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Regulation C2:

The balancing market and balance settlement

December 2017

In case of any discrepancy between the Danish text and the English translation, the Danish text shall prevail.

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Introduction

This regulation describes Energinet's organisation of the balancing market and specifies the rules for settlement of regulating power and balancing power.

- The pivotal theme in the regulation is *the terms governing the daily balance settlement*.

The regulation is therefore primarily aimed at players that have signed an agreement with Energinet in order to become balance responsible parties (BRPs) and to suppliers of regulating power. The regulation is also of interest to all who basically qualify to become BRPs, ie grid companies, electricity producers and electricity traders.

The regulation is effective within the framework of the Danish Electricity Supply (Consolidated) Act no. 418 of 25 April 2016 with subsequent amendments.

The regulation has been issued under the provisions of section 7(1)(i) and (iv) of Executive Order no. 891 of 17 August 2016 on transmission system operation and the use of the electricity transmission grid etc. (the executive order on system operation).

The regulation will be filed with the Danish Energy Regulatory Authority.

Complaints about the regulation can be filed with the Danish Energy Regulatory Authority, Carls Jacobsensvej 25, DK-2500 Valby.

This regulation takes effect on 20 December 2017.

In addition to this regulation, Energinet has prepared a memorandum no. ELT2004-230, 'Todelt balanceafregning' (Two-stage balance settlement) (only available in Danish), which describes the basic concept and details behind the settlement of power imbalances. The memorandum can be accessed on Energinet's website or obtained by contacting Energinet.

Further information and answers to queries can be obtained from Energinet's contact person responsible for Regulation C2, see Energinet's website www.energinet.dk, where the regulation applicable at any time can also be downloaded.

Revision

Section no and text	Revision	Date	
2	Deadline for adjustment of regulating-power bids changed from 30 to 45 minutes prior to the upcoming delivery hour. Already activated regulating-power bids cannot be adjusted. Three-hour postponement of matching procedure for regulating power on the day after the day of operation.	HEP	October 2008
3	New definition of imbalances, and introduction of one-price model for consumption and trade, see proposal for harmonisation of balance settlement in the Nordic countries. Settlement of power imbalances is only effected in relation to adjustable production in Western Denmark.	HEP	October 2008
2	Up and down regulation within the same hour is settled at marginal prices in the appropriate directions. Possibility of using € in regulating-power bids.	HEP	December 2009
3.6	Consequences due to the introduction of the supplier centric model. Preliminary balance sheets will be issued no later than 4 p.m. on the 6th working day after the day of operation. Final balance statements are issued immediately after the 1st re-fixation.	USS	August 2016
2.2	Minimum regulating-power bids are reduced from 10 MW to 5 MW.	HEP	December 2017

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Appendix 1: Examples of the determination of the direction and price of a regulation.

1. General

This regulation is aimed at balance responsible parties (BRPs). A BRP handles balance responsibility to Energinet for a given production plant, consumption or trade.

The BRPs are committed to submitting a notification to Energinet for every 24-hour period and to settling imbalances, if any, pursuant to the rules for settlement applicable at the time in question. BRPs for production or adjustable consumption must furthermore submit operational schedules to Energinet.

This regulation describes Energinet's organisation of the balancing market and specifies the rules for settlement of regulating power and balancing power.

The information communicated in notifications and power schedules is described in detail in Regulation C3, and the determination of actual consumption/production in the form of settlement metering etc. is carried out according to the rules laid down in Regulation D1.

1.1 Regulating power and balancing power

The balancing market is divided into a regulating power market and a balancing power market.

On the regulating power market, Energinet buys/sells power (regulating power) from/to the players in the delivery hour on the basis of bids for upward and downward regulation submitted to Energinet by the players.

On the balancing power market, Energinet buys/sells power (balancing power) from/to the players in order to neutralise imbalances incurred by them. Contrary to the procedure applicable to regulating power, the result of these trades is not calculated till after the delivery hour when metered data is available and the imbalances have been quantified.

2. Regulating power

Energinet is in charge of ensuring the physical balance of the power system, including the minimisation of unforeseen imbalances in relation to neighbouring areas in pursuance of existing agreements.

Energinet is part of a common Nordic regulating power market operating along the same fundamental principles as the spot market. On the regulating power market, a market price ('RP price') is formed hour by hour, which will be identical in all electricity spot market areas provided that no bottlenecks develop. As will be seen below, this RP price is a decisive parameter in the formation of the balancing-power price.

