



The design

INTRADAY COUNTERTRADE MODEL DRAFT

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1. Purpose of the document

The purpose of this document is to facilitate discussions and concrete input to the Intraday countertrade model (ID CT model) design from adjacent TSOs and interested market participants.

Energinet has drafted the initial starting point and considers this a working document which will be changed and altered during bilateral discussions and following the intraday countertrade design meeting 20 April.

In case confidential information is exchanged during bilateral meetings between Energinet, adjacent TSOs and market participants this will be kept separate to this document and considered if relevant for the design.

2. Intraday

The current volume traded on intraday is ranging between 0-1000 MWh in DK1.

Volumes countertraded as special regulation today varies from 0-3000 MWh in DK1, and the need for countertrade is expected to increase further.

Moving the countertrade volumes to intraday will have a big impact on the intraday market - no matter how the intraday countertrade model is designed. It is presumed that full transparency is the best way to avert distorting the market.

Even though trade is currently limited in the intraday market in Denmark, the liquidity is there. All bids in the current countertrade model can be bid into intraday and bids from the Nordic countries can participate after 15.00 day ahead once there is capacity on the Nordic borders. Furthermore, traders from all of Europe can participate in the intraday market after 18.00.

Energinet finds that a fully transparent model with all information (volumes, trading times and bid prices) available to market participants, is the best way to attract liquidity and ensure equal access to all market participants.

3. The intraday countertrade model

The ID CT model aims at a transparent, simple and yet flexible design, which covers both structural countertrade needs, known right after the day ahead market closes (e.g. TenneT Commit-

ments and the 70% rule), and unexpected countertrade needs that arise close to the operational hour (e.g. if an interconnector trips). The model shall be able to use for countertrade on all danish borders.

Below is a visualisation of the different types of countertrade which can be handled using the intraday market. Both structural and unexpected needs known ½ hour before ID Gate Closure Time (GCT) can be traded in intraday.

	Structural need	Unexpected need
CT needs arising later than ½ hour before ID (GCT) (Cannot be handled with the ID countertrade model)	If TSOs e.g. due to their planning process requests CT later than ½ hour before ID GCT	- Interconnector trips less than ½ hour before ID GCT - Internal lines (relevant to cross border capacity) trips less than ½ hour before ID GCT
Known after DA closure or at least ½ hour before ID GCT (can be handled with the ID countertrade model)	Tennet Commitments & 70% rule	- Interconnector trips more than ½ hour before ID GCT - Internal lines (relevant to cross border capacity) trips more than ½ hour before ID GCT - Requesting TSO needs CT after the two windows are closed

Energinet expects to define one, two or three trading windows, where structural countertrade volumes will be offered to the market, and then also be able to do continuous trading to cover unexpected countertrade needs after the windows are closed. Energinet is currently discussing whether unexpected countertrade needs arising within day also should be traded in the windows together with the CT volumes Day – 1 (day ahead), when possible, or whether it would be more straight forward to trade all unexpected countertrade volumes continuously.

The timing of the trading window can either be at a one specific time during the day, or it can be a time span, e.g., half an hour, or an hour.

In the following Energinet has suggested two ½ hour trading windows where the first trading window is right at GOT (Gate Opening Time) at 15.00 where capacity on the Nordic interconnectors is given to the market.

The rationale behind the timing of this first window is to ensure that countertrade needs requested before this window, can be traded in the market at the same time Statnett expects to trade their countertrade volumes in intraday, and thereby a synergy with increased liquidity is likely to happen.

The rationale behind the timing of second window is to ensure that countertrade needs which cannot be requested prior to the first trading window, e.g., due to the internal TSO planning process can be traded at a later stage. The second window is suggested to be after capacity on the interconnectors towards the continent has been released to XBID (18:00).

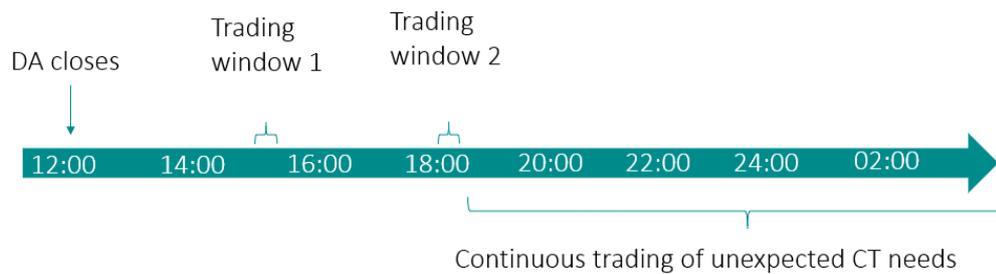


Figure 1: Illustrates how countertrade would be traded day ahead (D+1)

Energinet will strive to have a methodical flexibility to change the timing of the windows, and also to introduce continuous trading e.g. between 15-18.00 to ensure market efficiency in case it proves to be inefficient to handle the great trade volumes in predefined trading windows.

