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ANNEX 2 - IMPACT ASSESSMENT OF MARKET CONDUCT

In the sections below it is assessed to which degree the proposed model can be expected to entail an "unwanted" conduct by market players. Firstly, the approach to the assessment is explained, and then moving into the actual assessment.
Concretely it is assessed to what degree the introduction of counter trade, based on the ID marked, can lead to market manipulation that was not experienced when applying the special regulation as the tool for managing counter trade. To be able to predict "unwanted" conduct or market manipulation a definition of market manipulation must be established. Market manipulation is defined as a conduct that is not anticipated in a competitive market. In general market manipulation in electricity market, in order to increase profit, is done by withholding generation capacity. This can be done in two ways:

- A generator engages in *economic withholding* when it submits an offer curve that leads it to be dispatched for a price–quantity combination that is above its short-run marginal cost curve.
- A generator engages in *physical withholding* when it technically makes some proportion of its plant physically unavailable (perhaps by shutting it down).

The two ways are illustrated below, where the red dotted curve illustrates economic withholding and physical withholding is done by making 400 MW out of 900 MW unavailable. As can be seen both approaches will increase the price from 100 to 10,000 $ in order to balance demand and supply.

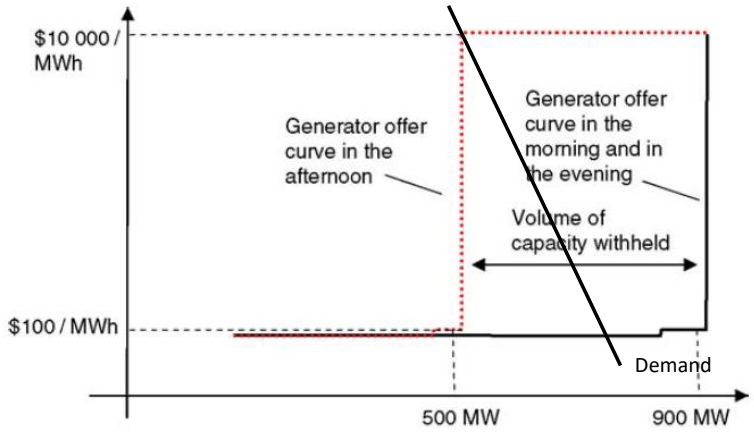

Figure 1: withholding of generation capacity and excessive pricing

Withholding of capacity might take place in market which fundamentally can be characterized as being concentrated. In this assessment it will not be considered if the ID market is too concentrated as the overall motivation of applying the ID market instead of special regulation is that the ID market basically is less concentrated. The ID market is much larger than DK1, where the market for special regulation is only DK1. Instead, it is considered if the ID market design can lead to a triggering of market manipulation, meaning that the very design in some situation can be manipulated by market players into a situation where the market becomes too concentrated and lead to less competitive pricing than surveilled in the market of special regulation.
The reference in the assessment will be the concept of a marked characterized by perfect competition and the assessment performed is whether the application of the ID market proposed can be expected to lead to an outcome that is less efficient outcome compared to the current model applying special regulation. So, the approach is to compare to which degree the distance of the two market designs/places (ID and special regulation) are away from the reference of perfect competition.
This reference is the standard approach applied by competition- and regulatory authorities in preparing antitrust cases such as merger and acquisition cases or cases of excessive pricing by exploiting a company's established market power, but also in a concrete case of e.g. assessing whether capacity hoarding has taking place in a certain electricity marketplace. We will apply this reference as well.
The concept of perfect competition (PC) as reference is applied as it is well known that PC has the potential to lead to an efficient market outcome, thus social surplus is maximized. Market manipulation may lead to situations where the final physical dispatch of generation and consumption can be expected to be out of merit, thus the generation cost electricity is not minimized, and consumer welfare is not maximized.
The concrete conditions or approach for a market player to be able to apply market manipulation is to create a situation where the market becomes more concentrated compared to the ex ante situation or to take advance of an already concentrated market. In electricity market these situations will typically differ from hour to hour as demand and supply condition typically change significantly during a day, where in other markets the concentration might be more persistent. In order to assess the impact in terms of market player conduct of applying the ID market for counter trading, the focus therefore will be if the TSO application of the ID market for counter trading may create or boost the likelihood of the market to become more concentrated.
Applying the ID market for counter trade has raised two concerns of market manipulation.
These concerns are:

