



NordREG
Nordic Energy Regulators

Harmonising the balancing market

Issues to be considered

Report 5/2010

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July 2010

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1 Background and purpose

1.1 Introduction

In a liberalised electricity market, the TSO is responsible for maintaining the balance between infeed and outtake of electricity in a control area. Since the TSO does not have production resources of its own, it must acquire balancing resources from players in the electricity market. As actual production and/or consumption deviates from planned production and consumption, the TSO buys balancing resources from actors such as generators and large scale consumers to ensure that the system is balanced at all times.

The TSO must set up a balancing mechanism in order to maintain operational security at any moment. To be compatible with the vision of one electricity market in Europe, such a balancing mechanism must be non-discriminatory, transparent and objective; both for the actors that cause the imbalances and the actors that provide the balancing resources, and also for other players on the market. It is especially important that the mechanism is efficient and easy to access for new market entrants.

In the report “Towards harmonized Nordic balancing services”¹, NordREG has agreed on common criteria to be used when the national regulators were to review the new terms and conditions for balancing that were implemented in 2009, since an evaluation of harmonized rules needs to be done from a Nordic rather than a national perspective even when the evaluation is done by the national regulators according to national legislation. The terms and conditions for balancing services should be:

- Objective: terms and conditions are compatible to a reasonable extent within the Nordic region such that entry barriers are reduced to all market players in all Nordic countries
- Non-discriminatory: terms and conditions are fair and well-founded. There should be no irrelevant favouring of one balance responsible party at another balance responsible party’s expense. This non-discriminatory treatment should apply across the borders
- Transparent: One of the most important rules in a competitive market is that all market participants have access to relevant information at the same time and at the same conditions.
- Cost reflective: The payments retrieved by the TSO from a balance responsible party should reflect the variable costs and a fixed cost element

¹ www.nordicenergyregulators.org, report 3/2008

- NorREG vision: the common balance settlement will be designed in such a way that it contributes to a well functioning market. This means for example that it will be attractive even for small suppliers and some end-users to be balance responsible parties.

The Nordic TSOs have cooperated about a common Nordic balancing market, often referred to as the Nordic regulation power market; a market for manual reserves. In this report we will refer to it as the Nordic balancing market.

1.1.1 Development in Europe with regard to balancing

As national grids and electricity markets have become more interconnected, the interest for cross-border balancing has grown. When national control areas are synchronously connected, the physical characteristics of the power flows in the connected system requires that national TSOs cooperate to balance the system. Furthermore, cooperation can lead to large efficiency gains. There is seldom enough competition within national control areas to form the basis for a competitive market for balancing services. Integrating balancing markets creates more competitive markets and allows for more efficient use of the balancing resources.

In September 2009, the European regulators (ERGEG) published “Revised Guidelines of Good Practice for Electricity Balancing Markets Integration (GGP-EBMI)”² following public consultation. The guidelines address:

- Functioning of balancing markets
- Benefits and key principles for efficient electricity balancing markets integration
- Roles and responsibilities of stakeholders in balancing markets
- Access to interconnection capacity in terms of reservation and charges
- Contracted reserves in terms of cross-border procurement of reserve capacity and amount of reserve capacity
- Approaches to implementing cross-border balancing
- Design of balancing markets in terms of gate closure and technical characteristics of balancing services, balancing services settlement and imbalance settlement
- Transparency and monitoring

²Ref: E09-ENM-14-04 9 September 2009, http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_ERGEG_PAPERS/Guidelines%20of%20Good%20Practice/Electricity/E09-ENM-14-04_RevGGP-EBMI_2009-09-09.pdf

The GGP-EBMI are intended to contribute to the work of the new Agency for the Cooperation of Energy Regulators (ACER), which is in the process of being established, when exercising its duties as regards future Framework Guidelines, in accordance with the provisions of the 3rd package.