Energinet anticipates that countertrade needs will be requested as early as possible, as the countertrade volumes only will be firm once they have been traded.

With regards to the pricing of the countertrade bids placed in the window, Energinet has the notion that if attractive bid prices, volumes and trading timings are published on a website prior to trading then it will attract liquidity. Therefore, Energinet expects to bid at very attractive prices assuming that a fierce competition will ensure an auction-like setup, where a long list of counter bids has already been placed in the intraday market prior to the opening of the first and second countertrade window, and thereby ensuring that efficient bids will be selected, and not Energinets very attractive bid price.

Some TSOs may however have a max price they are willing to pay for the countertrade, why the pricing should be further discussed with adjacent TSOs.

4. More detailed description of the intraday CT model

A third party is expected, on behalf of Energinet, to buy/sell energy on the European continuous intraday market (SIDC) using the XBID system, depending on the need for upward- or downward regulation. Therefore the following description of the different steps should be possible for a third party to follow.

A tender to find a third party to trade on behalf of Energinet, is expected to take place e.g., every third year to ensure competitive prices for the service.

4.1 Requesting countertrade needs

Countertrade needs are not required to be requested at a certain time. However, the requested countertrade volume is only firm once it has been traded, therefore the earlier the countertrade needs are requested the earlier it can be traded, and thereby the requesting TSO gets clarity on whether the requested countertrade volumes was successfully traded.

Requesting countertrade early also gives the advantage that unmatched volumes in the first trading window can be transferred to the next trading window, and thereby increasing the likelihood that volumes are matched.

Countertrade needs will have to be requested well in advance of the opening of the trading window. In the following it is anticipated that countertrade needs should be requested at least ½ hour before the window, and that the published volumes will be updated almost stimulatingly to the market participants (at least 20 minutes before CGT).

4.2 Accept of CT volumes before publication

The requested countertrade needs should be sent as schedules to the market tool for confirmation by the counterpart to provide a second check of the volumes.

Energinet does not foresee that we will limit the volumes of countertrade unless something unusual occurs.

Once confirmed the volumes will be published and forwarded to the third-party trading on behalf of Energinet.

4.3 Publication of volumes

Once the countertrade volumes have been confirmed Energinet will publish the volumes which are to be traded within a given window within a given hour. The volumes can be updated until ½ hour before the trading window, or until ½ hour before ID GCT (gate closure time) for the given hour when trading unexpected countertrade continuously.

Both sales and buy bids from a third-party trading on behalf of Energinet, can be present within the same hour, as netting of different countertrade needs will not take place prior to trading in intraday.

4.3.1 Publication of gradually increased volumes during implementation

A defined schedule/overview of gradually increased volumes during the implementation period will also be published. E.g., 2022: august x volume, September x volume, October x volume, November full volume.

4.4 Two categories of countertrade

4.4.1 Structural countertrade

Structural countertrade needs are suggested to be traded in two windows:

Window 1: 15.00 – 15.30

Window 2: 18.00-18.30

Countertrade must be requested at the latest ½ hour minutes before the trading windows to be traded in the given window and should be published immediately thereafter (depending on the IT solution) to market participants.

Energinet expects that there will be a stack of bids awaiting when the trading window opens, and in that case the bids will be instantly matched once Energinet enters the market.

Once intraday auctions are possible to use, the trading windows are expected to be moved to the intraday auctions which will be held: 15:00 day ahead (D-1), 22:00 day ahead (D-1) and 10:00 within day (D-0).

The reason why Energinet prefers using intraday auctions once they become available, is to avoid further complication of the electricity market by having both countertrade windows and

Intraday auctions, and that energy traded on the continuously intraday market does not provide congestion income, whereas intraday actions does. Furthermore, since intraday auctions will not take place in XBID but rather as a re-run of Euphemia with negative ATC, it will lead to an adjustment of the flow on the border, without having to do a TSO-TSO trade and trade on XBID. Note that intraday auctions are not finally designed yet, why Energinet does not have the full overview of the technicalities of Intraday auctions.