2.1 Participation on the regulating power market

To participate on the regulating power market the player must conclude an 'Agreement on balance responsibility' with Energinet.

The player's participation can follow one of two different models:

1. Based on Energinet's invitation to tender for ancillary services and regulating reserves, the player can conclude an agreement on keeping manual reserves available. This type of agreement commits the player to entering regulating-power bids for a specified volume

over a specified period of time. On activation (reserve market), the player receives in return an availability payment in excess of the energy payment.

2. The player can refrain from concluding such an agreement, instead entering regulating-power bids as he sees fit. On activation, the player is not entitled to any availability payment in excess of the energy payment.

Model 1 involves the conclusion of a bilateral agreement between the player and Energinet, which determines in detail the terms for obtaining availability payment, etc.

Both models involve entering of bids, activation and settlement of energy payment and imbalances pursuant to this regulation.

2.2 Requirements relating to regulating-power bids

Regulating-power bids must be submitted to Energinet, and Energinet will enter the bids on the common IT platform for the Nordic regulating power market, NOIS¹. The bids must fulfil the following requirements:

- The bids must be submitted to Energinet and may cover an entire day of operation.² The entered prices and volumes can be adjusted – by the player – up to 45 minutes prior to the upcoming delivery hour, reckoned from the time Energinet receives the request for adjustment.³
- The prices (DKK/MWh or €/MWh) and volumes (MW) entered for the next day of operation must be specified – hour by hour – separately for upward regulation and downward regulation.
- Bids can be entered for a minimum of 5 MW and a maximum of 50 MW and may refer to one plant or groups of minor plants/facilities.
- Upward regulation figures must be given using positive values and downward regulation using the negative sign.
- The player must be able to fully activate a given bid in maximum 15 minutes from receipt of the activation order.
- The minimum price of upward regulation in a given hour shall be the electricity spot price of the area in question.
- The maximum price of downward regulation in a given hour shall be the electricity spot price of the area in question.⁴
- The maximum price of upward regulation shall be DKK 37,500/MWh (~ € 5,000/MWh).

Regulating-power bids must moreover include a number of parameters enabling precise identification of supplier and bid reference, see regulation C3, section 6.2.

In extraordinary situations where a regulation is needed that exceeds the submitted bids, Energinet may invite additional bids. Bids involving special limitations in time and volume are processed separately, see section 2.5.

¹ Nordic Operational Information System – a common platform with all the regulating-power bids submitted by suppliers in Norway, Sweden, Finland and Denmark.

² Players committed to supplying ancillary services and regulating reserves must submit their first bid, corresponding as a minimum to the volume of their agreed reserves, to Energinet not later than at 17:00 on the day before the day of operation.

³ In special situations, Energinet may activate regulating power bids several hours ahead. Once such a bid has been accepted, the price of the reserved volume cannot later be changed by the relevant supplier(s).

⁴ On days when Nord Pool Spot uses preliminary exchange rates in the determination of electricity spot prices, the preliminary electricity spot price will stand, and the price will not be corrected subsequently.

2.3 Activation of regulating-power bids

The sequence in which regulating-power bids are activated in accordance with to the common Nordic regulating-power list is normally determined by the price, starting with the lowest price.

Activation of regulating-power bids in Denmark will always be effected by Energinet irrespective of the origin of the demand for regulation.

Orders for upward or downward regulation are communicated either on the basis of power schedules at 5-minute intervals sent to the player by Energinet or by direct activation without any exchange of schedules, see regulation C3, section 6.2.

Regardless of the mode of activation, the player's commitment is converted into a supplementary schedule constituted by 24 MWh/h commitments. Settlement is effected on the basis of the supplementary schedule together with the approved price bid for the regulation.

It is sometimes necessary to bypass one or more bids on the regulating-power list. This happens with

- regulating-power bids that cannot be activated because of a bottleneck.
- regulating-power bids that cannot be activated in compliance with the trade conditions laid down by the Nordic system operators.

Bypassing bids may also be relevant in cases of special regulation, see section 2.6.

2.4 Definition of upward and downward regulation hours

It is the sum of activated bids on the NOIS list that determines whether the overall situation in a given hour has been one of upward or downward regulation or no regulation at all.