1. Energy hoarding, refers to the act of a market participant ('MP') acquiring all or part of the buy orders with the purpose of controlling the pricing of these, e.g. towards the TSO need for managing congestions in the power system, when the TSO is on the selling side
2. Capacity hoarding, refers to the act of a market participant ('MP') 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 MPs (but few) takes a position at each side of a BZ

Below we explain the each of the concerns in turn and test whether the conditions for these concerns can be expected to turn into real market manipulation.

Energy Hoarding

The concern/situation:

Based on the expectation/knowledge that the TSO in, say DK1 will place a sell order in the ID market, a market player may place a sell order in advance of the actual TSO submission of the order, but after the TSO has announced the intention to supply energy. The origin of the TSO sell order comes from the cross-zonal counter trade arrangement with the adjacent TSO. The adjacent TSO needs to reduce net position in DK1, in order to reduce imports into say, DE. This need for a reduced net position materializes into a TSO sell order in the ID market in DK1.
The approach for the market player is to hoard as much of the buy orders and subsequently offer these as buy orders to match the TSO sell order. The hoarding is done by taking a sell order position in advance. By hoarding the buy orders, the market player manage to monopolize the buying side in the subsequent market round. Below a small numerical example is provided in order to see the sequence of the different steps potentially taking by the market player.

1. At T-20 min. the TSO of DK1 announces a sell order of 2,000 MWh in a specific hour at a price of -700 €/MWh, where T is the point in time for the TSO to submit the order to XBID.
2. Somewhere between gate opening of ID (at 15:00 D-1) and time T, the orderbook contains a certain amount of buy orders as the table below illustrates. Shortly after the buy orders has been submitted and the TSO announced the selling of 2,000 MWh, but before T, the market player submits a sell order at 5,000 MWh at a price of -700 €/MWh. The sell order at 5,000 MWh is exactly equal to the total amount of buy orders

BUY order (bids)		SELL order (asks)	
Amount, MW	Bid price, €/MWh	Amount, MW	Bid price, €/MWh
100	250	5,000	-700
200	200	100	300
300	100	300	450
400	80		
1,000	-40		
3,000	-50		
Total 5000			

The sell order price of -700 €/MWh says that the market player is willing to supply 5,000 MWh and pay to "get rid of the energy", hence the negative bid. Please note that the seller is willing

to acquire 5,000 MWh of buy orders even though the expected TSO sell position is only 2,000 MWh. The motivation is to acquire the total amounts of buy orders or in other words to have a single ownership of all buy bids, which potentially will be matched with the TSO sell orders. The stated selling price of -700 €/MWh[1] is no coincidence, as it on the one hand secures all buy orders will be acquired, thus monopolized, by this market player, and on the other hand able to match the expected selling of the TSO at a price of -700 €/MWh and make a profit. The table below illustrates the subsequent round in the ID market for the particular hour.

BUY order (bids)		SELL order (asks)	
Amount, MW	Bid price, €/MWh	Amount, MW	Bid price, €/MWh
5,000	-700	2,000	-700
		300	300

Assuming that the TSO did submit the bid to ID before the market player, the settlement price will be -700 € and the profit for the market player is (700-3.25)€/MWh X 2,000 MWh = 1,393,500 €. The market player is still left with an open buy position of 3,000 MWh, which potentially may lead to an imbalance for the market player. In order not to face the imbalance he may be able to make a trade of this amount with the market player that had an open buy position of 3,000 MWh at a price of -50 €/MWh, cf. the first table. Concretely he could pay 50€/MWh for a producer to produce (again) or a consumer for not consuming. This would entail a loss of 50 €/MWh X 3,000 MWh = 150.000$. This loss is however by far lower than the profit from trade with the TSO, leaving the market players with an overall positive net profit of 1,243,500 €.