Furthermore, the Project Coordination Group, which was established at the Florence Forum in 2008, has addressed cross-border balancing as a part of Target Model for capacity allocation and congestion management for various timeframes. The Nordic balancing model is in line with the proposed Target Model.

1.1.2 Cross-border balancing in the Nordic market area

Cross-border balancing has been employed for a number of years in the Nordic market area. The Nordic regulation power market (balancing market) was introduced in 2002. The common Nordic balancing market is based on cooperation between the TSOs and this model is referred to as a TSO-to-TSO model with common merit order.

The Nordic regulation power market is a market for manually activated reserves, also known as tertiary reserves. Secondary and primary reserves have so far not been part of the regulation power market, though there are plans to introduce secondary reserves as a new product. Primary reserves (frequency controlled or automatic reserves) are not directly a part of the regulation power market. In the following we shall refer to the regulation power market as the balancing market.

Integrating the balancing mechanisms of different countries requires a fair amount of harmonization of legislation, rules, and procedures. In the Nordic region, the balancing mechanisms have been integrated and harmonized in a stepwise way.

One of the main driving forces behind the integration and harmonization of the national balancing mechanisms has been the desire to create a common Nordic end user market for electricity. The Nordic wholesale market for electricity functions to a large extent as a common market for the whole region, but the retail markets are still largely national in scope. The creation of a common Nordic end user market is a prioritized goal of the Nordic Energy ministers, the Nordic energy regulators, the Nordic TSOs and the Nordic electricity industry. Harmonization of the balance settlement mechanisms was seen as one of the key issues in achieving this goal. The possibility of common Nordic balance settlement was studied by both the Nordic TSOs in Nordel and by NordREG during several years, resulting in a number of reports from both sides.

In 2008, the TSOs reached a compromise for a common Nordic balance settlement, which was supported by the Nordic Ministers. Before implementation each of the Nordic regulators scrutinized the proposed model, and the resulting terms and conditions with regard to e.g objectivity, non-discrimination and transparency. The Electricity Directive³ in its article 23 paragraph 2 stipulates that the regulatory authorities shall be responsible for fixing or approving, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for the provision of balancing services.

The harmonization measures that were agreed to were:

- Common gate closure for offers to the regulation power market and for final production and trade plans
- Harmonized cost base for balance settlement
- Common model for the settlement of imbalances

These measures were introduced by Denmark, Finland and Sweden in January 2009, and in Norway in September 2009. The introduction of these measures should be viewed as one step of many on the path to a fully harmonized balancing mechanism in the Nordic region. Another step was the extension of Elbas, a common Nordic intraday market in March 2009 into Norway. Since then, Elbas is used in all Nordic countries.

Since July 2009, Nordel does not exist as an organization. However, the Nordic TSOs continue to cooperate in issues related to the Nordic electricity market and the Nordic synchronous area. Most of earlier Nordel cooperation is now being integrated in the ENTSO-E work. This means that a wider regional view is taken in many issues. Nordel reports can be found on the homepage of ENTSO-E.

The issue of Nordic harmonization thus has to be seen in a wider north European context. Still, in order to create a common Nordic retail market, further harmonization of the Nordic balance settlement and thus also the underlying balancing power market should be a priority issue.

1.2 Purpose of the report

One of the work streams established in NordREG Work Programme for 2009 is related to the Nordic balancing power market and balance management. One of the tasks is to follow up the implementation of the

³ DIRECTIVE 2003/54/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC

common balance management according to what was described above, the other task is related to the efficient functioning of the Nordic balancing power market. While it has been noted that the Nordic wholesale market functions well, there is an expectation that further harmonization of the Nordic balancing power market would improve the efficiency of the market and form the basis for further integration with adjacent markets in the area of balancing services. Therefore NordREG has taken on to investigate in which areas further harmonization can be expected to be cost-efficient and contribute to a better functioning market and how this harmonized market could be monitored.