Consequently, it is not the local demand that determines the direction of the regulation but the aggregated net regulation carried out in the Nordic area. In cases of both upward and downward regulation activated in a given delivery hour, it is the net energy resulting from the activation of regulating power that defines unambiguously the direction of the regulation in the relevant hour.

In case of bottlenecks between electricity spot market areas in the delivery hour, the direction of the regulation may not be the same in all the areas.

Appendix 1 provides examples of how the direction of the regulation and its price are determined in various situations.

2.5 Pricing of regulating power

The price of regulating power (the RP price) on the common Nordic regulating power market is determined according to the marginal price principle and is calculated on an hourly basis in all the electricity spot market areas. The RP price is therefore usually set at the price of the most recently activated bid on the common regulating-power list, NOIS, provided that bottlenecks or other problems do not hinder the free exchange of regulating power between the electricity spot market areas.

The following rules apply for Denmark:

- Only regulating-power bids that players submit to Energinet of their own accord and through the designated channels and which are adequately specified in terms of price and volume are sent on to NOIS, and only such bids can influence the direction of the regulation and its price.
- Bids involving special limitations in time, volume and mode of activation can be activated under special circumstances and are settled at the player's price bid (pay-as-bid).⁵
- Pay-as-bid is furthermore used as settlement principle if expressly agreed with the supplier pursuant to his contract.
- For a regulating-power bid to be price-defining for a given delivery hour, the regulation must have been effective for at least 10 consecutive minutes of the hour in question.⁶

2.5.1 Pricing without the influence of bottlenecks

The RP price is determined on an hourly basis in all the electricity spot market areas. The RP price is set at the price of the most recently activated bid on the regulating-power list ranked according to price, NOIS.

It is therefore the highest activated regulating-power bid in the Nordic area that determines the common price of regulating power in all electricity spot market areas as long as there are no bottlenecks.

2.5.2 Pricing influenced by bottlenecks

The existence of a bottleneck between the electricity spot market areas becomes clear when balance regulations cannot be carried out according to the common regulating-power list without deviating from its usual price order, ie some of the bids have been bypassed.

Bottlenecks in the direction to or from an electricity spot market area, which occur on account of an imbalance in the area, will result in a split regulating power market, and as a consequence the area experiencing the bottleneck will have its own RP price.

When a bottleneck develops between electricity spot market areas in the delivery hour and, as a result, a regulating-power bid in a particular area cannot be activated, the area in question will have its own RP price, determined by the most recently activated bid on the common regulating-power list prior to the development of the bottleneck. For the other electricity spot market areas, the RP price is set at the level of the most recently activated bid on the common regulating-power list.

The same procedure is used for regulating-power bids in situations where bids on the NOIS list are bypassed due to limitations in trade between the Nordic system operators.

2.5.3 Upward and downward regulation during the same hour

If both upward and downward regulation bids are activated in the same delivery hour, the two types of regulating-power bids are settled according to marginal pricing.

If the aggregate result for the hour is one of upward regulation while downward regulation bids have been activated in Energinet's area, the downward regulation bids are settled at the

⁵ Examples of special bids are regulating-power bids from players south of the West Danish-German border, for which bidding and activation take place according to special arrangement, and regulations pursuant to the emergency plan DAVS (local warning system). Such bids are not sent on to the NOIS list and therefore influence neither the RP price nor the balancing-power price.

⁶ If the activation of a given regulating-power bid has been effective for less than 10 minutes, the relevant bid is settled at the player's price bid (pay-as-bid).

marginal price of downward regulation. The upward regulation bids are settled at the marginal price of upward regulation.

If the aggregate result for the hour is one of downward regulation while upward regulation bids have been activated in Energinet's area, the upward regulation bids are settled at the marginal price of upward regulation. The downward regulation bids are settled at the marginal price of downward regulation.

2.6 Special regulation

Special regulation is applied when Energinet makes a specific selection of regulating-power bids for upward or downward regulation disregarding the usual price order. This may occur either as a consequence of bottlenecks in Energinet's grid, bottlenecks/restrictions in the transmission grids of neighbouring areas or in case of announced or unannounced testing of reserve plants. Regulating-power bids used for special regulation are settled at the bid price (pay-as-bid)⁷.

2.7 Settlement with suppliers of regulating power

Every time Energinet issues a power schedule to a player or effects direct activation, the order is simultaneously converted into a supplementary schedule. At the end of a day of operation, a time series (24 MWh/h values) is therefore available showing the player's commitment according to the regulating-power bids activated.

