. and set fair rules for cross-border exchanges in electricity, thus enhancing competition within the internal market for electricity, and facilitate the emergence of a well-functioning and transparent whole-sale market.

The above must be read having in mind the Regulation recital (27), which reads that:

"Uncoordinated curtailments of interconnector capacities increasingly limit the exchange of energy between Member States and have become a serious obstacle to the development of a functioning internal market for electricity […]*"*

ENERGINET
Myndighedsenheden

3.1.2 National law

The legal framework for Energinet's activities, including procurement of energy to countertrade, are established in the Danish Electricity Supply Act § 1:

"1. The purpose of the act is to ensure that the national power supply is organized and carried out considering security of supply, social economy, environment, and consumer protection. Within this framework, the act must ensure consumers access to cheap power and maintain consumers' possibility to influence administration of the values in the power sector.

Subsection 2. In accordance with the aims set forth in section 1, the act must, in particular, promote sustainable energy use, including energy consumption reduction and the use of combined heat and power, renewable energy and environmentally friendly sources, and ensure the efficient use of financial resources, and establish competition on markets for power production and trade, aggregation and energy storage."

The legal basis for procurement of supply for countertrade follows, among other things, from § 27 a:

"Subsection 1. Energinet is responsible for ensuring the established level of security of (power) supply and for monitoring the development thereof.

Subsection 2. When procuring energy and other services to ensure the established level of security of (power) supply, Energinet applies market-based methods, cf. the rules established pursuant to § 27d, subsection 1, 2. sentence. If only one provider can provide the services described in subsection 1, Energinet shall pay the regulated price."

Consequently, the responsibility for security of supply in Denmark rests with Energinet, that, to fulfil that responsibility, procures services for countertrade, including ensuring a steady and secure power system operation. Authority is provided by the Minister of Climate, Energy and Utilities, subject to his supervision, cf. Danish Electricity Supply Act §§ 27a and 51 and the Danish Act on Energinet. Pursuant to the Danish Electricity Supply Act § 51, Minister (Danish Energy Agency) supervises compliance with the Electricity Market Regulation.

Further, pursuant to the Danish Electricity Supply Act § 28, section 2 no. 3, Energinet must, when performing its activities

"cooperate with the other countries' responsible system operators on the establishment of mutual, equal principles for power supply and on tariffs, access and transit, market issues etc., coordinate transmission connections, hereunder the handling of balancing and capacity issues, and enter into necessary joint agreements on system operation, thus ensuring exploitation of the benefits of interconnected systems."

Under the Danish Electricity Supply Act, it is a fundamental requirement that Energinet makes use of transparent, non-discriminatory and market-based solutions when procuring energy to perform its tasks, cf. the Danish Electricity Supply Act § 18, subsection 1, no. 16. The requirement is repeated in the Executive Order on transmission system operation and the use of the power transmission grid etc. § 19, subsection 4.

Further, pursuant to the Danish Electricity Supply Act § 31, subsection 1, Energinet must

"[…] support, when performing its activities, the best possible conditions for competition in the markets for power generation and power trade, cf. § 1 subsection 2".

It thus follows from the Danish Electricity Supply Act that Energinet is committed, in its activities, including when countertrading, to applying the methodology which provides the best possible conditions for competition in the power generation and power trade markets. Based on fundamental principles of competition law, this implies a commitment to ensure access for as many participants as possible, the optimal supply situation, and, thereby, the most intense competitive situation.

This is in line with the considerations listed in § 2, subsection 1 in the Danish Act on Energinet which commits Energinet to include considerations on security of supply, climate, and environment as well as transparency and equal access for all users of the system and efficiency in its operational duties. It is further supported by the legislative material pertaining to the Danish Act on Energinet, which, in excerpt, reads:

"The purpose of this rule is to highlight considerations and requirements which Energinet is committed to consider and balance when performing its activities.

[…]

The provision establishes security of supply as a superior consideration for Energinet, however the provision does not impose specific obligations on Energinet in respect of means to ensure security of supply. Such specific requirements are included in the Danish Electricity Supply Act and the Danish Natural Gas Supply Act.

The provision further implies that Energinet in general includes considerations on climate and environment in its administration. Energinet shall include its climate footprint in its general considerations. Thus, to the extent possible, operation and expansion of the energy infrastructure must be based on climate friendly technologies. Likewise, Energinet shall be committed to focus on the effects in respect of the climate objectives, also when performing other activities.

[…]

As a fundamental consideration, Energinet shall also ensure efficiency in its administration. Efficiency means a cost-efficient administration as well as socio-economic performance of its tasks.

It follows from this, that Energinet shall balance the numerous considerations included in the Danish Electricity Supply Act and the Danish Act on Energinet as well as EU-legislation when performing its tasks, which include procurement of services to enable countertrade; Also, Energinet shall be committed, in general, to aiming to accommodate the climate objectives.

3.1.3 Relevant considerations in respect of the methodology for countertrade

As established in the above section, Energinet, in its role as Danish TSO, is committed to ensure the level of security of supply set by the Minister, cf. the Danish Electricity Supply Act § 27a and the Danish Act on Energinet § 2, subsection 1.

If more options are available to procure the energy needed for countertrade, Energinet shall base its choice between them on the application and balancing of the other considerations mentioned above.

ENERGINET
Myndighedsenheden

To that end, it must be noted that establishing competition, and one which extends beyond national borders within the EU, is a profound requirement under EU legislation. This also applies to countertrade as mentioned in the Electricity Market Regulation. Thus, if more methodologies are equally appropriate in terms of security of supply, Energinet shall be committed to ensuring that the competitive situation, offered by the respective possible methodologies, is taken into consideration. Energinet must support the solution which, without prejudice to the outcome of the other relevant considerations, provides all relevant resource providers, with non-discriminatory access to participate. Finally, Energinet must promote cross-border competition, cf. also the Danish Electricity Supply Act § 31.

Further, the Danish Electricity Supply Act seems to presuppose that competition considerations further demand socio-economic efficiency. That would be in line with general competition principles. Socio-economic efficiency is thus also a consideration when selecting a new countertrade methodology.

Competition and well-functioning markets shall benefit final consumers' energy price.

Finally, the recent re-wording of §1 in the Danish Act on Energinet commits Energinet to consider climate in its task performance; thus, climate must also be taken into consideration when deciding on a new methodology for countertrade.

4. The intraday methodology

4.1 Scope of the intraday methodology

The intraday methodology established in the current section 4 is transparent, simple, and yet has a flexible design. It covers Energinet's procurement of energy for both structural and unexpected countertrade and establishes what countertrade energy is subject to procurement in the intraday market and what may be handled as imbalances. Further, it outlines the details on procurement of countertrade energy in intraday.

As it appears from the above section 2, the introduction of TSOs' commitment to procure countertrade energy which is structural by nature (and the significant volume thereof) has had vital impact on the design of the methodology. It is exactly the structural countertrade portfolio which makes the intraday timeframe an obvious basis for the procurement of countertrade energy. However, the time of communication to Energinet of a countertrade request (or a countertrade need) will impact Energinet's handling of the request as illustrated in the below table.

	Structural	Unexpected
Countertrade needs arising later than half an hour before window 2 (**cannot be handled in intraday under the methodology**).	~~If TSOs, for example due to their planning process, request countertrade later than half an hour before intraday GCT.~~	~~- Interconnector trips less than half an hour before intraday GCT~~ ~~- internal Critical Network Element (CNE) trip less than half an hour before intraday GCT~~
Countertrade needs arising after day-ahead closure or at least half an hour before window 2	Tennet Commitment & 70% rule	- Interconnector trips more than half an hour before intraday GCT - Internal CNE trip more than half an hour before intraday GCT

(can be handled in intraday under the methodology).		- Countertrade which the other party could not countertrade and must thus be reversed after the windows.

Figure 8: The scope of the intraday methodology is limited to countertrade needs which can be traded within the intraday time frame.

The methodology bases on procurement in the intraday timeframe. However, it is still necessary to use balancing for the procurement of countertrade energy in some situations of unexpected countertrade, eg.

- trips on interconnectors or internal CNECs; where the need for countertrade energy meed be handled as an imbalance for the frist couple of hours after the trip, and
- circumstances when a neighbour TSO or Energinet has been unable to procure the agreed volume of countertrade energy on its' side of the border.

4.2 The intraday market and SIDC

The cross-zonal European intraday market is a common, implicit cross-zonal capacity allocation mechanism. It allows bids entered by market participants to be matched continuously on one bidding zone border with bids submitted in any other bidding zone to the extent transmission capacity is available (continuous trading) in the intraday market. Bids are settled pay-as-bid.

In the single intraday coupling (SIDC) design, bids/offers already placed in the system will be settled at the entered price when matched with a more attractive counterbid/counteroffer placed in SIDC afterwards. This dynamic ensures that, if a stack of bids/offers are already available when Energinet places a bid in the market, then the price of the bid entered first will be the matching price.

Energinet expects a stack of counterbids/counteroffers to be ready when Energinet starts to trade. These counterbids/counteroffers will compete with each other to ensure that they are matched with Energinet's countertrade volume. As bids/offers will be settled at the bid/offer price first entered in SIDC when matched with a more attractive bid/offer.

Another SIDC mechanism is that every single time a trade is done in one direction on an interconnector, capacity equal to the size of the trade performed will be released in the opposite direction. For example, if an interconnector has 300 MW southbound and 2000 MW northbound in the intraday market and a 200 MW trade is made southbound, then capacity on the interconnector is instantly updated to 100 MW southbound and 2200 MW northbound.

4.3 Detailed description of the methodology

The current section 4.3 describes the intraday methodology in chronological order, from a TSO's request for countertrade is received by Energinet, to trading in intraday and finally ending with the settlement.