The task according to the work programme is:

“In its initial work regarding Nordic balancing, NordREG noted that the common Nordic list for bids in regulation power works fairly well. However, there seems to be scope for increased efficiency. This might be attained by identifying important differences in the framework between countries as well as proposing a genuine Nordic harmonisation. It is important initially to discuss to what degree harmonisation is necessary in order to improve the efficient functioning of the market. “ In approaching these topics, NordREG has been discussing with the Nordic TSOs, where appropriate, and has made use of Nordel’s publications on this topic.

This report provides an overview of the current state of integration and harmonization of balancing in the Nordic region. The report also provides a summary of the harmonization measures that might be implemented in the future.

2 Balancing in the Nordic region

2.1 A key function of the TSOs

The national electricity markets in the Nordic region have over time become highly integrated. The wholesale electricity market is a truly Nordic market, and the balancing mechanisms of the individual countries are also characterized by a high degree of cross border balancing. This means that the Nordic synchronous area is to some extent regarded as one balancing area. As long as there is interconnector capacity available, up- and down regulation will be done with the least costly resources without respect to in which of the Nordic countries they are located. Since hydropower is easy to regulate and in most cases also least expensive, Norwegian and Swedish power stations will be utilized for up-regulation to a large extent.

The overall purpose of the balancing function is the need at any moment to keep the balance between the infeed and the outtake from the system. This is a core element of the system responsibility. It is not possible for the players to forecast all changes in consumption, due to weather, and other unexpected circumstances. Likewise, production and transmission facilities may suddenly have to be taken out of service. Therefore, it is normal that certain imbalances occur in the system.

To maintain balance, the TSOs sign balancing agreements with Balance Responsible Parties (BRP). Each consumption and production point as well as connection point for interconnectors, have to have a balance responsible party. And every producer, trader or supplier needs either to be a BRP themselves or have a contract with a BRP – the rules on balance responsibility differ somewhat between the Nordic countries, but the function is basically the same. It is also possible for (large) customers to manage their balance responsibility themselves. The BRPs are required to supply plans to the TSO regarding their planned production and trade which balances their consumption. Each BRP is responsible to plan themselves into balance between infeed and outtake from the system. This can be done by planning production and trade through own production and trade – bilaterally or on the spot market, and the first plan is normally submitted to the TSO shortly after the closure of Nord Pool Spot. Furthermore, the BRPs are financially responsible for any difference between planned and actual production on one side, and trade and consumption on the other side⁴. They therefore have an interest to continue to

⁴ Each generation and consumption point is associated with exactly one BRP. The BRP concept is used in most European countries, but it is not used in some countries such as the UK where actors are not obliged to be in balance but are punished financially if they are not.

adjust their balance for known changes up to the TSOs gate closure about one hour before the operating hour - this intraday trade can be done bilaterally or on Elbas. Through the balance settlement, the costs of the TSOs are retrieved from the BRPs.

Responsibility for ensuring that the system as a whole is balanced at all times rests with the TSO. The TSOs will therefore use the plans submitted from the BRPs in addition to other knowledge in order to make plans for keeping the system balanced. In the Nordic region the TSOs are Statnett for Norway, Svenska Kraftnät (SvK) for Sweden, Fingrid for Finland, and Energinet.dk for Denmark.

With the exception of western Denmark, which belongs to the continental synchronous system, the grids of all four Nordic countries make up one synchronous system.

Since the TSOs do not own any reserves for normal balancing purposes⁵, they purchase balancing services from actors in the market. In the general literature, these actors are called Balance Service Providers (BSP). In the Nordic area, the BSPs are usually BRPs, but in some countries it is possible for non-BRP actors to sell balancing services under certain circumstances.

The Nordic TSOs cooperate in balancing the system. Balancing services anywhere in the system can be used to handle imbalances anywhere in the system, of course with due regard to congestion. The cooperation takes on various forms. For instance, each TSO contributes a certain part to the set of automatic frequency controlled reserves that are used for the region as a whole, according to the Nordic Grid Code. The TSOs also maintain a common merit order list of offered resources for manual up and down regulation. It is displayed for all TSOs through the Nordic Operational Information System (NOIS). Often their merit order list is referred to as the NOIS list.