Not later than at 12:00 on the day after the day of operation, Energinet sends the player a statement of the regulated volume as recorded by Energinet and the price involved.

The player must report any discrepancies he may have found between Energinet's statement and his own not later than at 16:00 on the first weekday after the day of operation.

Discrepancies, if any, must be resolved by the player and Energinet not later than at 16:00 on the first weekday after the day of operation. Disputes that remain unsolved by this time will be dealt with outside the ordinary regime for regulating-power settlement.⁸

Invoicing of or crediting for regulating power is effected for one calendar month at a time, see section 3.6.2.

3. Balancing power

3.1 Calculation of settlement basis

The settlement basis for balancing power is constituted by the submitted BRP notifications and power schedules and the metered values required to compute the BRPs' consumption and production.

⁷ The pay-as-bid rule in connection with special regulation only applies if it has been necessary to bypass bids on the NOIS list in order to carry out the necessary regulation. If it turns out after the delivery hour that no bids on the list ranked according to price, NOIS, have been bypassed, the special regulation made is settled at the RP price of the area.

⁸ If, after expiry of the ordinary deadline, the player is able to identify a material error in the regulating power computation, the error will be corrected in connection with the ordinary monthly settlement or the correction settlement, see Regulation D1.

3.2 Notifications of consumption, trade and production (BRP notifications)

The notification, which forms the basis for the balance settlement, is made up of one to maximum three elements:

- The original notification submitted by the BRP and approved by Energinet the day before the day of operation.
- Adjustments to the notification submitted by the BRP and approved by Energinet during the day of operation as a consequence of intraday-trade.
- A supplementary schedule in accordance with the BRP's regulations activated by Energinet, see section 2.7.

3.2.1 Operational schedules from BRPs

In addition to the notifications, BRPs for production and consumption with adjustable consumption must be prepared at any time to provide Energinet with information about the anticipated operation of their plants/facilities in the form of power schedules at 5-minute intervals. A set of power schedules from a BRP constitutes an operational schedule.

The first operational schedule must be received by Energinet not later than at 17:00 on the day before the day of operation, and the operational schedules must be adjusted during the day of operation, see regulation C3.

During the day of operation, BRPs with more than one production plant are entitled to make rearrangements between the individual plants within the framework of the overall notification of production. Energinet must be advised of such rearrangements in the form of new operational schedules.

3.3 Recording of consumption and production

After the day of operation, the grid companies or their metering point administrators submit the approved registered time series – individual meterings or aggregated metered time series – as agreed between the system operator and the metered data collectors.

The total number of registered time series serves to ensure that production and consumption can be computed separately.

The rules regarding registration of consumption and production are described in detail in regulation D1.

3.4 Computation and settlement basis – Purchase/sale of balancing power

When all the registered time series from a BRP have been received, his purchase and sale of balancing power is computed for Eastern and Western Denmark separately. The imbalances for each area are computed separately for production and for consumption and trade along the following guidelines:

PRODUCTION

Imbalance = registered production – notification of production

Production is always indicated by a positive sign. If the production imbalance is positive, the actual production has been bigger than planned. The BRP has consequently created a demand for downward regulation.

If the production imbalance is negative, the actual consumption has been smaller than planned. The BRP has consequently created a demand for upward regulation.

In addition to registered imbalances on an hourly basis, BRPs for production or adjustable consumption in Western Denmark are also charged for power imbalances, if any. Settlement of power imbalances is described in section 3.7.

CONSUMPTION AND TRADE

Imbalance = notification of production + registered consumption + notification of trade⁹

As can be seen, the notification of consumption is not an element in the consumption and trade imbalance. The imbalance of a player who is BRP exclusively for consumption is determined as the difference between the notification of trade and the metered consumption.

If the imbalance is positive, the actual consumption has been smaller than planned. The BRP has consequently created a demand for downward regulation.

If the imbalance is negative, the actual consumption has been bigger than planned. The BRP has consequently created a demand for upward regulation.

Consumption and trade imbalance also applies to players that are BRPs exclusively for production, only it always equals 0 unless the final notification does not balance, see section 3.2.

3.5 Pricing of balancing power

In the Nordic electricity exchange area, two models for settlement of balancing power are used – the one-price model and the two-price model. In Energinet's area, as in the rest of the Nordic region, the two-price model is used for settlement of production imbalances, and the one-price model is used for settlement of balancing power in relation to consumption and trade.