The description is made of the intraday methodology as it will be implemented to begin with. Please note that:

- trading structural countertrade in windows (section 4.3.1) is a temporary solution, and will be replaced by intraday-auctions, as set out in detail in section 4.6.1;
- capacity submission to SDIC, as described in section 4.3.1.2, only implies difficulties in respect of structural countertrade during the period of time when the temporary solution applies. After the transition to intraday auctions, its scope is only relevant for unexpected countertrade;
- the procedure described in this section 4.3 applies also to Energinet's own countertrade needs, ie. to the up-and downward regulation Energinet must carry out on the Danish side of the border when requesting countertrade from another TSO. Except if otherwise explicitly set forth, the procedure in this section shall be read mutatis mutandis to describe Energinet's procurement of countertrade energy for its own need.

4.3.1 Methodology design basics

Energinet shall use continuous trading only to procure energy for unexpected countertrade.
Energy for structural countertrade shall be traded in two predefined timeslots, "windows", thus creating an auction like set-up:

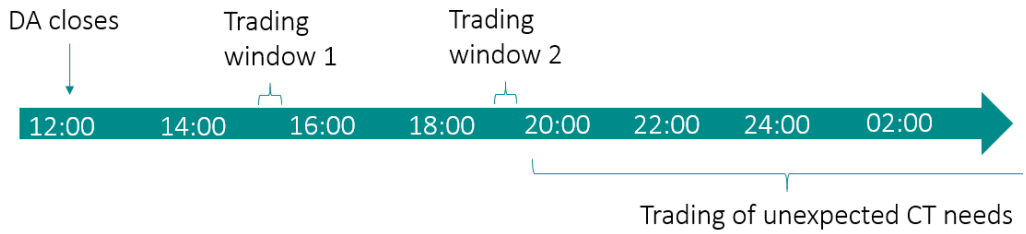

Figure 9 illustration of how structural countertrade will be performed in day-ahead (D+1), and how unexpected countertrade needs can also be covered on the day until half an hour before intraday GCT

All bids will be hourly bids.

The windows are:

Window 1: 15:02 – 15:30 p.m.
Window 2: 18:02-18.30 p.m.

In principle, it would be possible to trade all countertrade energy continuously from closure of the day-ahead market and until half an hour before intraday GTC. However, as explained in detail in the sections below, TSOs need to perform manual processes following any MTU in which it has procured energy for countertrade purposes (updating volumes to SDIC and updating schedules). Being, in Energinet's assessment, very difficult to handle operationally and more cumbersome than the added value warrants, a design choice has been made to trade structural countertrade energy in windows, and not as continuous trading.

The timing of windows reflects the release of cross-border capacity, which takes place at 15:00 p.m. on the Nordic borders and at 18:00 p.m. on all borders on the continent.

Submission to SIDC at 15:02 p.m. and 18:02 p.m, respectively, will ensure that cross-border capacity is available on SIDC when Energinet enters the market, even if cross-border capacity allocation on a border has been slightly delayed[32].

The intention is, in respect of structural countertrade, to create an auction-like set-up, where a stack of bids/offers are already available when the trading windows open to match instantly Energinet's bids. Publication of volumes and prices support this view.

Energinet's procurement of unexpected countertrade energy shall be handled as continuous trading in intraday as soon as practically possible. Until then, it shall be handled as a system imbalance. The deadline for TSOs' agreement on volumes, the same as the deadline for requesting countertrade volumes as detailed in the sections below, will be treated as an imbalance during the first couple of hours following a countertrade- relevant trip.

4.3.1.1 Netting

Energinet shall not net up- and downward requests for countertrade before submitting bids to SIDC. Countertrade requested for upward and downward regulation, respectively, shall be procured separately.

Thus, if Energinet receives a request from TenneT for downward regulation in DK1 and a request from Statnett for upward regulation in DK1, respectively, for the same hour, both requests will be sold and bought in the intraday market in the same hour.

However, Energinet shall monitor market dynamics in these cases, and if all bids are cleared in the market, resulting in a match with between Energinet's own bidding and asking prices, Energinet may change the timing so that bid and offer prices are submitted, for example, 5 minutes apart, allowing market participants sufficient time to submit and shift bids/offers before Energinet enters the market again.

4.3.1.2 Capacity submission to SIDC

Before buying or selling countertrade energy in SIDC, adjustments to the capacity submitted to SIDC on an interconnector must be submitted to SIDC by the appointed[33] TSO or Regional Security Centre on specific interconnectors, to ensure that the impact of the countertrade is not diminished by the release of capacity in the opposite direction, as described in section 4.2.

The submission of capacities to SIDC after day ahead market closure is handled differently on Danish borders[34]. However, there is currently no procedure in place to adjust the capacities submitted to SIDC following an intraday countertrade on Danish borders, except on DK1-DE/LU.

On DK1-DE/LU, a procedure is already in place when Tennet (Germany) requests for countertrade, and Energinet shall follow the procedure set forth here:

[32] To Energinet's current understanding, Statnett also expects to trade their countertrade volumes in intraday at this time, likely creating synergy with increased liquidity

[33] Appointed TSO means the TSO which is responsible for sending the calculated NTC and AAC to SIDC on each border

[34] The Nordic Operational Information System, NOIS, submits capacity to SIDC on all Nordic borders; Energinet submits capacities for DK2-DE; whereas TenneT (Germany) and TenneT (Netherlands), respectively, submit capacity to SIDC on DK1-DE/LU and DK1-NL. This implies that if Energinet adjusts the NTC on DK1-DE/LU or DK1-NL, coordination towards TenneT (Germany) and TenneT (Netherlands), respectively, is required, as the said TSOs must manually update the capacities submitted to SIDC. If Energinet updates NTC on DK2-DE no further coordination is needed, as Energinet already has capacities from 50Hertz.

TenneT allocates a reduced NTC due to the countertrade to the intraday market. If NTC in day-ahead is fully utilised in the day-ahead market flow direction, SIDC then calculates negative ATC by subtracting the already allocated capacity (AAC_{DA}). This only allows trade in the opposite direction of the day-ahead flow. The set-up in SIDC only allows market participants to see zero ATC in the system, even if calculated capacity is negative.

Normally (without countertrade) and if all capacity in the day-ahead flow direction has been utilised, the NTC allocated to the intraday market will equal the NTC in day-ahead, and SIDC will calculate zero ATC for intraday when subtracting AAC from day-ahead. Zero ATC is therefore applied in the intraday market in the market flow direction, which likewise only allows trades in the opposite direction of the day-ahead flow.

Example: NTC and ATC without countertrade
Day-ahead: Energinet allocates NTC = 1500 MW to day-ahead, and 1000 MW is traded which results in an AAC of 1000 MW
Intraday: Energinet allocates 1500 MW NTC_{ID} to SIDC, and SIDC calculates (1500 MW-1000 MW) = 500 MW ATC_{ID} which is allocated to the intraday market in the market flow direction.
* Note that 2500 MW (1500+1000 MW) will be released to the intraday market in the opposite direction of the market flow.

Example: NTC and ATC with countertrade
Day-ahead: Energinet allocates NTC = 1500 MW to day-ahead, and 1000 MW is traded which results in an AAC of 1000 MW.
Countertrade: 800 MW countertrade is requested to reduce flow in the market flow direction.
Intraday: Requesting TSO allocates 1500 MW – 800 MW = 700 MW NTC_{ID} to SIDC, and SIDC calculates (700 MW-1000 MW) = - 300 MW ATC_{ID} to the intraday market in the market flow direction.
* Note that 2500 MW (1500+1000 MW) will still be made available to the intraday market in the opposite direction of the market flow.

The difference between a negative ATC and zero ATC is that intraday trades in the opposite direction of the day-ahead flow will, when ATC is zero, trigger the release of capacity in the direction of the day-ahead flow, whereas negative ATC will not, until trades in the opposite direction of the day-ahead flow exceed the negative ATC.

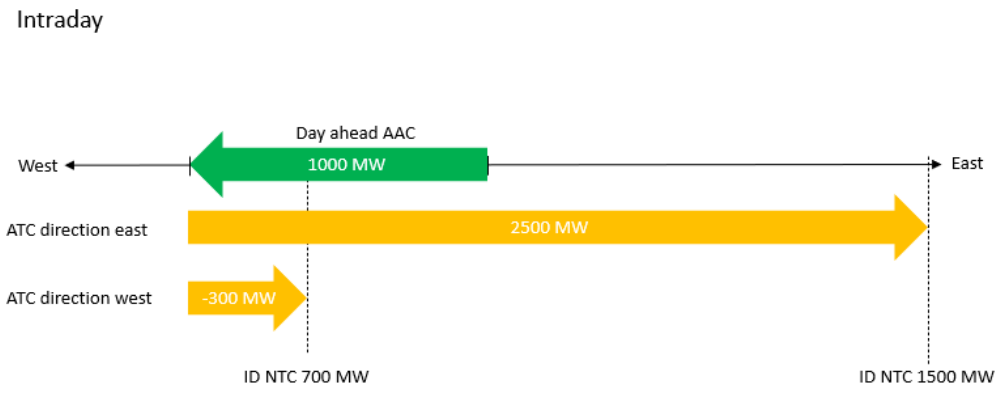

Figure 10: SIDC will calculate a negative available transfer capacity (ATC) in the intraday market of -300 MW, when net transfer capacity given to intraday (ID NTC) is adjusted to 700 MW.

The current approach described above to allocating capacity to the intraday market in case of countertrade results in a negative ATC which is not visible to the market, and it also prevents new capacity from being released to the intraday market if trades against the market flow direction have been done in the market after the countertrade has been done.

In the long run, after the transition to intraday auctions (in respect of structural countertrade), the above-mentioned mechanism to adjust capacity before submitting to SIDC will only be relevant in respect of unexpected countertrade.