BSP never interact directly with NOIS. Offers are always submitted to the local TSO which then places the offer in the NOIS list. When offers are selected from NOIS, the activation order is always passed to the BSP by the local TSO.

During settlement TSOs first settle imbalances between countries among themselves, and then each TSO settles imbalances within its country with the BSPs of the country. According to the Nordic System Operation Agreement, Statnett and Svenska Kraftnät, share the responsibility to balance the joint synchronous system with cooperation from the other TSOs.

⁵ The Nordic TSOs may own so-called disturbance reserves or other reserves for extreme situations.

2.2 Reserves

The reference frequency in the Nordic synchronous system is 50 Hz. The frequency is the main measure of balance in the system. In order to handle frequency deviations, there are automatic frequency controlled reserves (also known as primary reserves), mainly power stations fitted with equipment which responds automatically to frequency variations. So that these unit are not part of the balancing market place as such.

According to the definition of the Nordic TSOs, frequency variations between 49,9 and 50,1 Hz are handled by automatic frequency controlled *normal* operational reserves. Response times are required to be 2-3 minutes and the whole region has reserves of this kind of 600 MW. Each TSO is responsible for one part of the total.

Larger deviations between 49,9 and 49,5 Hz, which may be due to disturbances such as power plant shutdown are handled by automatic frequency controlled *disturbances* reserves. Response times are 5-30 seconds and whole region has reserves of this kind of 1000 MW. Again each TSO is responsible for one part of the total.

Both kinds of frequency-controlled reserves are acquired by TSOs using different kinds of contracts with generators. In some cases interruptible load contracts are also used for the frequency controlled disturbances reserves. There is work in progress among the TSOs in order to harmonise the acquisition of frequency controlled reserves. It is important that the processes are transparent to all players.

Frequency controlled reserves are designed for rapid response but low energy volumes. Other kinds of reserves are required for full restoration of balances. In the continental system, some of these reserves with larger volumes and somewhat longer activation times are often automatically activated. In the Nordic region, these reserves are mostly manually activated. There is a discussion among Nordic TSOs of the possible introduction of a certain amount of automatically activated reserves for load frequency control (LFC). In the continental system, this is called secondary regulation. These reserves would have a response time in the range of minutes and have more intelligent activation mechanisms.

In the Nordic system today, mainly manually activated reserves are used to restore the balance after deviations during the operating hour and to relieve the frequency controlled reserves. Most of these reserves are intended to deal with normal deviations and are called *regulation power* reserves and are required to have activation times of no more than 15 minutes and durations of at least one hour. These are offers to increase production or lower consumption when there is a shortage of electricity in the system, or offers to decrease production or increase consumption in situations when there is a surplus of electricity in the system.

The regulation power reserves are combined in a common Nordic merit order list, and this is what is referred to as the Nordic regulation power market, or in this report the common Nordic balancing market.