THE TWO-PRICE MODEL

1. Imbalances in the same direction as the system's total imbalance and which consequently contribute to the imbalance are settled at the area's RP price.
2. Imbalances in the opposite direction of the system's total imbalance and which consequently 'remedy' the imbalance are settled at the area's electricity spot price.

THE ONE-PRICE MODEL

1. Imbalances, irrespective of direction, are settled at the area's RP price.

The two-price model gives Energinet an operating profit in hours of opposite player imbalances. The profit is used for partial financing of the fixed availability payment for reserve capacity, consequently reducing the system tariff.

Even in hours without active regulation (no regulation), there is still an account to be settled. Some players will have positive imbalances, others negative imbalances. Settlement in these cases is also undertaken by Energinet. The exchange of balancing power between the players is effected at the area's electricity spot price without profit contribution to Energinet.

⁹ It is the norm for notifications of trade to have a positive sign for purchase (energy into the area) and a negative sign for sales (energy out of the area).

3.6 Settlement of balancing power

Energinet performs the balance settlement in relation to the BRPs separately for production, consumption and trade. A BRP for both production and consumption will therefore receive two hourly-based balance computations for every 24-hour period.

The balance settlement is based on the difference hour by hour between consumption and production compared to the submitted notifications and the corresponding values calculated on the basis of hourly registrations.

3.6.1 Computation routines and information

The metered data collectors are responsible for submitting approved registered time series for consumption and production to Energinet not later than at 10:00 on the third weekday after the day of operation, see Regulation D1.

In normal circumstances, Energinet will send the preliminary BRPs balance computations with hourly specification of imbalances in MWh before 16:00 on the 6th weekday after the day of operation. In the balance computation, the imbalances expressed in MWh are also converted into DKK on the basis of the hourly computation of the prices of balancing power.

Final balance sheets per day will be issued immediately after 1st re-fixation, starting 5th working day after the operating month, cf. Regulation D1.

On request, the reports are sent to the BRPs by e-mail in Ediel format. The BRPs can also download the reports in PDF format via Energinet's self-service portal.

The prices of balancing power hour by hour are published on a current basis on Nord Pool Spot's website with approx. two hours' delay. Historical prices for balancing power can moreover be downloaded via Energinet's website.

3.6.2 Dates of payment

Invoicing or crediting of regulating power and balancing power takes place for a calendar month at a time. The settlement basis is created on the final balance sheets.

Amounts due are payable into Energinet's account with value on the 25th day of the month. If this is not a business day, payment shall be due on the next business day.

Energinet's payments are made on the 25th day of the month following the relevant month of settlement. If this is not a business day, payment will be made on the next business day.

Unless otherwise agreed, net payments shall be made in those cases where more than one invoice/credit note has been submitted to a BRP, eg for consumption and for production.

Amounts owing to a BRP will be settled net.

In special cases, Energinet reserves the right to change to more frequent invoicing, including daily invoicing.

3.7 Settlement of power imbalances

In addition to settlement of balancing power on an hourly basis, BRPs for adjustable production in Western Denmark are also charged for power imbalances, if any.¹⁰

3.7.1 Settlement basis

Energinet settles the BRPs' power imbalances on the basis of the difference between:

- the power schedules that are the most recently submitted before real-time operations, converted into quarter-hourly values
- the metered production on a quarter-hourly basis reported by the grid companies after the day of operation.

The sum of all the player's power schedules constitutes one part of the settlement basis. The sum of quarter-hourly registrations from all the player's plants contributes the other part. On this basis, the difference between total power schedule and total meter reading is calculated quarter-hour by quarter-hour. If the deviation is bigger than 2.5 MWh/quarter-hour, a settlement is made for the part of the deviation that exceeds 2.5 MWh/quarter-hour.

In other words, the power-imbalance settlement operates with a 'deadband' of 2.5 MWh/quarter-hour corresponding to a minimum volume of +/-10 MW.

3.7.2 Settlement prices

Two sets of prices are used in the settlement of power imbalances:

- Upward and downward regulation prices for ordinary balancing power (BAL_{up} and BAL_{down}) and
- Upward and downward regulation prices for the use of automatic reserves (AUT_{up} and AUT_{down}).