Energinet has initiated discussions with Nordic TSOs and TenneT to implement an approach which will enable this re-release of capacity to the intraday market. Ideally, this approach will be the same on all of Energinet's borders, but this depends on agreements with neighbouring TSOs. Solutions to ensure the best procedure to adjust the capacities submitted to SIDC following an intraday countertrade on Danish border must be worked out border by border, cf. section 4.6.3.

4.3.2 Procedure for handling requests for countertrade

4.3.2.1 Countertrade requests from neighbour TSOs

Once the day-ahead market closes at 12:00 p.m. on the day ahead, the need for structural countertrade can be assessed. If countertrade is required, it can be requested from neighbouring TSOs on the relevant borders.

A requesting TSO must request structural countertrade no later than half an hour in advance of a trading window (to allow for coordination and validation of the countertrade volumes before publishing, as detailed in the following sections).

Subject to the choice of the requesting TSO, unmatched volumes in the first trading window may be transferred to the next trading window. A requesting TSOs may also, in its own discretion, chose to countertrade part of its need in the first window and the remaining need in the second. It is up to the requesting TSO to decide on the volumes requested in each window.

Energinet will withdraw unmatched bids after window 2 from the market and inform the requesting TSO that the volumes could not be traded. The requesting TSOs must then reduce the countertrade (on its own side) and take operational measures to ensure operation within security limits.

Unexpected countertrade must be agreed upon between the two involved TSOs at least half an hour before intraday GCT.

4.3.2.2 Accept of countertrade volumes

Following the request for countertrade, the requesting TSO shall update schedules to the market tool. Energinet uses the updated schedules to confirm the requested countertrade volumes.

Energinet's accept of a countertrade request implies confirmation to the requesting TSO that Energinet shall place a bid for the said amount of energy in the market in accordance with the request. Prior to confirmation, Energinet shall check that system security does not require rejection of the countertrade request.

Energinet´s accept and confirmation of a countertrade request does not guarantee that the requested energy volumes are, in effect, traded. This is only ensured if, and when, the bid placed by Energinet is matched.

4.3.2.3 Publication of volumes and bid prices

After confirmation to the requesting TSO as described in section 4.3.2.2, volumes and bid prices shall be published to notify market participants. Volumes and bid prices shall be published at least 10 minutes before trading is initiated, ie. at least 10 minutes before Energinet's submission of bids to SIDC.

Further, in events of unexpected countertrade, the TSO operating the interconnector will publish an Urgent Market Message (UMM) to inform the market of the volumes and bid price(s) which will be countertraded at a certain hour on SIDC for all following hours.

When Energinet requests countertrade from neighbour TSOs, unless otherwise required by the circumstances, Energinet will request the full forecasted need for countertrade, as the planning tool in Energinet is relatively accurate.

4.3.2.4 Pricing

4.3.2.4.1 Requesting TSO

The requesting TSO determines the bid/offer price. Bid/offer prices may differ from day to day and from hour to hour.

The requesting TSO is responsible for setting a sufficiently attractive bid/offer price to ensure that the volumes are traded.

4.3.2.4.2 Energinet requesting (own countertrade needs)

Likewise, Energinet determines, bid/offer prices in respect of its own countertrade volumes.

In general, Energinet shall set a sufficiently attractive offer/bid price to ensure that a match is very likely to happen, while still ensuring that the price is not excessively attractive, as there may be cases where liquidity is scarce, and energy will be settled at Energinet's bid/offer price. However, submitting "the right" bid price implies a continuous monitoring of the market and justifies a flexible approach to pricing.

Energinet's initial starting point for the bid/offer price, by the time of implementation of the methodology, shall be to procure energy at a price which covers trades in the intraday market in 99.9% of all hours of the previous three years. This means that if Energinet needs downward regulation and offers to sell energy in SIDC at this calculated price, there is a 99.9% probability that the countertrade will be matched (if prices are identical to the average of the past three years). Likewise, if Energinet needs upward regulation, the purchase price of energy would result in a match 99.9% of the time.

As all bids/offers already placed in SIDC will be settled at the first entered price when matched with a more attractive counterbid/counteroffer placed in SIDC subsequently, Energinet expects competition to ensure a competitive intraday price, even though Energinet enters with a price that is generally more attractive than the market level on the specific day.

4.3.3 Examples

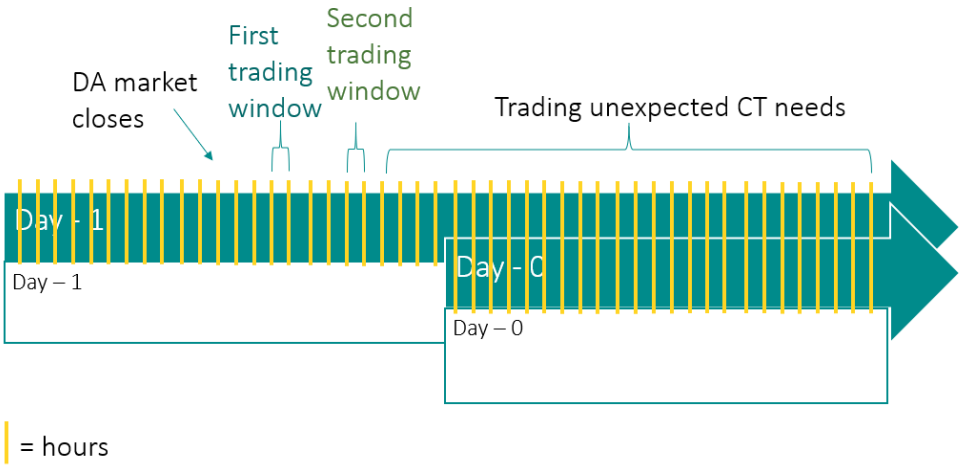

Figure 11: Overview of trading times for structural and unexpected countertrade

Example 1 (structural countertrade):
At 14:30 p.m. the day before delivery (D-1), TenneT requests Energinet for 1000 MW of countertrade for all 24 hours of the next day (D). Volumes are published by Energinet right after they are requested and validated at least 10 minutes before the first window.
Not all bids were matched during the first trading window (D-1), and the unmatched 500 MW in the hours 15:00 p.m. (D-1) to 15:00 p.m. on the delivery day (D) are therefore transferred to the second window and published shortly after the first window closes.
Further updates to the requested countertrade volumes can be made by requesting TSO and will be published at least 10 minutes before the second window opens.
All countertrade volumes were sold in the second window except for 500 MW in the hour 9-10.00 a.m. Energinet informs Tennet that all but one hour of the requested countertrade had been successfully traded.
TenneT must then reduce the countertrade by 500MW for the specific hour and take operational measures to ensure operation within security limits (eg. curtailment of German wind).

Example 2 (unexpected countertrade):
At 15:56 p.m., Skagerrak trips.
The first 2-3 hours (subject to an individual assessment by the control centres on each side of the interconnector) after the trip (approximately 15:56 -17:00 p.m. within the current day) Energinet will handle as imbalances. However, if it takes two days to restore the interconnector, the full volume sold in all hours in both the day-ahead and intraday markets as of 17:00 p.m. on the current day (D) and until the end of the next day (D+1) will be published by Energinet and then traded on SIDC for all relevant hours. The day after tomorrow will be handled by limiting the interconnector capacity allocated to the day-ahead market to zero by both TSOs, and therefore no countertrade is needed.

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4.3.3.1 Update of schedules

The update of schedules (also called TSO-TSO trade or ASP (Agreed Supportive Power)), is a separate schedule between the TSOs that is aggregated with the commercial schedules, thereby ensuring that the flow on the border remains within the physical limits. Changes to the schedule leads to imbalances on each side of an interconnector, which will be handled by placing sales or purchase bids in the intraday market in the Danish bidding zones (DK1 and DK2).

The update of schedules can be done from up to 32 hours (for the last hour next day) until half an hour before the operational hour, and corrections can be done within the hour.

Energinet expects to update the schedules after countertrade volumes have been purchased/sold in SIDC, as countertrade is fixed at that time. In practice this would be after window 1, window 2, or after trading unexpected countertrade. However, this may be subject to adjustments as it must be coordinated with the requesting TSO.

SIDC and market participants do not have access to schedules. Schedules are an operating tool, to forecast the balance of the system.

4.3.4 SIDC out of operation

If SIDC, for maintenance reasons or due to fault, is out of operation for a short period during the two defined trading windows, Energinet and requesting TSO can agree on a specific time when countertrade will be done after the windows (much like unexpected countertrade). This will only be possible in the agreed period and all hours must then be traded within that period. Countertrade outside the two windows will always be published by Energinet as an UMM, and the exact timing, countertrade volumes, and prices will be published.

An example:

A UMM was published by the NEMOs (Nominated Electricity Market Operators), stating that the SIDC systems would be out of operation for maintenance on 28 April from 08:00 a.m. to 18:30 p.m. CEST at the latest, and that the option to do any intraday cross-border trading would be unavailable.

In this case, Energinet would agree with the requesting TSO whether the purchase of countertrade energy is to be performed in the trading windows without cross border capacity, which limits the market participation to danish participants, or whether the volumes for the relevant hours should rather be traded at an agreed time when cross-border trading reopens.

If SIDC is completely out of operation for, for example, 24 hours, Energinet will have to reject countertrade requests as volumes cannot be traded on SIDC.
If only cross-border trading on SIDC is closed, then Energinet can offer to trade the requested countertrade volumes in the relevant Danish bidding zone (BZ), much like it is done today, just within the intraday time frame.

Energinet will handle unexpected countertrade as an imbalance if this cannot be traded before the balancing time frame, whereas structural countertrade (in normal circumstances) cannot be justified to be handled as an imbalance.

An UMM shall be published in case of changes to the volume or timing of any countertrade.