The reason why the suggested trading windows are not equal to the timings of the future ID auction is to ensure that structural countertrade is traded as early as possible after DA closure, and right after capacity on the borders are released in order to minimize the opportunity to do Capacity hoarding (see section 6.2).

4.4.2 Unexpected countertrade

Unexpected countertrade is suggested to be traded continuously up to GCT. Unexpected countertrade volumes must be requested at the latest ½ hour before GCT and will be published right thereafter.

*note that timings are details which must be closely coordinated and interlinked – these are just a first suggestion!

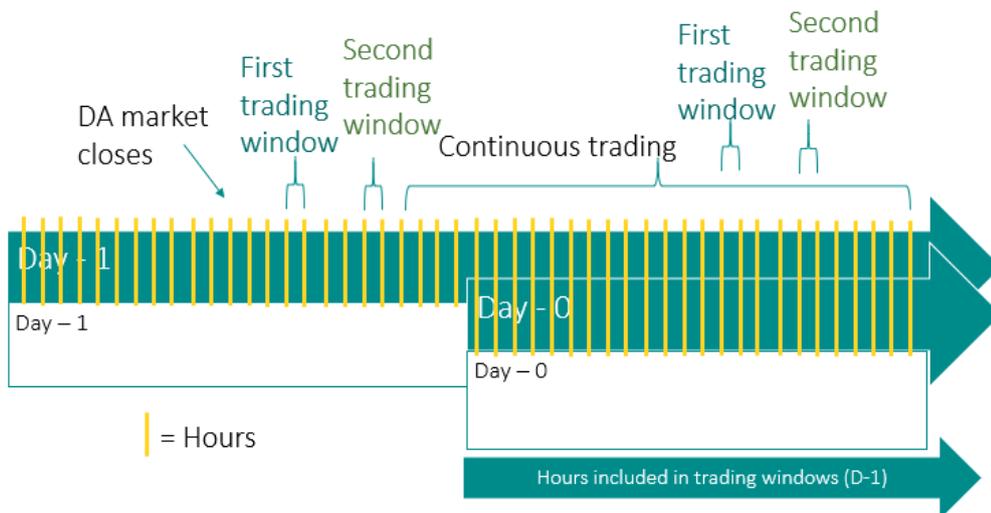
4.5 Volumes are firm once traded

Unmatched countertrade volumes in window 1 (in case of shortage of bids) can be transferred to window 2 and will be published as a part of the total countertrade volumes to be traded in window 2.

Unmatched volumes (in case of shortage of bids) after window 2 will be withdrawn and Energinet will inform the adjacent TSO that the volumes could not be traded.

The adjacent TSO have the possibility to either reduce the countertrade (TSO-TSO trade) and take operational measures to ensure operation within security limits, or request countertrade closer to GCT (unexpected countertrade), which thereby gives a third chance for the remaining unmatched structural countertrade needs to be traded in intraday.

4.6 Trading timeline



Example 1 (structural countertrade):

At 14:30 the day before operation (D-1), TenneT requests 1000 MW of countertrade for all 24 hours on the next day (D). Volumes are published right after they are requested, or at least 20 minutes before the first window.

Not all bids were matched at the trading window at 15:00 (D-1), so 500MW in the hours 15.00 (D-1) to 15.00 within day (D) is transferred to the second window, and this is published shortly after the first window closes.

Further updates to the requested countertrade volumes can be made and will be published around 20 minutes before the second window opens.

All countertrade volumes were sold in the second window except for 500MW within day hour 9-10). Tennenet then receives the confirmation that the requested countertrade had been successfully traded except for one hour.

TenneT can then request this last hour of countertrade to be sold in the continuous intraday market, just like unexpected countertrade, or they can change the countertrade volume (TSO-TSO trade) that hour.

This process will enable all volumes to be countertraded in the end, if the TSOs willingness to pay is sufficient to ensure that the countertrade volumes are there.

Example 2 (unexpected countertrade):

At 15:56 Skagerrak trips.

The hours within the operational hour and right after, approximately 15.56 -17:00 (within the current day) will be handled as imbalances. However, if it takes two days to restore the interconnector, the full volume in all hours sold in the both the day ahead and intraday market as of 17:00 within the current day (D) and until the end of next day (D+1), must be traded on the intraday market. The hours 17-19 within the current day, must be traded continuously, and then the second window can be used to trade all volumes for hour 20-24 within the current day (D), and all 24 hours the next day(D+1). The day after tomorrow will be handled by limiting the interconnector capacity given to the day ahead market to zero, and therefore no countertrade is needed.