BUY order (bids)		SELL order (asks)	
Amount, MW	Bid price, €/MWh	Amount, MW	Bid price, €/MWh
3,000	-50	3000	-50
		100	150
		300	300

The assessment:

Now the question is if the situation described above is realistic, meaning that this will occur systematically and persistent and not as seldom single events, that may occur in rare cases. To answer this question, it is needed to investigate to what degree the market player above can "maintain this game" without entry of other market players. It is well known from micro economic theory and practice that persistent profit in a market will attract other market players. At what speed entry will happen is different in different markets, but it will happen in case of low or no barriers. This holds also for so-called contestable markets[2]. Only if the barriers of en-

[1] Please note the market players does get a better payment as -200 €/MWh and will be the weighted average of buy orders as these went into the XBID before the seller. The weighted average is -3.25€

[2] https://www.investopedia.com/terms/c/contestablemarket.asp

try are sufficiently high the market player may be able to take advance of the difference between the initial buy position and the negative selling price of the TSO, hence he will make a systematic profit.

It is concluded that such barriers does not exists, for four reasons:

1. If this game took place systematically and persistent there could probably be filled a case of abuse of dominant position by the competitions authorities as this conduct would probably not be seen in a market of competition; in a market of competition persistent excessive pricing is not possible. The potentially illegal conduct may prevent the market player from doing this in the first place.
2. The key-thing for the market players is to submit the sell bid of 5,000 MWh at a right point in time to be matched with the open buy orders. There is nothing that prevent other market players for trying to do the same thing, thus it will weaken the initial market players attempt to put to much resources in this game as he know that others may capture the bids as well.
3. The initial buy orders (from the first table) will see that their orders are matched only to be used for arbitrage towards the TSO sell order. Assuming the BRPs behind these bids aims at maximizing their profit, the outlook for profit will cause these to adjust their bids, hence capturing some of the profit initially captured by the market player. There are no barriers that will prevent these BRPs to do this or in other words the conditions for the initial market player to capture the profit systematically and persistent does not exist.
4. Other market players will see that the initial market players can make a profit in hoarding all energy bids. The impact is that other market players may submit bids with the purpose of hoarding and monopolize the buy positions. However, if another market player shall succeed, he needs to submit a selling bid price below -50 € in order to win against the in initial market players. There is nothing that prevents other market players to enter into that bidding game, thus it may be expected competition will put a downwards pressure on selling prices, thus the wind fall profit will decrease to 0 or close to 0.

There may however exist one barrier of entry. In case of no available capacity (after DA market) on the interconnectors between DK1 and SE/NO/DK2, market players of Norway, Sweden and DK2 may not be able to participate in offering buy bids, cf. point 3 above. This may leave the market of DK1 as closed and prevent competition from adjacent areas. However, this will not be the case in all hours. Compared to the current practice of applying the special regulating market, this is assessed to be an improvement as the only bids applied in the special regulating market was DK1 bids and asset based. Congestions on the interconnectors as barrier of entry does not exist for the "hoarding game" of point 4. The submission of the initial 4,000 MWh is purely financial and has no "physics behind", thus a market player from, say, Australia can take advance of the situation.

CAPACITY HOARDING

The concern/situation:

The concept of capacity hoarding has already been well explained by ACER in the Guidance note On *The Application Of Article 5 Of Remit On The Prohibition Of Market Manipulation - Transmission Capacity Hoarding*. Capacity hoarding is understood as *the acquisition of all or part of the ATC means that a MP buys and sells simultaneously contract(s) for the supply of electricity in two bidding zones that implicitly contain(s) the ATC needed for the electricity to be delivered from the other bidding zone.* The MP might submit a buy order on the one side of the

BZ border and a parallel sell order at the other side. XBIDs matches these orders and simultaneously with the matching, the capacity on the interconnector (ATC) will be allocated to this MP. Consequence is that no other MPs can use the capacity[3] for the particular hour(s).
As the market approaches to the hour of operation the MP might reverse the trade (entirely or partially) by placing new (opposite) bids in the ID market. This in order not to face an imbalance, in case the original intention was not to actual use the capacity.
To concretely illustrate the situation, example 2 and 4 from the ACER guidance note are re-produced below.

Description of the situation:

The ATC between bidding zones A and B for the hour 20 (19:00-20:00) is 500 MW in each direction.