4.4 Costs of intraday trading

Costs of trading in intraday shall be paid by the requesting TSO in respect of structural countertrade, except if administrative costs by the NEMO are smaller than Energinet's administrative burden of splitting costs between TSOs.

In case of unexpected countertrade (trip of an interconnector), the current practice of splitting the costs for upward and downward regulation on either side of the border will continue.

4.5 Implementation of the methodology

As explained in section 2.3.5.1, the AOF is scheduled to go into parallel operation on the Nordic platform in November 2022. The intraday methodology for procurement of countertrade energy needs to be fully implemented by the time AOF goes into parallel operation.

To ensure that liquidity in the intraday market is built up to match Energinet's countertrade volumes, a gradual transition to procurement of countertrade energy in intraday will start August 2022. Countertrade volumes traded in intraday will gradually increase until November 2022, when all countertrade volumes will be traded in the intraday market.

4.6 Adjustments to the intraday methodology

4.6.1 Intraday auctions

ACERs Decision on Algorithm - Annex III – ID requirements[35] establishes January 2023 as deadline for implementation of intraday auctions.

When intraday auctions become a reality, trading in windows as set out in section 4.3.1 shall be replaced with intraday auctions taking place at

- 15:00 p.m. day-ahead (D-1), and
- 22:00 p.m. day-ahead (D-1) and
- 10:00 a.m. within day (D-0).

The first two auctions are open for bids for the entire delivery day, whereas the auction on the day of operation is open for the first hours of the operation day.

The continuous intraday market will still be available when intraday auctions are implemented. However, the continuous market will close shortly before and open again shortly after each intraday auction, eg. it will be closed between 21:45 p.m. and 22:15 p.m. to accommodate the auction at 22:00 p.m. day ahead.

There are several key advantages to intraday auctions. One is the addition of marginal pricing to the intraday time frame (which should reduce the incentive to bid strategically, thereby increasing socio-economic gain). Moreover, by using intraday auctions, Energinet avoids further complicating the electricity market by having both countertrade windows and intraday auctions. Also, energy traded on the continuous intraday market does not generate congestion income, whereas intraday actions do. Finally, since intraday auctions will not take place in SIDC but rather as a re-run of

[35] Annexes to the DECISION OF THE AGENCY FOR THE COOPERATION OF ENERGY REGULATORS No 04-2020 (europa.eu)

Euphemia with negative ATC, this will lead to an adjustment of the flow on the border without a TSO-TSO trade and trade on SIDC.

On this basis, Energinet expects intraday auctions to become the permanent foundation in the methodology. However, this review is associated with significant uncertainty as the details of the intraday auctions are still under development. Intraday auctions are planned to go live in January 2023.

Provided that the final design of intraday auctions gives the advantages set out in the above section, Energinet may replace trading in windows with trading in intraday auctions. The transition from trading in windows to intraday auctions may be implemented stepwise, subject to prior communication on the details of the set-up and the transition phase to the market.

4.6.2 Adjustments re. bid prices, trading in windows, netting etc.

Energinet shall perform an annual assessment to monitor the market response to the intraday methodology and shall evaluate the intraday methodology in case of lack of liquidity, significant market changes and/or a general, noticeable increase in prices whenever Energinet trades, and in the unlikely event of persistent market manipulation (annex 2).

This pertains in particular to Energinet's commitment to publish in advance bid prices for countertrade energy cf. 4.3.2.3 and Energinet's commitment to trade (only) structural countertrade in the trading windows 4.3.1 and netting 4.3.1.1.

4.6.3 Improvements of mechanism for capacity submission to SIDC

There are currently no procedures in place to adjust the capacities submitted to SIDC following an intraday countertrade on Danish borders, except on DK1-DE/LU. Energinet will pursue agreements in this respect. Dialogue with the Nordic TSOs have already been initiated.

In respect of DK1-DE/LU, as stated in section 4.3.1.2, Energinet does not find that the current solution on the border is ideal as it results in a calculated negative ATC in the direction of the day-ahead flow, while the market participants only see zero ATC in the SIDC system. Further to this, the negative ATC prevents new capacity from being re-released, in case of trades in the opposite direction of the day-ahead flow.

If agreement can be made with neighbor TSOs regarding the Danish borders, Energinet shall apply the following approach:

Before procuring energy in the intraday market, the TSOs on the relevant border will adjust the capacity given to SIDC to account for countertrade.

Capacities adjusted before cross-zonal Gate Opening Time (GOT) can be achieved by submitting an AAC and a net transfer capacity (NTC) that accounts for countertrade, resulting in zero available transfer capacity in the day-ahead market flow direction. This is relevant possible prior to the first trading window at 15.02 p.m.
As regards the second trading window, or in case of unexpected countertrade, this is after cross zonal intraday GOT, and the market must therefore be closed on the specific border (eg. by using the technical mechanism in SIDC: Contract

Halt or Service Halt) when sending in the adjusted capacities. This is necessary as the update of AAC before the NTC can lead to the re-release of capacity, diminishing the effect of the countertrade.

As the market must be closed on the specific border when adjusting the capacities to SIDC, Energinet does not currently find that be justified to countertrade in every MTU in the continuous intraday market as that would limit the market significantly. However, the limiting effect on the market will be quite small, if the market is only closed for a short time period prior to the second window (especially since these trading windows will be replaced with intraday auctions when implemented), and also on the rare occasions when unexpected countertrade is needed. When an interconnector trips and unexpected countertrade is needed, it should be remembered that the physical flow will have to be reduced to zero anyway, meaning that closing the market in both directions (using Contract halt) on the specific interconnector does not limit the market more than necessary.

Below is an example of how the model would work:

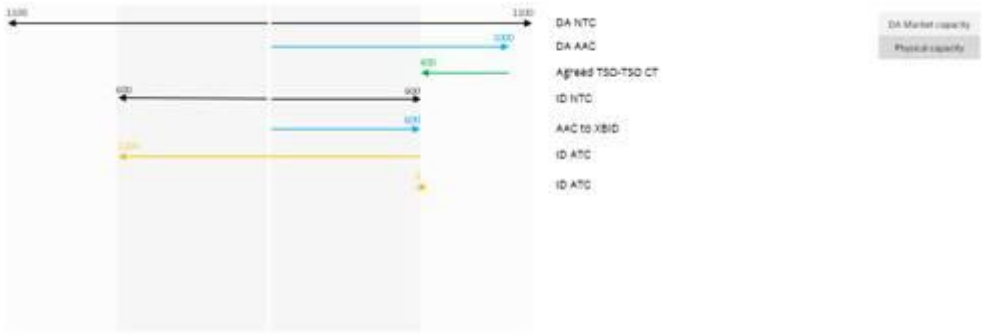

Figure 9: Illustration of the adjustments to the ATC needed in SIDC to take countertrade into account.

In the example, AAC sent to SIDC is 600 MW & net transfer capacity (NTC) sent to SIDC is 600 MW - taking physical capacity and countertrade into account. The result is that available transfer capacity (ATC) calculated in SIDC is 0 MW in the day-ahead market flow direction, and 1200 MW in the opposite direction. This ensures that if trades in the opposite direction of the market flow is performed in the intraday market after countertrade has been performed, then new capacity equaling the volume of the trade will be re-released in the intraday market.

Energinet is open to other, better suggestions from neighboring TSOs. In the event agreements are made with the other TSOs which deviate from the above approach, the intraday methodology will be supplemented accordingly.

4.6.4 ACER's proposal to revise CACM

If the revised CACM establishes that 70% minimum capacity applies to the intraday time frame, Energinet will re-evaluate the methodology.

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5. Assessment of the methodology

5.1 Available options in the balancing time frame

As set out in section 2.3.5.2, the transition to MARI is obligatory. The Nordic platform is discontinued when the Nordic TSOs go live on MARI. The MARI Steering Committee has decided that structural countertrade is not permitted on MARI.

Due to the early implementation of the MARI requirements with alterations to the Nordic platform, using Danish special regulation for structural countertrade is technically/practically not possible after November 2022.

There are no mFRR-based/balancing time frame-based methodologies/ tools already available which comply with the regulation and deadline.

At an early stage of the process, it was considered and discussed whether a specific Nordic market for countertrade procurement could be established (the "Nordic TSO-TSO CT model"). Energinet chose not to pursue the Nordic TSO-TSO model, however, for several reasons.

First, the other Nordic TSOs did not express commitment to set up such a market (as was the case in 2017). To Energinet's current understanding, Statnett is working towards implementing an intraday solution and finds that countertrade close to the delivery hour represents an unnecessary operational risk, whereas Svenska kraftnät has not taken a public stand on its preferred model at this stage. The position of Fingrid is that structural countertrade is not necessary on their borders, but they are looking into the possibility of using the intraday market when unexpected countertrade is needed.

In these circumstances and considering the deadline for implementation of a new countertrade methodology (including the uncertainties pertaining to content of agreements between TSOs, necessary IT development etc.), Energinet assessed it would not be prudent to pursue the development of an entirely new (Nordic) market at that time.

Further, it was assessed that the Nordic TSO-TSO CT model would not offer better solutions to the challenges in Danish countertrade practice than an intraday-based solution, nor provide a better competitive basis.

5.2 Procurement in intraday

Procuring structural countertrade energy in the existing intraday market can be implement as per November 2022. The below analysis shows the intraday methodology remedies the challenges experienced in the current Danish countertrade practice and, further, that it complies with regulatory requirements.

5.3 Introductory remarks to the assessment

When comparing the summary in section 2.5 on challenges in the Danish countertrade practice to the legal requirements and considerations pertaining to an intraday methodology for the procurement of countertrade energy as set forth in section 3.1.3, there is resemblance. Choice has been made to present the assessment following the legal requirements. An assessment of the methodology's ability to handle the issues in the current Danish countertrade practice are made in the relevant sections.