In the two examples above it is assumed that the total volume requested should be countertraded as soon as possible. However, it can be discussed whether it would be an advantage to only countertrade e.g., 80% of the structural countertrade early, and then the last 20% continuously, to avoid unnecessary countertrade. Energinet's position is that the requesting TSO should make the judgement, and only request the necessary volumes and then leave the rest for continuous trading e.g. in case of inaccuracies in wind forecast which can lead to a lower need for countertrade closer to the operational hour.

4.7 Publication of prices

Both structural and unexpected countertrade requests will be bid into the market at very attractive prices (e.g. very low sell bids e.g. -200 Euro/MWh & very high buy bids e.g. 200 Euro/MWh) to ensure to attract liquidity in the market. The final maximum price will be included in the methodology (if it should be published) and it will be based on Energinet and adjacent TSOs willingness to pay. Volumes will not be countertraded if the price limit is exceeded.

Energinet plans to publish the sell - and buy prices on the same page as the volumes and trading timings.

The topic "publication of prices" has been a major point of discussion. Energinet acknowledges that there are different approaches to trading in the intraday market, and that there are potential upsides and downsides of the different approaches.

4.7.1 Full transparency approach

Some argue that the market will be less distorted if all information is available (prices, volumes, and timings) as Energinet would then avoid having a trading strategy. Full transparency would also attract liquidity and make the countertrade energy available for all participants - also those who do not have the capacity to forecast the countertrade volumes and do not have time to discover the "hidden" max price. There are market instances where the maximum price will be visible even without Energinet publishing this price (in case of lack of counter bids), therefore Energinet has taken a full transparency approach and will also publish the price. This approach is however likely to lead to less favourable prices than what could be accomplished if an experienced trader actively traded the volumes.

This very simple pricing approach would enable an algorithm to do the trades, and the external provider of the algorithm could also participate in the competition of buying the countertrade energy on the intraday market, as all information on how the algorithm is designed would be publicly available. It has been indicated by market participants, that automated trading can be offered at a very low price, whereas active trading would be very expensive, since this would mean that they would exclude themselves from participating in the intraday market - or at least in the structural countertrade windows (to ensure REMIT compliance).

4.7.2 Active trading and less transparency

If prices and timings were not published a trader could trade volumes during the whole intraday timeframe (depending on when adjacent TSOs need to ensure firmness of the countertrade volumes). However, this would not be under optimal conditions, as all market participants would know that the volumes must be countertraded. The external provider would have to know the TSOs willingness to pay (maximum price) in case of scarcity of counter bids, and in this case the maximum price would be revealed to the market.

An external provider:

Most of the market participants suggest that Energinet should do the countertrade themselves if timing and prices are not published.

Market participants find that active trading would be very expensive for an external provider, since this would mean that they would exclude themselves from participating in the intraday market in the timeslots where countertrading would be done (to ensure REMIT compliance).

4.7.3 Why then publish the price?

Energinet prefers that countertrading is done via an external provider. Energinet would thereby avoid matters such as insider information (due to also handling balancing needs) and questions about roles and responsibilities as a TSO. Every three years there would have to be tenders to ensure that Energinet has the most competitive service provider, this means that that over time several external providers would gain insider information. Therefore, if an external provider should be able to also participate in intraday while countertrade is traded automatic trading must be set up.

Energinet also expects that the volumes will be there in intraday, and that they will be bid into the market if all information is available. Therefore it does not make a difference whether max price is publicly available or not. In the minutes prior to the trading window there will be competition between the bids, ensuring a competitive price.

In the beginning awareness must be built why a gradual implementation is important, however in the long run, nobody will "leave money lying on the floor".

If max price was not published, the big market participants would quickly discover it.

4.8 Structure of bids traded in Intraday

- Hourly bids
- All countertrade volumes will be bid into XBID at the requested volume (all in one chunk with the same price)
- All bids are bid into XBID at the very attractive price as suggested by Energinet – or as agreed (price cap) with the requesting TSO

4.9 Publication of trades after GCT

Trade data after ID GCT is accessible at XBID, EPEX and Nord Pool and will therefore not be published by Energinet.

4.10 Netting

Netting of countertrade needs will not occur prior to trading in the intraday market.

Thus, Energinet can have a countertrade need requested by TenneT for downward regulation in DK1 for one hour and a countertrade need requested by Statnett for upward regulation in DK1 in the same hour, and they will respectively be sold and bought in the intraday market. This enables the market participants to both sell and buy energy in the intraday market within the same hour, and earn a profit on that, and thus the need for up- or downward regulation will be settled on market terms and Energinet will not have precedence to the up- or downward regulation energy prior to the intraday trading.