The development in the balancing power prices can be followed on Nord Pool Spot's website whereas, at present, the power prices for the use of automatic reserves are set at the area price in DK1 (Western Denmark) +/- DKK 100/MWh. Both price sets are determined on an hourly basis.

Power imbalances are settled at different prices depending on the ratio between notification, power schedule and metered result in a given quarter of an hour, as outlined below:

If Metered result > Power schedule > Notification → (Metered result-Power schedule) x (BAL_{down} - AUT_{down})

If Power schedule > Metered result > Notification → (Metered result-Power schedule) x (BAL_{down} - AUT_{up})

If Metered result > Notification > Power schedule → (Metered result-Power schedule) x (BAL_{up} - BAL_{down})

If Notification > Power schedule > Metered result → (Metered result-Power schedule) x (BAL_{up} - AUT_{up})

If Notification > Metered result > Power schedule → (Metered result-Power schedule) x (BAL_{up} - AUT_{down})

¹⁰ What is referred to is in reality balance settlement of production on a quarter-hourly basis. For a detailed description of the settlement model, see Energinet's memorandum ELT2004-230 'Todelt balanceafregning' (Two-stage balance settlement) (only available in Danish).

If Power schedule > Notification > Metered result → (Metered result - Power schedule) x
(BAL_{down} - BAL_{up})

It is only the part of the deviation that lies beyond the deadband of 2.5 MWh/quarter-hour that is settled. As previously mentioned, prices are determined on an hourly basis whereas the imbalances are computed on a quarter-hourly basis. An hour's four quarter-hourly deviations are therefore multiplied by the same settlement prices applicable to the particular hour.

If the settlement prices (BAL_{down} - AUT_{down} and AUT_{up} - BAL_{up}) for a given hour become negative, the values are replaced by DKK 0/MWh.

The settlement of power imbalances will either be cost-neutral in relation to the player or represent an expense. The reason for this is that settlement of power imbalances represents a correction to the ordinary balance settlement. The settlement of power imbalances must take into account that part of the player's total imbalance (the difference between power schedule and metered value) must be settled at less favourable prices (prices for the use of automatic reserves) than the ordinary balancing power prices.

3.7.3 Invoicing

Invoicing of power imbalances takes place on a monthly basis as part of the ordinary balance settlement, see section 3.6.2. The basis for the invoicing of power imbalances will appear from a separate appendix submitted to the BRPs.

4. Special agreements

4.1 Settlement of imbalances with neighbouring system operators

In relation to the system operators of neighbouring areas, Energinet is responsible for the fulfilment of approved 24-hour-period notifications for the interconnections. The notifications are compared to the exchanges agreed on, and deviations are settled according to the rules laid down for each border crossing.

4.1.1 Liability in case of defects on international connections

Every day at 9:30, following discussions with the system operators of the neighbouring areas, Energinet makes public the transfer capacity available for spot trade on the next day of operation on the interconnections to Norway, Sweden and Germany, see Regulation C3.

The trade capacities for the next day of operation available to Nord Pool Spot for trade on Elbas are published on a current basis on Nord Pool Spot's website. The trade capacities may change throughout the day of operation but trades already made are guaranteed.

If, during the actual day of operation, faults occur on the interconnections to Norway, Sweden or Germany that limit the transfer agreed via Nord Pool Spot and TenneT, the system operators on either side will compensate for the fault by counter-trading.¹¹ Counter-trade is not used on the Kontek link but compensation is otherwise ensured by Nord Pool Spot.

Consequently, a fault on an international connection during the day of operation will have no financial bearing on trades made by the market players via Nord Pool's Elspot or Elbas.

¹¹ In case of faults on either the Skagerrak interconnection or the Konti-Skan interconnection it must, however, first be investigated whether it is possible to move the entire delivery or part of it from the defective connection to the operational connection.

The financial settlement between the system operators in case of faults on international connections is settled according to the system operation agreements applicable at the time in question.

4.1.2 Stadtwerke Flensburg

In December 2007, an agreement was concluded between Energinet and Stadtwerke Flensburg (SWF) – 'System Operation Agreement between Energinet and Stadswerke Flensburg GmbH'. The agreement specifies special requirements in relation to SWF's daily submission of notifications and schedules and settlement terms for non-planned exchange.

4.2 Force majeure situations

Energinet can declare force majeure in situations that pose a threat to the security of supply in the form of extensive system disturbances, extreme weather etc. and which result in vast areas remaining without normal power supply.