A meaningful assessment of the methodology's compliance with legal requirements and considerations and requires, for the most part, comparison. However, as concluded in section 5.1, there are currently no alternatives to an intraday-based methodology available, giving no relevant basis to compare to. For that reason, and when required to assess meaningfully a legal requirement or consideration, the current Danish countertrade practice is used as basis for comparison.

Legal requirements and considerations revolving around competition have been split into subsections to support overview.

5.4 Security of supply and system operation

Ensuring security of supply and system security are superior considerations. As established in section 2.3.12.3.1.1, it has previously been found that when liquidity in Danish countertrade practice is insufficient to cover Energinet's need for balancing energy as well as countertrade energy, the general principle of proportionality entails that balancing needs are met first and foremost.

As set out in section 2.3.1.1, liquidity in the current Danish countertrade practice is a general concern. Even if the priority in circumstances of shortage of bids is clear, the general situation cannot be disregarded. Thus, the fundamental treaty obligation under article 4, 3. to (i) take any appropriate measure, general or particular, to ensure the fulfilment of the acts of the institution of the Union, and (ii) to refrain from any measure which could jeopardize the attainment of the Union's objectives, implies that Energinet, in situations as the current, shall be committed to search for alternatives to ensure that it reduces the risk of having to reject requests for countertrade, if an alternative way to procure the energy is available.

To that end, the intraday methodology seems to offer a more appropriate solution. In practice, it gives Energinet access to the procurement of countertrade energy in the European cross-border intraday market. This implies that more market participants have access to procurement of countertrade energy. Further, the intraday methodology allows Energinet to pertain to structural countertrade needs at an earlier point in time, leaving more time to procure the necessary volumes.

In terms of addressing the concerns described in section 2.3.1.2 (risk of errors in the control centre when manually procuring countertrade energy in the balancing time frame), the intraday methodology addresses and remedies the current situations already because the procurement of countertrade energy is made well in advance of the operational hour.

That being said, Energinet has considered, prior to deciding the detailed design of the methodology, a number of ways to organize the practical set-up of the procurement of countertrade energy on intraday. The chosen solution(s) in this respect include and balance more considerations than merely the situation in the control centre, at set out in the following sections.

5.5 Market-based, non-discriminatory and transparent solution

The Electricity Market Regulation and the Danish Electricity Supply Act both state as fundamental requirement for the procurement of countertrade energy that it must be market-based and non-discriminatory.

The procurement of countertrade energy in the intraday methodology will take place on the already existing cross-border intraday market, and thus complies with the requirement to be market based. The market is well established and accessible for all market participants on non-discriminatory terms.

The Danish Electricity Supply Act requires transparency in addition to market-based ad non-discriminatory solutions. The requirement for transparency seems to have two implications.

First, it refers to the functioning of the market in which the procurement of countertrade energy takes place. In this sense, it is seen as supplementary to the other two conditions and underlines that it is not sufficient in itself that a market-based and non-discriminatory solution; it is further required that the rules pertaining to market access and the way the market functions are transparent, to ensure, in effect, equal access and possibilities not only for participants already involved on the market, but also for those who would consider entering. The intra-day market complies with this legal requirement.

The second implication of the transparency requirement pertains to Energinet's trade. As established in section 4.3, the intraday methodology provides full transparency, in advance, of bid prices, volumes and trading times, and netting does not take place.

5.6 Socio-economic efficiency

The Electricity Market Regulation requires explicitly that network congestion problems be addressed with solutions with give efficient economic signals to the market participants and the transmission system operators. This implies, in Energinet's assessment, that the intraday methodology should result in the lowest possible socio-economic costs based on a competitive price setting, and that this should be reflected in the price of the countertrade energy which is to be paid by the requesting TSO.

The Danish Act on Energinet also requires Energinet to include socio-economic efficiency considerations in its task performance.

On this basis, Energinet has made a qualitative assessment of the efficiency of the intraday methodology and Danish countertrade practice in general and a quantitative assessment of the impact of countertrade on DK1-DE/LU in 2020.

5.6.1 Qualitative assessment

From a qualitative perspective, two parameters are central to the socio-economic costs associated with the choice of countertrade methodology[36].

1. Market coupling (more market coupling increases efficiency)
2. Prequalification requirements (prequalification reduces efficiency)

The Danish countertrade practice and the intraday methodology score differently on these drivers as shown in the below in Table 1.

[36] Energinet has disregarded the availability of reserve bids since these bids generally have the lowest opportunity costs of providing reserves, implying that it is unlikely that these bids would be activated for countertrade purposes and there is therefore a very low socio-economic effect of reserve bids in relation to countertrade. Also, the effects of the applied pricing principle in different markets are ignored, where, in particular, the open order book in the continuous intraday market implies that the risk of inefficiency due to the pay-as-bid principle is significantly reduced. Also, the expected pay-as-cleared principle in intraday auctions implies that efficiency concerns in relation to the methodology due to pay-as-bid settlement would be greatly reduced by the introduction of intraday auctions.

	Intraday -based methodology	Danish special regulation
Prequalification requirements	No	Yes
Market coupling	High[37]	Low

Table 1 – Efficiency drivers with respect to the countertrade methodology.

All else being equal, prequalification requirements for systematic countertrade known well in advance of the operational hour will have a negative efficiency effect. Based on this, the intraday methodology must be assumed to be more efficient than the current Danish countertrade practice since it shows the highest degree of market coupling.

Market coupling is characterized by decreasing marginal utility, ie. the benefits of market coupling are relatively large, when the degree of market coupling is small, and vice versa. As such, the Danish countertrade practice with a low degree of market coupling is expected to be significantly less efficient than the methodology.

In summary, Energinet finds that there is a significant efficiency difference between the intraday methodology and the Danish countertrade practice. The intraday methodology with a high degree of market coupling and no prequalification requirements is expected to be significantly more efficient than the current Danish countertrade practice.

5.6.2 Quantification of efficiency of countertrade on DK1-DE/LU in 2020

In the following, the efficiency of the Danish countertrade practice and the intraday methodology is compared. The purpose is to model the cost effects of the changes to generation and/or the value effects of changes to load resulting from countertrade. The value of countertrade can be estimated by calculating generation cost savings from reduced generation (generator revenue minus producer surplus, ie. the area under the supply curve) and the extra value from increased generation (total consumer payments plus consumer surplus, i.e. the area under the demand curve).

It is impossible to quantify the future efficiency of the current Danish countertrade practice and intraday methodology as both future countertrade volumes, relevant borders and the direction of the countertrade (up- or downward regulation) is unknown. The qualitative assessment in the previous section is made to the extent possible on that account.

However, countertrade on DK1-DE/LU presents an actual case of countertrade where recorded data exists, which makes a quantification of the effects more credible. The quantification is associated with significant uncertainty for several reasons;

- The quantification of the effects of the Danish countertrade practice can only be based on assumptions made by Energinet where the availability of information necessary for Energinet to make these assumptions is limited
- The considered countertrade methodologies cannot be compared within one analytical framework but must be compared across two such frameworks.

[37] If countertrade energy is traded in the first window according to the proposed methodology, not all borders will be open which implies a reduced level of market coupling at that time. However, since these borders will open at a later stage, market participants can send countertrade energy to "any" bidding at a later stage, ensuring optimal efficiency.

Therefore, Energinet emphasizes that the theoretical arguments presented in the previous section suggest that the intraday methodology is socio-economically superior to the current Danish countertrade practice. Thus, the uncertainty in the calculations presented below is rather a result of the use of the assumptions made to enable the use of a day ahead model in the calculations, than a stylized fact that the current Danish countertrade practice could be considered equally or more efficient than the intraday countertrade methodology.

5.6.2.1 The Danish countertrade practice

In the Danish countertrade practice, countertrade on DK1-DE/LU in 2019 and in 2020 resulted in downward regulation in Denmark and in netting with the DK1 and system imbalances as presented in the below table.

Type	GWh (2019)	GWh (2020)
Wind	420	1.461
Electric boilers	289	517
Thermal generation	603	1.065
Netting	602	853
Total	1,914	3.896

Table 2: Downward regulation in Denmark as a result of countertrade requests on DK1-DE/LU border in 2019 and 2020.

The value of countertrade in the Danish countertrade practice depends on the derived socio-economic consequences based on type of special regulation (netting is technically not special regulation). Table 3 and Table 4 below shows the assumed socio-economic cost savings resulting from countertrade in the Danish countertrade practice in 2019 and 2020.

Type	GWh	Unit price, EUR/MWh	Total value, mEUR
Wind	1,461	3	4
Electric boilers	517	17	9
Thermal generation	1,065	18	19
Netting	853	12	10
	3,896		**42**

Table 3 Socio-economic cost savings resulting from countertrade in the Danish countertrade practice in 2020.

Energinet estimates that countertrade in the Danish countertrade practice resulted in cost savings of 42 million euros in 2020. The details on the estimation of the unit cost savings are available in annex 1.

The average price of special regulation was -23 EUR/MWh in 2020.

The below table shows the assumed socio-economic cost savings resulting from countertrade in the Danish countertrade practice in 2019.

Type	GWh	Unit price, EUR/MWh	Total value, mEUR
Wind	420	3	1
Electric boilers	289	25	7
Thermal generation	603	42	25
Netting	602	25	15
	1,914		**48**

Table 4 Socio-economic cost savings resulting from countertrade in the Danish countertrade practice in 2019.

Energinet estimates that countertrade in the Danish countertrade practice resulted in cost savings of 48 million euros in 2019. The details on the estimation of the unit cost savings are available in annex 1.

The average price of special regulation was -12 EUR/MWh in 2019.