In the intraday continuous electricity market a MP enters a sell order in bidding zone A and a matching buy order in bidding zone B for the hour 20 and a quantity of 500 MW. As the ATC between the two bidding zones exists, it is allocated implicitly and the two orders match, i.e. a cross-zonal wash trade is performed. Through the wash trade, a MP implicitly acquires all the ATC from bidding zone A to B (500 MW). After the transaction, the ATC for the hour 20 is 0 MW from A to B (and 1,000 MW from B to A).

Later in the trading session the MP fully reverses the wash trade by buying in bidding zone A and selling in bidding zone B 500 MW of electricity for the same hour of delivery (hour 20).

Interpretation:

Capacity hoarding - This case meets both criteria for capacity hoarding:

(i) *Acquisition of all or part of the ATC* - The MP enters into two arrangements for the sale/purchase of wholesale energy products. Although the orders to buy and sell are placed in different bidding zones, they match as a result of the implicit capacity allocation mechanism. In this way the MP acquires all the ATC from bidding zone A to B;

(ii) *Without using the ATC* - As a result of the netting effect of the two opposing wash trades, the ATC is not used by the MP. Without these transactions, other MPs could have used this ATC between the bidding zones during the time span the capacity was not available.

Considerations:

Figure 2: ACER example 1 in capacity hoarding guidance note

The capacity hoarding basically serves one of two objectives (Cf. ACER):

1. Give or is likely to give false or misleading signals to the market as to the supply, demand or price, and therefore falls under the category of market manipulation (Article 2(2)(a)(i) of REMIT), or it intends to do so and falls under the category of attempted market manipulation (Article 2(3)(a)(i) of REMIT).
2. Secure or attempts to secure the price of a wholesale product at an artificial level (price positioning), and therefore falls under the category of market manipulation (Article 2(2)(a)(ii) of REMIT), or it intends to do so and falls under the category of attempted market manipulation (Article 2(3)(a)(ii) of REMIT).

As an example of bullet point two ACER provides example four:

[3] Please note that the method for allocation is implicit. Explicit is not discussed as this is not applied in XBID on Danish BZ borders

Summary:

Market manipulation in the intraday electricity markets through the non-use of 100 MW of transmission capacity that positions the price at an artificial level in bidding zone B.

Description of the situation:

During the trading session for electricity in the intraday time frame, the following succession of events occurs (numbered with Ts):

T1: For a specific hour of delivery in the intraday market, the bidding zones A and B form a single price zone (prices are the same in both zones), with 200 MW unused capacity available for trading between them in both directions. In the shared order book, sell orders from bidding zone A form the "asks" and buy orders from bidding zone B form the "bids" of the bid-ask spread which is 28-30 euro/MWh. MP Y is the one with the best bid (28 euro/MWh).

T2: MP X performs a wash trade across bidding zones, simultaneously selling 200 MW in bidding zone A and buying 200 MW in bidding zone B at a price of 29 euro/MWh.

T3: The wash trade splits the price zone into two price zones, as transmission capacity between the bidding zones is not available anymore. The bidding zone A has now moved to a bid-ask spread of 20-30 euro/MWh and bidding zone B has moved to a bid-ask spread of 28-41 euro/MWh. Afterwards, MP X places a sell order of 200 MW in bidding zone B at a price of 40 euro/MWh (this becomes the best ask and the bid-ask spread is now 28-40 euro/MWh in zone B).

T4: At some point MP Y in B realizes it will not be able to buy at the price of 28 euro/MWh, and matches the ask of 40 euro/MWh for 100 MW. Following immediately, MP X, who performed the wash trade and sold the 100 MW to MP Y in bidding zone B, buys 100 MW at a price of 30 euro/MWh in bidding zone A, matching the lowest ask.

T5: No further trading happens until close to the end of the trading session when the wash trade is reversed for the remaining 100 MW at a price of 29 euro/MWh.

T6: At the end of the trading session, there is 100 MW of the ATC remaining from bidding zone A to B.