Energinet anticipates that the large bid volumes into the market at attractive prices, will boost the competition leading to high liquidity, why selling, and buying countertrade energy within the same hour will imply competitive prices with low profit margins, which in fact will lead to netting happening in the intraday market, instead of having precedence to a TSO-TSO netting practice prior to trading on intraday.

The downside is that there will be trading fees for both upward and downward regulation.

Energinet is currently investigating whether “netting” by using intraday could lead to a match between attractive TSO bids bid in XBID (if e.g. Statnett also decides use a very attractive price when selling/buying on XBID). In such a case it would not be an efficient netting solution.

4.11 Why is a flexible model needed?

Unexpected needs which can be handled in ID is expected to be handled in ID - only needs that cannot be handled in ID are expected to be accepted on MARI.

The intraday countertrade model is designed to be able to handle all countertrade needs known after DA closure or until ½ hour* before ID GCT.

* Energinet will strive to ensure that CT can be performed close to ID GCT, however it depends on the publication requirements prior to trading and the concrete technical setup.

5. Technical intraday setup

5.1 Zero net transfer capacity given to XBID

When day ahead flow exceeds physical transfer capacity (e.g. due to TenneT commitments or the 70% rule) it leads to countertrade between TSOs to reduce the physical flow and adjustments to excess or missing energy which must be made on either side of the border.

Due to the countertrade (CT) the limiting TSO gives a lower net transfer capacity (NTC) to the intraday market. XBID will then calculate a negative available transferable capacity (ATC) by subtracting the already allocated capacity (AAC_{DA}). This only allows trade in the opposite direction of the day ahead flow.

Normally (without countertrade), and in case all capacity in the day-ahead flow direction has been utilised, the NTC given to the ID market will be equal to the NTC in day ahead, and XBID will calculate zero ATC intraday, when subtracting AAC from day ahead. Zero ATC will be given to the intraday market in the market flow direction, which likewise only allows trades in the opposite direction of the day ahead flow.

Ex. NTC and ATC with no need for countertrade:

Day ahead: Energinet gives $NTC = 1500MW$ to DA and $1000MW$ is traded which gives an AAC of $1000 MW$

Intraday: Energinet gives $1500MW$ NTC_{ID} to XBID, and XBID calculates $(1500MW - 1000MW) = 500MW$ ATC_{ID} which is given to the intraday market in the market flow direction.

* Note that $2500MW$ ($1500 + 1000MW$) will be released to the ID market in the opposite direction of the market flow.

Example NTC and ATC with countertrade:

Day ahead: Energinet gives $NTC = 1500MW$ to DA and $1000MW$ is traded which gives an AAC of $1000 MW$.

Countertrade: 800MW countertrade is requested, to reduce the flow in the in the direction of the market flow.

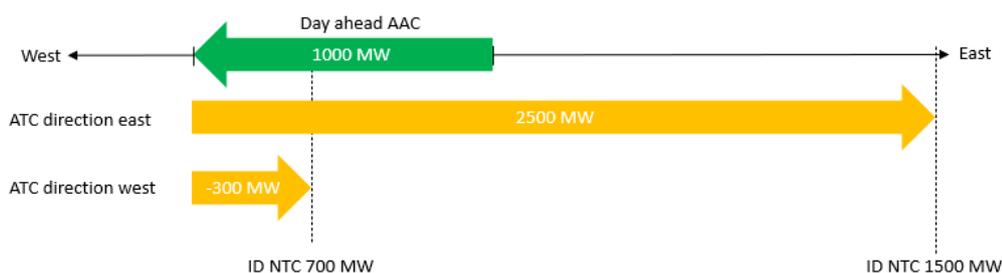
Intraday: Requesting TSO gives $1500\text{MW} - 800\text{MW} = 700\text{MW}$ NTC_{ID} to XBID, and XBID calculates $(700\text{MW} - 1000\text{MW}) = -300\text{MW}$ ATC_{ID} to the intraday market in the market flow direction.

* Note that 2500MW ($1500 + 1000\text{MW}$) will still be released to the ID 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.

The main benefit of having negative ATC (in the current setup reached by decreasing ID NTC below DA AAC, to the actual physical NTC), would be if the need for countertrade were decided closer to operating hour. Then Intraday trades in the opposite direction of day ahead flow, could have been carried out, without the capacity in day ahead flow direction being made available for the intraday market, and thus reducing the need for countertrade.