5.6.2.2 The intraday methodology

Naturally, no actual data is available to assess the proposed intraday methodology so the assessment of the effects of the intraday methodology are purely counterfactual. Energinet has used the Simulation Facility model to estimate these counterfactual effects. This model allows Energinet to use realized bids in the day-ahead market to approximate the effects of countertrade in the intraday time frame. The modelling only allows Energinet to calculate socio-economic impact on a global level from a cost and load value perspective, but it does not allow the calculation of the distribution of socio-economic benefits between market participants (and by extension between members states). The reason for this is that the calculated day-ahead price which is key for the determination of these distributive effects does not reflect what the actual day-ahead price is likely to be. The cost and load value estimations, however, do not depend on the day-ahead price, but on the actual dispatch following the intraday market.

Countertrade on the DK1-DE/LU border results in an increase in supply in the DK1 bidding zone. This supply will, due to market coupling, be used to reduce generation and increase load in the markets connected to DK1 where the marginal (most costly) generation would otherwise happen. The bidding zones where these changes in generation and load can happen depend on the availability of cross-zonal capacity. The Simulation Facility model allows the full optimization of these changes across the entire power system market modelled in the Euphemia algorithm.

Area	Increased load value, mEUR	Decreased generation costs, mEUR	Total, mEUR
Denmark	0.7	4.5	5.2
Other Nordic countries	1.6	17.7	19.3

Non-Nordic countries	7.5	15.3	22.8
Total	9.8	37.5	47.3

Table 5 – Socio-economic effects of the intraday methodology if applied in 2020.

The simulations from the Simulation Facility imply a positive socio-economic impact on a European scale in the range of 47.3 mEUR resulting from countertrade with the intraday methodology and only about 10% are realized in Denmark. The details on the estimation of the socio-economic effects of the intraday methodology are presented in annex 1.

From the simulations, the average DK1 price in hours with countertrade was 20.3 EUR/MWh, ie. the minimum price of countertrade energy would be expected to be 20.3 EUR/MWh.

Area	Increased load value, mEUR	Decreased generation costs, mEUR	Total, mEUR
Denmark	13.2	19.0	32.3
Other Nordics	27.8	31.5	59.3
Non-Nordics	-27.0	-17.6	-44.6
Total	14.0	32.9	46.9

Table 6 – Socio-economic effects of the intraday methodology if applied in 2019

The simulations from the Simulation Facility imply a positive socioeconomic effect on a European scale in the range of 46,7 mEUR resulting from countertrade the intraday model of which all of it is realized in the Nordics and Denmark, and a large part of it is realized in Denmark. The details on the estimation of the socioeconomic effects of the intraday model are accounted for in annex 1.

5.6.2.3 Conclusion

Estimations of the socio-economic impact of the Danish countertrade practice and the intraday methodology show that the intraday methodology would have increased socio-economic welfare by roughly 5 mEUR in 2020, and -1 mEUR in 2019. As such, the intraday methodology cannot quantitively be shown to be socio-economically more efficient than the current Danish countertrade practice.

These overall efficiency considerations are considered to reflect the “efficient economic signals” to the market participants involved in countertrade. As for the TSOs involved in countertrade, system efficiency is not the most relevant point but rather the realized prices of countertrade, ie. that the price of countertrade reflects the underlying costs, ensuring that TSOs are not faced with artificially high costs of countertrade which could lead to TSOs taking remedial actions that are too costly or ultimately overinvest in grid development based on such excessive costs.

The average price of special regulation of -23 EUR/MWh in 2020 is extreme compared to the calculated average price of countertrade in the intraday methodology of 20.3 EUR/MWh. It is clear that the countertrade practice provides a highly inefficient price signal to TenneT as requesting TSO.

In conclusion, an intraday-based countertrade methodology will provide more efficient price signals to market participants and TSOs. Further, even though socio-economic efficiency could not be properly quantified, the qualitative assessment suggests that the intraday methodology is socio-economically superior to the current Danish countertrade practice.

5.7 Consumer prices

As per recital (2) of the Electricity Market Regulation, the Energy Union aims to provide the final customers – household and businesses – with competitive and affordable energy. Danish law establishes consumers' access to cheap power as one of the most vital aims of the act.

The benefits of a competitive market for TSO's energy shall, thus, reflect in consumer's prices.

As established in section 5.9.2.1, if the current volumes of downward-regulated countertrade energy were purchased in the intraday market instead of in the Danish special regulation countertrade practice, then the day-ahead price would have decreased by 1.5 EUR/MWh in 2020 and 1 EUR/MWh in 2019, as Danish consumers can buy the countertrade energy in intraday market, and thus have a possibility to shift their demand from the day-ahead market to the intraday market (see further explanation in section 5.9.2.1.)

5.8 Environment and climate

The recent re-wording of the objects clause in the Danish Act on Energinet commits Energinet to consider climate in its task performance.

Against the background established in section 2.4, Energinet has examined accordingly if an intraday-based methodology to purchase energy would reduce European CO-emissions.

The analysis is available in annex 3.

Taking into account that 10% of hydro power is "run of river" (where water cannot be saved for later use), the estimated CO_2 effect of switching from the Danish countertrade practice to the intraday methodology is that European CO_2 emissions could be reduced by 0.9 million tonnes CO_2.

5.9 Market impact of countertrade in intraday

As stated in section 3.1.3, Energinet shall support well-functioning markets. This section addresses the potential impact Energinet's procurement of countertrade energy in the intraday market may have on the electricity markets as well as the legal frame for Energinet's trade in the intraday market.

Current volumes countertraded as special regulation vary from 0 to 3000 MWh on the DK1-DE/LU border. Moving countertrade volumes to any other market will have a big impact on the market, regardless of how a new countertrade model is designed.

In the intraday methodology all bids (except for reserves) in the current countertrade model can also be placed in the intraday market, and bids from the Nordic countries can be traded in Denmark after 15:00 p.m. in the day-ahead

market, if the necessary capacity is available on the Nordic borders. Furthermore, all European traders can trade in Denmark at 18:00 p.m., once the necessary capacity is available on the interconnectors with the continent.

The broad market access without any prequalification requirements, provides the best possible ground for competition, increased liquidity, and efficient prices.

5.9.1 Energinet as market participant in the intraday-market

It is, as stated in section 3.1.3, a fundamental requirement that Energinet uses market- based solutions to procure energy needed to fulfil its obligations as certified TSO.

Regulation no 1227/2011 of 25 October 2011 on wholesale energy market integrity and transparency has as its declared goal to ensure that

"[…] *consumers and other market participants can have confidence in the integrity of electricity* […] *markets, that prices set on wholesale energy markets reflect a fair and competitive interplay between supply and demand, and that no profits can be drawn from market abuse"* (recital (1)),

and further that

"the goal of increased integrity and transparency of wholesale energy markets should be to foster open and fair competition in wholesale energy markets for the benefit of final consumers of energy" (recital (2)).

REMIT includes TSOs in its definition of "market participants" cf. article 2 (7). When procuring energy in the intraday, TSOs shall comply with REMIT.

REMIT article 3 prohibits insider trading. It reads in excert:

"1. Persons who possess inside information in relation to wholesale energy product shall be prohibited from:

(a) using that information by acquiring or disposing of, or by trying to acquire or dispose of, for their own account or for the account of a third party, either directly or indirectly, wholesale energy products to which that information relates;
(b) disclosing that information to any other person unless such disclosure is made in the normal course of the exercise of their employment, profession or duties;
(c) recommending or inducing another person, on the basis of inside information, to acquire or dispose of wholesale energy products to which that information relates

[…]

3. Points (a) and (c) of paragraph 1 of this Article shall not apply to transmission system operators when purchasing electricity or natural gas in order to ensure the safe and secure operation of the system in accordance with their obligations under points (d) and (e) of Article 12 of Directive 2009/72 […]"[38]

REMIT article 2(2) defines inside information:

[38] Directive 2009/72 has been repealed by the Electricity Market Directive where art 40 is the relevant article.

ENERGINET
Myndighedsenheden

(1) "inside information" means information of a precise nature which has not been made public, which relates, directly or indirectly, to one or more wholesale energy products and which, if they were made public, would be likely to significantly affect the prices of those wholesale energy products.

For the purposes of this definition, "information" means:

(a) Information which is required to be made public in accordance with Regulations (EU) no. 714/2009 and (EC) no. 715/2009, including guidelines and network codes adopted pursuant to those Regulations;
(b) Information relating to the capacity and use of facilities for production, storage, consumption or transmission of electricity or natural gas related to the capacity and use of LNG facilities, including planned or unplanned unavailability of these facilities;
(c) Information which is required to be disclosed in accordance with legal or regulatory provisions at Union or national level, market rules, and contracts or customs on the relevant wholesale energy market, in so far that this information is likely to have a significant effect on the prices of wholesale energy products; and
(d) Other information that a reasonable market participant would be likely to use as part of the basis of its decision to enter into a transaction relating to, or to issue an order to trade in, a wholesale energy product.

Information shall be deemed to be of a precise nature if it indicates a set of circumstances which exists or may reasonably be expected to come into existence, or an event which has occurred or may reasonably be expected to do so, and if it is specific enough to enable a conclusion to be drawn as to the possible effect of that set of circumstances or event on the prices of wholesale energy products".

It thus follows from REMIT that TSOs may trade energy needs to ensure the safe and secure operation of the transmission system in the intraday market, even though they possess inside information.

Being a market participant under REMIT, the obligation in article 4 to publish inside information pertains to Energinet.

Article 4,1. reads

"Market participants shall publicly disclose in an effective and timely manner inside information which they possess in respect of business or facilities which the market participant concerned, or its parent undertaking or related undertaking, owns or controls or for whose operational matters that market participant or undertaking is responsible, either in whole or in part. Such disclosure shall include information relevant to the capacity and use of facilities for production, storage, consumption or transmission of electricity [...] *including planned or unplanned unavailability of these facilities".*

In Energinet's assessment, the article requires that Energinet publish, in advance of trading, the volume it intends to trade. Publication in advance has been included in the intraday methodology design, cf. section 4.3.2.3. In combination with the predefined time slots for Energinet's trade, the intraday methodology provides all information which ensures that the market can adjust their behaviour to the increase in supply which the countertrade energy (downward regulation), will lead to in the intraday market.