This succession of events can be illustrated in the Figure below:

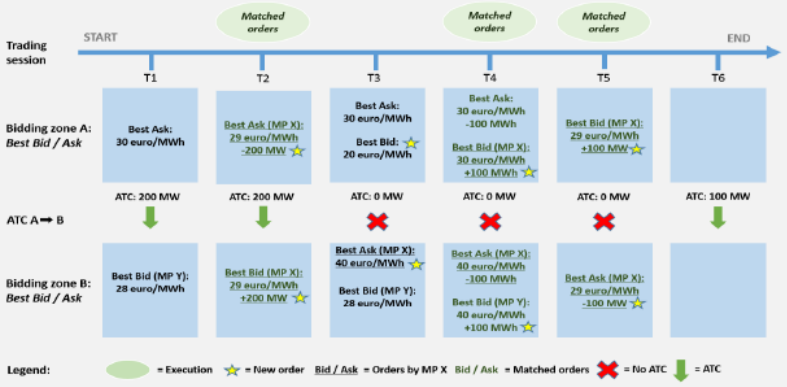

Figure 3: ACER example 4 in capacity hoarding guidance note (price positioning)

No matter of the objective, one or two, all capacity hoarding share one common feature, which is the attempt to decrease the size of the market and hereby concentrate the market by decreasing the number of market players impacting or neutralize competition. Below is an illustration of the approach. In case of no capacity hoarding the bidding zone of A and B constitute one common marketplace or the relevant market as phrased within antitrust legislation and "language". This is a common market as the capacity (ATC) of the interconnector is large enough to secure well-functioning competition between generators in A and B towards consumers in both zones; if a generator in B attempts to do excessive pricing, he will face a response from generators in A.

The "task" in terms of market manipulation for the generator in B is to create a situation where he does not face competition from other generators. He cannot prevent other generators in B to supply electricity and/or balancing energy as they market wise is part of the same "copper-plate", but he is able to prevent generators in A to supply if he can block the capacity on the interconnector. This blocking can be done by hoarding capacity and may in some situations (hours or locations) be enough to decrease the size of the market.