Intraday



5.2 TSO-TSO trade

TSO-TSO trade is a separate schedule only between the TSOs that is aggregated with the commercial schedules, thereby securing the flow on the border being within the physical limits. The change of the schedule leads to imbalances on each side of the interconnector, which will be handled by a third party, on behalf of Energinet, by placing sell- or buy bids in the intraday market, in the danish bidding zones (DK1 and DK2).

The TSO-TSO trade can take place up to 32 hours (for the last hour next day) till ½ hour before the operational hour – corrections can be done within the hour.

XBID does not have knowledge of the TSO-TSO trade.

6. Market implication of countertrading in XBID

6.1 Bids taking an alternative route

Bids can be matched between the two Bidding zones (BZ) where countertrade is needed if there is capacity on an alternative route. E.g., when countertrading is performed on DK1-DE/LU, no capacity in the DA flow direction will be given to the intraday market, and therefore

German bids cannot be utilized in Denmark through the DK1-DE/LU border. However, German bids can be utilized for needs in Denmark, if there is capacity on the alternative route DK1-DK2-SE4-DE

6.2 Capacity hoarding

Capacity hoarding is *“the acquisition of all or part of the available transmission capacity (ii) without using it or without using it effectively”*¹.

Already today capacity hoarding is practiced in the market. Moving the systematic countertrade on the DK1-DE/LU border to Intraday may increase the market participants incentive to engage with capacity hoarding.

However, Energinet has placed the two trading windows at exactly 15.00 when capacity is released on the Nordic borders, and at 18.00 when capacity is released towards the continent, which allows no time apply capacity hoarding and thereby reduce the efficiency of the markets.

6.3 Reserves cannot participate in intraday

When trading in intraday, balancing bids bid into the Nordic regulation marked as reserves, cannot participate in intraday, and thus not provide the needs occurring due to countertrading. Especially in DK2 and SE4, this might pose a risk, that there will be a lack of liquidity bid into intraday market when upward regulation is needed, and resources are scarce.

Leaving room in the methodology to be able to countertrade in the balancing market as a last resort, would be preferred, but whether this will be possible depends on which rules will be agreed upon amongst the European TSOs.

Energinet further foresees that this split of liquidity may increase the price for reserves, as the market participants committing to reserves, previously could be activated both for special regulation and for balancing purposes, whereas in the future with an intraday countertrade model the reserves will only be used for balancing. Due to this the price for reserves might increase, as market participants would expect a better outcome of participating in intraday than payment for being reserve. However, estimating upwards special regulation is not as easy as downwards regulation, why the market participants have more uncertainty.

6.3.1 Examples of issues with structural countertrade:

In case countertrade on Øresund, requested by Svenska kraftnät, would lead to a need for upward regulation in DK2, and capacity on both DK2-DE/LU and Storebælt (DK1-DK2) is fully used for import (sold in day ahead), then most certainly there will only be few resources bid into intraday market as sell bids, to meet need for upward regulation due to countertrade, as reserves will not be able to participate. In this case we risk paying the maximum price and clear all bids, and still not have enough resources, why Energinet must inform Svk that some of the countertrade volume could not be traded – or the balancing market could be used to cover the remaining need, if this becomes a possibility in MARI.

6.3.2 Examples of issue with unexpected countertrade

In case Øresund trips and there is a need for countertrade (upward regulation in DK2 and downward regulation in SE4), the first couple of hours after the trip will be handled on MARI as imbalances, as mentioned in Example 2 (unexpected countertrade), and the rest of the hours will be traded in intraday. However, in case all resources bid into intraday market in DK2 are

¹ [Guidance Note Transmission Capacity Hoarding \(acer-remit.eu\)](https://www.acer-remit.eu/Guidance-Note-Transmission-Capacity-Hoarding)

cleared, and further upward regulation is needed, then this will have to be settled as imbalance in the end – or countertrade using the balancing market if this becomes a possibility in MARI.

7. Costs of trading in intraday

7.1 Administrative costs and trading fees

Energinet expects that a yearly administrative cost and volume-based fee will be charged by the third party. Once a year (or every quarter/once a month) Energinet will divide the administrative cost and volume-based fee between the adjacent requesting TSOs. The costs will be divided based on their share of the total volumes traded.

7.2 Energy costs

With regards to the costs (and potential income) of buying/selling the countertrade energy, they will be transferred to the requesting TSO.