5.9.2 Impact of prices in day-ahead, intraday, and balancing markets

5.9.2.1 Day-ahead price impact

Simulations in annex 1 show a day-ahead price decrease of 1 EUR/MWh from 38.3 EUR/MWh to 37.3 EUR/MWh in 2019, and a day-ahead price decrease of 1,5 EUR/MWh from 25,1 EUR/MWh to 23,6 EUR/MWh in 2020, when simulating the procurement of countertrade energy in the intraday market. The price effect is a result of a shift in demand from the day-ahead market to the intraday market. Energy consumers will purchase their energy in the market with the lowest prices, and thus some of the demand will shift from the day-ahead market to the intraday market, resulting in lower day-ahead prices.

Please note that in the simulation, price convergence between intraday and day-ahead is the underlying assumption when modelling effects of countertrade using a day-ahead market model. However, Energinet would assume that market participants cannot optimize their purchase of energy 100% as they only have knowledge about the volumes of countertrade energy after the day-ahead market has closed. This means that it is riskier to cover their demand in the intraday market. Due to this, Energinet expects a day-ahead price decrease which is lower or less than 1 EUR/MWh (2019) or 1,5 EUR/MWh (2020). If the demand in day-ahead is decreased with 30-60% of the countertrade volume which will be offered in intraday, then the effect on the day ahead price would be a decrease in price of 0.3-0.6 EUR/MWh in 2019, and a decrease in the day ahead-price of 0.5 – 0.9 EUR/MWh in 2020.

The electricity price in the day-ahead market generally varies quite a lot. From table Figure 6: Increasing negative price of Danish downward regulation. it can be seen that the average day-ahead price was 25 EUR/MWh last year, whereas it was 44 EUR/MWh in 2018.

From the day-ahead price-effect it can be seen that the increased competition, enabled by European market participation in the intraday methodology, will lower the electricity prices for consumers in Denmark, which implies well-functioning markets.

5.9.2.2 Intraday price impact

The current intraday trade volumes range from 0 to 1000 MWh in DK1. While the current volumes countertraded as special regulation vary from 0 to 3000 MWh. This means that increasing the liquidity in intraday is needed to accommodate for the countertrade volumes and ensuring efficient prices. The broad market access and the publication of the countertrade volumes will enable this.

The intraday and day-ahead price is expected to converge to some degree. It is not possible to predict the actual level of price convergence. However, an assessment commissioned by TenneT and performed by Consentec shoved that the larger and more predictable volumes of countertrade are, the closer the correlation of day-ahead and intraday prices are, as market participants can predict the countertrade volumes which will be submitted to the intraday market.

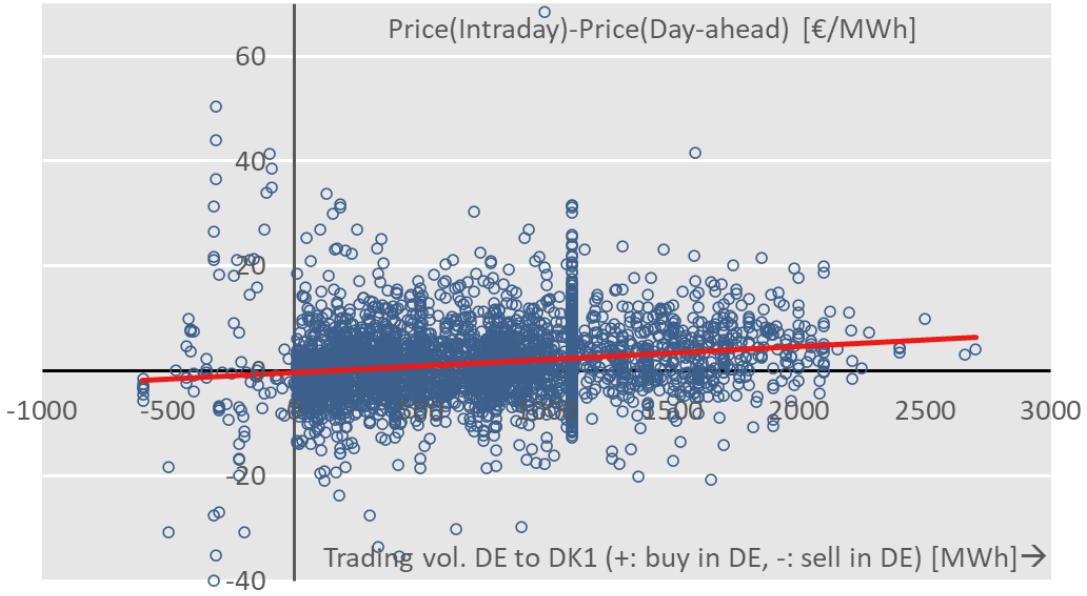

Figure 1: Relation between price difference (intraday vs. day-ahead) in Germany and total of trades for safeguarding cross-border transmission capacity. Positive volume denotes buying in DE and selling in DK1. Source: Assessment of Consentec commissioned by TenneT

	2018 (JD)	2019 (JD)	2020 (JD)	2020 (JD+other)
Frequency of countertrade for safeguarding transmission capacity [% of hours]	17.5%	35%	38%	43%
Average share of countertrade in continuous intraday trading volume [% during hours with countertrading]	6.5%	8.4%	11.1%	12.8%
Correlation coefficient between countertrade volume and day-ahead-intraday price difference	0.25	0.12	0.10	0.15[39]

Table 7: Comparison of frequency and volume of countertrade between 2018, 2019 and 2020 in Germany. Source: Assessment of Consentec commissioned by TenneT

The structural countertrade volumes purchased in the intraday market increases the competition as market participants are consider whether they will get the best price for their energy in the day-ahead market or the intraday market, which will lead to a price convergence between intraday and day ahead market when large volumes of countertrade are being traded. This is also a sign of well-functioning markets.

[39] When only considering the JD volumes the correlation coefficient between countertrading volume and day-ahead-intraday price difference is 0.1

ENERGINET
Myndighedsenheden

5.9.2.3 Balancing markets price impact

On 10 March 2019, Energinet submitted a confidential report on special regulation (2018) to the Danish Utility Regulator. The report has not been published due to the inclusion of special regulation prices, which are currently deemed confidential due to concerns of reduced competition and price coordination. The report concludes that:

- Danish bids for downward regulation are aimed at activation of special regulation, as the offer price of downward regulation is significantly lower (more negative) than the average balancing price. Therefore, balancing bids/offers are primarily delivered by Statnett and Svenska kraftnät. The effect on the balancing price may, however, be insignificant, as bids/offers from Statnett and Svenska kraftnät are generally more competitive.
- An increase in the balancing price of upward regulation is expected when procuring countertrade energy in the intraday market. This is due to the fact that in the methodology, netting with balancing needs will not happen as structural countertrade energy will be procured almost a day before the balancing time frame.

Once the procurement of countertrade energy has been moved to the intraday market Energinet expects that Danish mFRR bids/offers submitted to the NPRM for downward regulation will be closer correlated to the other Nordic mFRR bids/offers send to the NPRM, as these bids/offers no longer can expect to be activated at their bid-price if the bid/offer is above the marginal price for balancing. This will generally speaking improve the competition in the NPRM as Danish bids/offers lead to increased competition, however it is often the case that Swedish and Norwegian bids/offers that are the most competitive, why the effect will be minimal. Further to this, as the Nordic market participants can buy the countertrade energy when transiting to an intraday countertrade model, it may be the case, that the balancing price will increase in case of eg. downward regulation both in intraday and in the following balancing timeframe, as all market participants in the NPRM can also participate in intraday prior to participating in NPRM. On the contrary if downward regulation happens in the intraday timeframe, and upward regulation is needed in the balancing timeframe, then more upward regulation is available due to the countertrade, which will lower the price for upward regulation.

The price for upward regulation and for reserves might however increase as netting with balancing needs will not take place, and as committing resources to reserves (upward regulation) hinders that the committed volumes can participate in the intraday market, why a reserve price increase may be the result of missing the opportunity to procure countertrade energy. However, in case of structural countertrade a price convergence between day-ahead and intraday is expected, why it will only be a marginal profit which can be earned by participating in intraday, which therefore may not lead to a price increase for reserves.
Whether the price for balancing increases or decreases depends on the direction of the countertrade requested. In case of a need for upward regulation there can be situations where resources are scares. In these situations, a high price for upward regulation is expected. This is also a natural consequence of competition in the markets, and TSOs must dimension their need for reserves to accommodate this.

5.9.3 Imbalance risks

When procurement of countertrade energy is executed intraday, it also becomes possible for consumers and power traders to trade countertrade energy, and the equilibrium between supply and demand will be reached in a different way than in the Danish countertrade practice. Today, consumers typically procure their energy day-ahead while countertrade energy results in downward regulation in the regulating power market. With the methodology, countertrade energy is sold in the intraday market instead where Energinet expects that Danish consumers, power traders, and Nordic generators will procure the energy (just like Danish generators buy countertrade energy in as Danish special regulation). This means that Danish consumers will reduce their demand day-ahead, while power traders will increase their

day-ahead supply, expecting to cover their position in the intraday market. All else being equal, this means that the day-ahead market result, if realized, would not be balanced (consumers and/or traders have an unbalanced position after the day-ahead market). However, the intraday market is integral part of the power market so this cannot be considered wrong in any way.