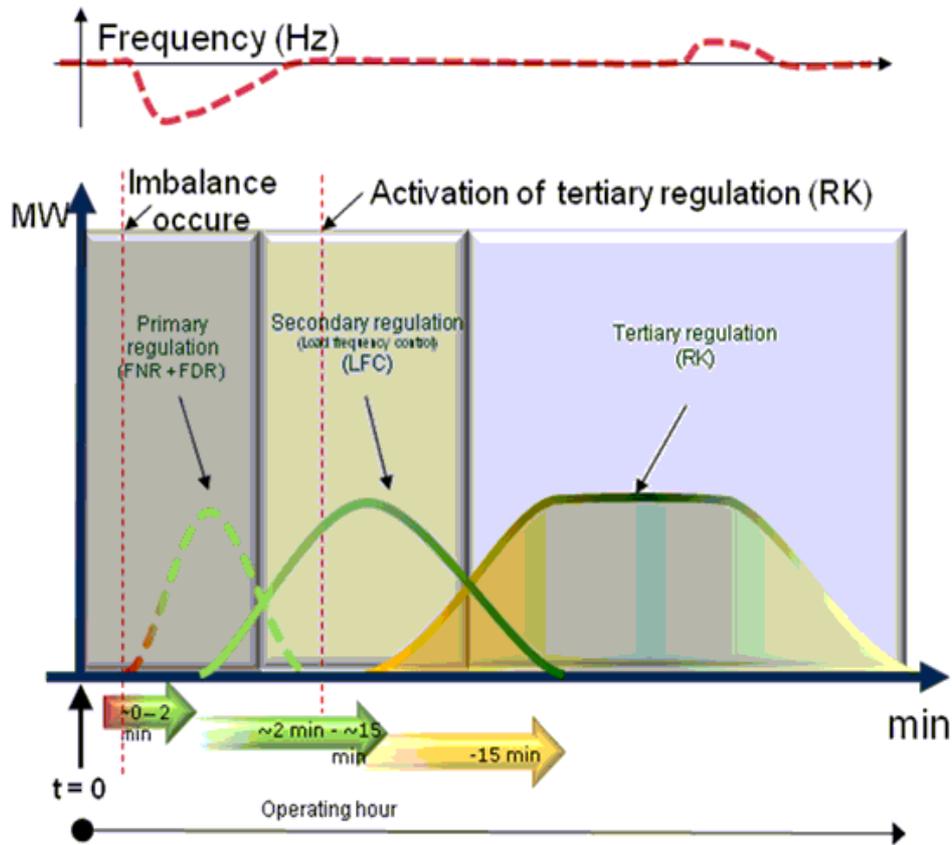
The intention is to use the bids on this list as far as possible to handle imbalances due for forecast errors as well as for counter trade to alleviate congestion problems during the operating hour. If congestion problems are known in beforehand, congestion problems can also be handled by reserves with longer activation times. Congestions normally require the choice of bids which are located in the relevant part of the grid. Therefore only certain bids can be used for counter trade/special regulations. In case no bid in the NOIS list is feasible, the TSOs have to approach BSPs bilaterally.

In addition to the normal regulation power reserves, there is a need to be able to restore balance after deviations due to disturbances and to handle situations that would otherwise lead to load shedding. For that purpose there are separate manually activated *disturbance reserves*. These reserves are the last resource to be used to keep the system functioning and consist of for instance gas turbines.

Finland and Sweden have temporary *peak load* reserves that are designed for situations with an extreme shortage of electricity due to extremely cold weather. These peak situations occur so seldom that it is not profitable for the players to maintain such resources. However, during certain circumstances, these reserves may also be used for other purposes. The Swedish peak load reserve has been used for counter trade and congestion management on several occasions.

The following figure shows the dynamic between different resources for balance regulation. It also shows scope for possible future automatic resources for secondary regulation (secondary regulation is not a part of the Nordic balancing market today).

Figure 1 Resources for balance regulation



2.3 NOIS and the balancing market

The specific Nordic balancing cooperation is called the Regulation Power Market. There are specific requirements for participation in this market. Each TSO receives balancing service offers from BSPs in its own country. These are then placed on the common NOIS list where the TSOs cooperate in selecting offers.

The NOIS list is a mixture of different kinds of offers that are used for different purposes. The main requirement is that the offer can be activated in less than 15 minutes and that it can have duration of up to one hour. There are also rules regarding minimum size. The TSOs have somewhat differing requirements when it comes to the requirements for real time measurement, which is required for participation in the regulation power market in Sweden but not in Norway, for instance.

NOIS also contains offers with longer activation times and offers that do not fulfil all requirements for the Nordic balancing market. These resources can be used for special regulations, mainly to deal with congestions. They can also be used in situations when there is a lack of available regulation power bids. The list finally contains reserves for certain situations like disturbance reserves and peak load reserves.