In force majeure situations, Energinet is entitled to use all the system's resources within the technical limitations of the individual plants with a view to restoring or securing normal operational reliability, see section 27 c of the Danish Electricity Supply Act. The rules applying to payment on the balancing market are suspended at the same time.

In force majeure situations, balancing power is settled indiscriminately at the area price whereas the market players – as would be the case in any other situation – pay each other according to the terms laid down contractually.

APPENDIX 1: Examples of how the direction and price of a regulation is determined

The first three examples given below illustrate the relationship between Western Denmark and the other Nordic countries with regard to determination of the direction of a regulation etc. It is characteristic of Western Denmark that it is connected to the other Nordic countries via HVDC connections. Deliberate action is therefore required to exchange balancing power between the areas whereas in synchronous areas, exchange of a surplus/deficit happens automatically. As part of the common Nordic regulating power market, the HVDC connections are operated as if they were AC connections – in the sense that coinciding surpluses and deficits between the areas are exchanged first before any regulating power from the NOIS list is activated. Balancing power exchanged between TSOs is often referred to as supportive power.

Example 1: *Exchange of supportive power without activation of bids*

- Area 1 has a surplus of 100 MW
- Area 2 has a deficit of 100 MW
- The two areas exchange 100 MW supportive power
- No bids from the NOIS list are activated.

In both areas, the RP price is set at the area's electricity spot price as no regulating-power bids from the NOIS list have been activated (no regulation).

Example 2: *Exchange of supportive power and activation of bids in one direction*

- Area 1 has a surplus of 100 MW
- Area 2 has a deficit of 150 MW
- The two areas exchange 100 MW supportive power
- Area 2 still needs upward regulation of 50 MW
- The lowest bid on the NOIS list is activated (irrespective of whether it originates from area 1 or area 2).

Both areas now experience an upward regulation, and the RP price is identical in the two areas.¹²

Example 3: *Exchange of supportive power and activation of bids in different directions*

- Area 1 has a surplus of 100 MW
- Area 2 has a deficit of 150 MW
- The two areas exchange 100 MW supportive power
- Area 2 still needs upward regulation of 50 MW
- The lowest bid on the NOIS list originating from area 2 is activated.

Later on during the same hour, the surplus in area 1 increases. Due to a bottleneck between the two areas, downward regulation from the NOIS list becomes necessary in area 1.

Consequently, area 1 ends up regulating downwards and area 2 regulating upwards, and, of course, different RP prices apply in the two areas.

¹² Provided that the RP price lies on the right side of the electricity spot price of both areas.

Example 4: Pricing in case of bottlenecks

Upward regulation is necessary in the Nordic countries, and the following bids from the NOIS list have been activated:

Bid no.	Area	Price DKK/MWh	Activated
1	DK1	200	Yes
2	DK1	210	Yes
3	DK2	220	Yes
4	SE	230	Yes
5	DK1	240	No
6	NO1	250	Yes
7	SE	260	Yes
8	FI	270	Yes

DK1=W. Denmark, DK2=E. Denmark, NO1= S. Norway

After activation of bids nos. 1 and 2, the connections out of Western Denmark are fully utilised, ie a bottleneck has developed. Consequently, bid no. 5 cannot be activated.

Upward regulation is taking place in all areas. The resulting price in Western Denmark is DKK 230/MWh corresponding to bid no. 4 ('the bid from the common regulating-power list most recently activated before the bottleneck occurred', see section 5.2.5), while the RP price in the other areas, including Eastern Denmark, is DKK 270/MWh ('the most recently activated bid from the common regulating-power list', see section 2.5.2).

Example 5: Determination of the direction of the regulation in case of bottlenecks

Upward regulation in Norway is necessary whereas the other areas balance. The following bids from the NOIS list have been activated:

Bid no.	Area	Price DKK/MWh	Activated
1	DK1	200	No
2	DK1	210	No
3	DK2	220	Yes
4	SE	230	Yes
5	DK1	240	No
6	NO1	250	Yes
7	SE	260	Yes
8	FI	270	Yes

There is a bottleneck between Western Denmark and the synchronous area right from the start, ie bids from Western Denmark cannot be activated as part of the upward regulation.

In this case, the West Danish situation is one of no regulation, and the RP price is set at the area's electricity spot price. The other areas have been regulated upwards, and the RP price ends at DKK 270/MWh.