Market participants with unbalanced positions after the day-ahead market are incentivized to balance themselves in the intraday market if they expect the cost to be lower in the intraday market than for imbalance settlement. If the cost is expected to "high" in both markets, market participants will assume a more balanced position in the day-ahead market. As such, market participants will continuously optimize their position to obtain the best price for their energy.

The intraday methodology creates a new dynamic where the intraday market becomes more important, but it does not fundamentally impact the incentive to be imbalanced after the intraday market. A consumer that, in the absence of the methodology, would balance himself in the day-ahead market, would balance himself in the intraday market instead, if he wants to (attempts to) buy countertrade, regardless of whether he actually buys countertrade energy or not. Similarly, a trader would have no reason to speculate more in being unbalanced, just because he also speculates in trading countertrade energy. In both cases, there would be plenty of time in the intraday market to balance unbalanced positions from the day-ahead market that were not balanced with countertrade energy. As such, Energinet expects the overall imbalance risk to be the same.

Based on the above, Energinet sees no reason to suspect that the intraday methodology will increase the imbalance risk and thus no increased risk for system security.

5.9.4 Market conduct in the intraday methodology

Energinet interprets the REMIT regulation to imply that structural countertrade volumes, which are to be traded in any given market, must be publicly disclosed before trading the volumes. Energinet does not find any obligation to publish time and bid price prior to trading.

REMIT article 4: "*Market participants shall publicly disclose in an effective and timely manner inside information which they possess (…)*", when reading the definition of 'inside information' (REMIT Article 2(1)) it means "*information of a precise nature which has not been made public, which relates, directly or indirectly, to one or more wholesale energy products and which, if it were made public, would be likely to significantly affect the prices of those wholesale energy products*".

Market manipulation as defined in article 2(2) in REMIT is prohibited.

As such, the normal competitive behaviour of market participants seeking the best price for their energy, as described in annex 2 cannot be considered market manipulation since, contrary to market manipulation, this behaviour ensures competitive prices for the consumers.

The risk of market manipulation is considered potentially relevant in an intraday-based methodology where the intraday methodology will provide market participants with ex ante knowledge of upcoming trade volumes and trading timings.

The concern of market manipulation is primarily related to two types of market manipulation:

1. Energy hoarding, refers to the act of a market participant acquiring all or part of the buy (or sell) orders with the purpose of controlling the pricing of these, for example towards the TSO need to manage congestion in the power system, when the TSO is on the selling (buying) side

2. Capacity hoarding, refers to the act of a market participant acquiring all or part of the available transmission capacity ('ATC') without using it or without using it effectively. This is done by one or more market participants (but few) taking a position at each side of a biding zone.

With respect to energy hoarding, Energinet considers the risk of market manipulation theoretical. Energinet expects the competitive pressure to make such behaviour unprofitable.

With respect to capacity hoarding, Energinet finds that there is a risk associated with an intraday-based methodology as described in Annex 2. However, Energinet considers it too risky for market participants to engage in such activity, making it unlikely that it would indeed happen, as this would constitute a breach of the rules under the REMIT regulation.

Based on the above, Energinet does not find that the risk of market manipulation makes the intraday methodology less attractive. Further, several choices have been made in respect of its detailed design to minimize the risk for capacity hording, eg. timing of the windows. Finally, the introduction of intraday auctions is expected to limit the scope of capacity hoarding since countertrade energy would then in an opening auction, rendering capacity hoarding impossible.

5.10 Conclusion of the assessment

Energinet finds that the intraday methodology addresses the needs for a new countertrade model listed in section 2.3 and applies with the current European and national law in section 3. The intraday methodology not only ensures that a countertrade model is in place after November 2022, but it is also a far better alternative than the current countertrade practice when it comes to the central legal requirements; system security, market-based, non-discriminatory, efficient and transparent. Furthermore, the increased market size in the intraday methodology also ensures competitive efficient consumer prices and that the production units with the highest marginal cost of producing energy, will be the production types which will be stopped, in case downward regulation is needed. This further leads to the positive environmental effect, that the curtailment of wind will be less in the intraday methodology.

Energinet has assessed some potential concerns with the intraday methodology such as risk of imbalances in section 5.9.3 and the capacity submission to SIDC 4.3.1.2. These concerns are addressed by ensuring a transitional period with a gradual increase in volumes traded on intraday or have been accommodated in the detailed design of the intraday methodology.

6. Process

This section provides an overview of the process that has taken place to ensure involvement of relevant stakeholders and transparency.

6.1 Internal process in Energinet

An evaluation of the current countertrade practice, and thus the internal work on a new countertrade methodology, was initiated in the beginning of 2020 in accordance with the impact assessment. The Danish Utility Regulator was informed of the initiation of the work at a meeting on 20 February 2020.

The work was initiated due to an increased demand for countertrade on DK1-DE/LU and a possible demand for countertrade on all borders, deriving from the 70% rule. Furthermore, at that point, it was not certain whether it would be allowed to use MARI for structural countertrade.

Initially, all countertrade models assessed in the impact assessment from 2018 were listed as alternative countertrade models by the internal working group. However, since the methodology has to be applicable on all Danish borders, models such as the CoCa model (using transmissions rights) was disregarded as there are not any transmission rights on the Nordic borders. Due to the intermediate changes in the regulatory framework, it was not considered possible to continue the existing practice. The alternatives considered (which were presented at the first workshop[40] in August 2020), were:

1) Countertrade using intraday auctions
2) Countertrade in the continuous intraday market
3) A Nordic TSO-TSO countertrade model (countertrade in a separate Nordic market)

The work faced challenges right from the beginning because the deadline for the implementation of a new countertrade methodology/actual date when the Danish countertrade practice could no longer be used was not fixed. This was due to a mix of legal and practical issues. At first, MARI, and the rules pertaining to it, was found to "set the deadline" (2023/2024). However, soon after the first workshop, it became apparent that the Nordic Balancing Model (NBM) had projected AOF implementation (in parallel operation) in Q2 2022. The implementation of the AOF implied a new, even tighter deadline for the implementation of a new countertrade methodology. Thus, by the date of the AOF implementation, it would no longer be possible to countertrade according to current practice. The implementation date of the Nordic AOF was later moved to November 2022.

An assessment was made of whether an IT solution could potentially solve the problem caused by the AOF (i.e. a solution which could activate mFRR bids pay-as-bid after the AOF). For several reasons, the idea was rejected, as it rather quickly became apparent that it would be a complex task to solve, and since the Danish countertrade practice could not efficiently handle the large countertrade volumes, the IT solution was not investigated further.

However, a determining factor was the outcome of the analysis conducted in the meantime to assess the pros and cons of implementing an intraday-based methodology for countertrade needs (as opposed to continuing a practice based on mFRR). First, an intraday-based model would – unambiguously – accommodate the critical practical issues identified in the Danish countertrade practice (control centre aspects, including operational security). Second, an intraday-based methodology was found to be most compliant with the requirements and considerations in EU and Danish law, and, in this respect, it was also found to be the superior socio-economic/most efficient solution.

In the process, it was also clarified that a Nordic TSO-TSO countertrade model was simply not possible, as the idea of creating a separate Nordic market was not supported by the other Nordic TSOs.

40 Workshop 1 on alternative countertrade models | Energinet

On this basis, Energinet continued to work on an intraday-based methodology.

In December 2021, the Nordic balancing model (NBM) programme announced that implementation of the AOF was postponed to November 2022.

6.2 Involvement of market participants

To ensure transparency and involvement to the highest possible extent, Energinet has involved and informed market participants and other interested parties in the process on an ongoing basis.

Workshops were announced on Energinet' website and at a stakeholder meeting for Danish market participants. Furthermore, an invitation was sent to neighbouring TSOs, and energy organisations representing the Danish, Norwegian and Swedish market participants have been encouraged to inform their members about the workshops. In general, a personal invitation to the subsequent workshop was sent to participants who participated in one of the first workshops. Memos and presentations were sent out in advance to facilitate discussions, and summaries were circulated after the workshops. All information on countertrade has been published here: Modhandel | Energinet on Energinet.dk.

At the first workshop in August 2020, Energinet explained the reasoning behind the review of the countertrade practice and the aspects supporting the introduction of a new countertrade methodology (as they were at the time).

At the workshop, Energinet experienced general discontent with the fact that clear, unambiguous answers to legal and practical issues, including the deadline for the implementation of a new countertrade methodology, could not be provided. Consequently, many requests for clarification were made, which, in turn, complicated the intended solution-focused dialogue.

To ensure the best possible framework for discussions, including a solid basis, Energinet pushed back the second workshop to 12 January 2021. At this workshop, intermediate developments pertaining to the legal and practical framework were explained, as was the rationale for pursuing, and preferring, an intraday-based methodology.

In the meantime, one market participant had approached Energinet to question whether the effect on day-ahead prices of an intraday-based methodology had been sufficiently examined and considered. The issue was addressed and explained at the workshop.

Moreover, three speakers were invited to provide input for discussions:

- Statnett who presented their thoughts on implementing an intraday countertrade methodology
- Ørsted who presented arguments that the Danish countertrade practice is well-functioning and their interpretation of the 70% rule
- Energi Danmark who presented arguments that an intraday-based methodology would be market-based whereas the Danish countertrade practice was not.

A third workshop was held on 2 February 2021 to provide market participants with further details on analyses and the rationale underpinning Energinet's preference for an intraday- based methodology. The question of relevant time frame(s) for the 70% rule was handled by the Danish Utility Regulator, which presented its interpretation and possible

interpretation bases. TenneT gave a short presentation on their planning process and scheduled grid expansion projects.

At this workshop, participants also voiced several reflections on the design details of an intraday -based countertrade methodology.

This input was processed and a fourth workshop, an intraday design meeting, was held on 20 April 2021. Input from this workshop was taken into account in the submitted intraday methodology.