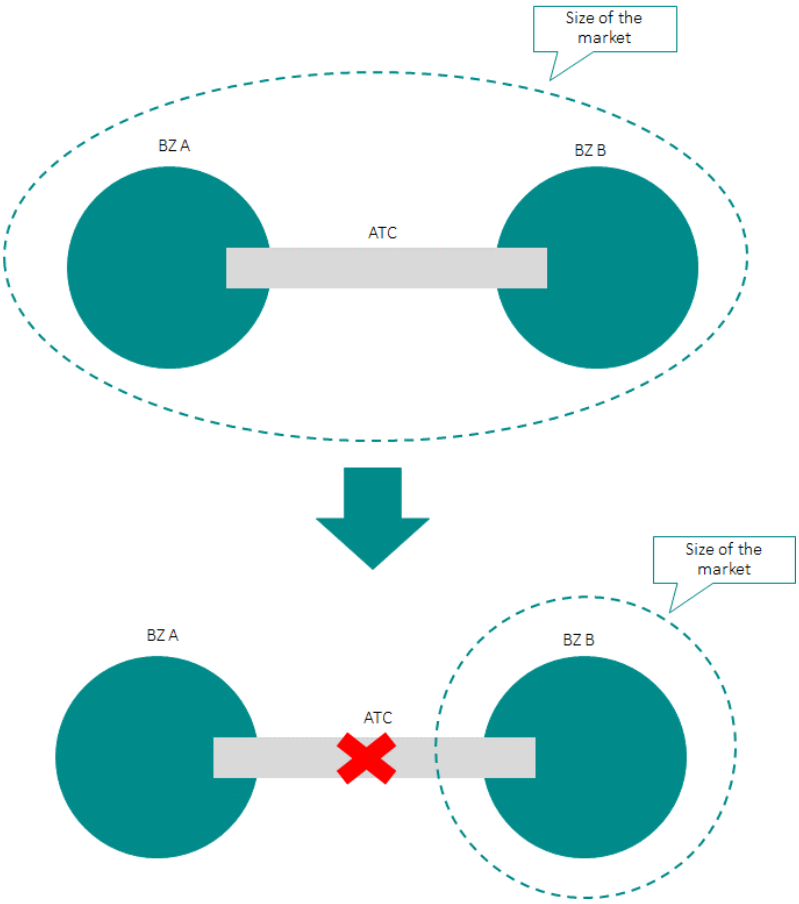

Figure 4

The illustration serves the purpose to illustrate the attempt to do market manipulation, performing excessive pricing is linked to – and only linked to the size of the market. In the above case its about capacity hoarding, in the ID market is about taking position in order for the ATC to be allocated to you. In other situation market manipulation might be done by taking advance of the fact the electricity cannot be stored, thus different hours might not be part of the same relevant market, hence electricity markets do not have an intertemporal dimension[4], thus surplus of electricity in one particular hour cannot be supplied in other hours of excessive pricing. The assessment of whether the application of the ID market for managing counter trade will therefore have to focus on the potential for a market player to, not only decrease the size of the market, but decreasing the size of the market to such degree that the relevant market becomes sufficiently concentrated in order for the market player to be able to control pricing.

ACER defines capacity hoarding as *(i) the acquisition of all or part of the available transmission capacity (ii) without using it or without using it effectively*. (see page 6 in GUIDANCE NOTE 1/2018 ON THE APPLICATION OF ARTICLE 5 OF REMIT ON THE PROHIBITION OF MARKET MANIPULATION - TRANSMISSION CAPACITY HOARDING). From the definition is it clear that hoarding is not just about acquiring capacity it is also about how it is used. Without using it or without using it effectively refers to a situation where the acquiring of cross-zonal capacity in the ID timeframe prevents an economic efficient market outcome. From this it is seen the

[4] Branding of goods is basically a way of decreasing the size of the market or monopolizing your product; if consumers believe that Coca Cola is better and different from Jolly Cola and the price of Coca Cola is 2-3 times higher than Jolly, Coca Cola can be said to succeed in decreasing the size of the market (this is already well-known within Industrial Economics) .

ACER definition and understanding of capacity hoarding applies the reference of the competitive market, also outlined in the beginning of this chapter.

The assessment:

Now the question is if capacity hoarding is realistic, meaning that this will occur systematically and persistent and not as seldom single events, that may occur in rare cases.

It cannot be concluded that capacity hoarding will not take place. However, it can be concluded that the potential for a market player to decrease the size of the ID market of DK1 is lower compared to apply the market for special regulation for counter trade. Applying the ID might in some cases lead to capacity hoarding and thus leave DK1 as a concentrated market. But due to the fact that only suppliers located in DK1 can participate in special regulation, the market for special regulation de facto works as capacity was hoarded in all of the hours and on all interconnectors.

Capacity might or might not be hoarded as part of the ID market. On the one hand capacity might be hoarded due to the basic feature of the ID market as being a market where transmission capacity is allocated on a 'first come, first served' basis and is normally acquired at a price equal to zero. Acquiring of capacity is basically about acquiring an option (as a financial option) but at a price of zero. A good which has a value but a price of zero will of cause attract market players as nobody will "leave money untouched in road side".

On the other hand, some elements might not support that hoarding might occur:

1. If this game took place systematically and persistent there could probably be filled a case of capacity hoarding by the competitions authorities. The potentially illegal conduct may prevent the market player from doing this in the first place.
2. There is nothing that prevent other market players for trying to do the same thing, thus it will weaken the individual market players attempt to put too much resources in this game as he know that others may do this as well. And please note that capacity can also be acquired by competitors outside DK1, thus putting a competitive pressure on DK1 assets.
3. To create a situation where the ID market of DK1 is just as concentrated as in the market for special regulation, a market player shall be able to hoard capacity on all interconnectors simultaneously – DK2 / NO2 / SE3 in order to be able to fully control the pricing (besides competitors located in DK1). DK1 is strongly interconnected to other markets relative to the size of the area, which does not support that significant hoarding will take place.
4. As also recognized by ACER, electricity intraday markets are more prone to manipulation by means of capacity hoarding than other time frames. This is due to the fact that, in these markets, transmission capacity is allocated on a 'first come, first served' basis and acquired a price equal to zero. However, as capacity pricing will be introduced in XBID at some point within a few years, the incentive to hoard will decrease significantly as first come, first serve will be replaced by auctions.