As far as possible, offers are selected according to merit order. The cheapest offers are selected first, unless congestion is present. When there is a shortage of electricity the TSOs will buy electricity for up-regulation (increased production or decrease consumption) having the lowest asking price. When there is a surplus of electricity, the TSOs will buy down-regulation by selecting offers to decrease production or increase consumption.

The TSOs act jointly as one single buyer in the Nordic balancing market and cooperate in selecting the offers to use. In practice, it is Statnett and Svenska Kraftnät that monitor the system and decide which offers to select. Whenever an offer is selected, responsibility for ordering the BSP to activate the service is delegated to the local TSO.

How activation orders are communicated to BSPs varies from country to country. Denmark has an automated computer network for both offer entry and offer activation. In other countries, orders to activate offers are made by phone.

Congestion are generally handled in the day ahead market though market splitting (different price areas in case of congestions). If there are internal congestions within these areas, these are in principle handled by TSOs as early as possible. When congestions are known in advance, offers with longer activation times are selected in order to deal with congestions ahead of the operating hour. When congestions occur close to or during the real time, bids from the Nordic balancing market should be used as far as possible. Statnett is obliged to use the balancing market for this purpose if possible, whereas e.g. Svenska Kraftnät can use special reserves for this purpose.

The rules for when offers can be submitted to the balancing market differ from country to country. The most crucial aspect is the gate closure time, which has now been harmonized and is set to 45 minutes before the operational hour. After gate closure all submitted offers are legally binding. Before that offers can be submitted, modified, and cancelled, but the rules for when submissions, modifications, and cancellations can take place are different in each of the countries. For instance, in Finland, bids can be submitted at any time up to gate closure time. In Denmark and Norway bids must be submitted before 17:00 and 19:00 respectively the day before. After this, offers can be modified until gate closure. In Sweden, offers can be submitted as early as 14 days before, and can be modified until gate closure.

2.4 Security of supply

BSP actors are in general not required to submit balancing service offers to the RPM and there is always a risk that there will not be a sufficient volume of reserves available to handle imbalances that occur.

TSOs have both short term and long-term mechanisms to handle this problem. In Denmark, Finland, and Sweden, TSOs may ask BSP actors to submit additional balancing service offers if the existing volume of offers is deemed insufficient.

Some TSOs may also enter into long-term bilateral availability contracts with BSP actors. The BSPs receive an availability payment up front and in return agree to provide the balancing market with a certain volume of balancing service offers. Exactly how this is done varies from country to country.

In Eastern Denmark, Energinet.dk uses long-term contracts and - to a lesser degree - daily auctions to ensure availability of both normal regulation reserves and manually activated disturbance reserves. Participation in the regulating power market can take place in two different ways. On the basis of Energinet.dk's call for tenders, BSPs can sign long term contracts with Energinet.dk regarding availability obligation and settlement. Under such an agreement, the company is obliged to place regulating power offers (via a balance responsible party) of a specified amount for specified periods and with a cap/floor of the offered energy payment. In return, the player gets availability compensation. Alternatively, BSPs that choose not to sign such agreements are free to place regulating power bids (via a balance responsible party) when the company finds it attractive and using uncapped prices. In this case, the company is not entitled to availability compensation and only gets the energy payment when the bid is activated.

Since Denmark West is synchronously connected to the UCTE system, Denmark West is not totally integrated in the common Nordic balancing market and cooperation.

The Norwegian TSO, Statnett, runs an options market RCOM (regulation power options market) to secure sufficient resources. RCOM serves as a catalyst to the common Nordic balancing market, and is available for both generation and demand.

RCOM is operated on a weekly basis (with plans for a yearly product), where price and quantity for the coming week is published on Statnett's website (Thursdays 14:00 the week before). Through the options market Statnett purchases flexibility to be used in the regulating power market. Statnett pays a compensation (an options premium) for this capacity.

Statnett's goal is that there shall be at least 2000 MW available for the regulation market in any hour. In periods with low demand and imports, this quantity is

available without utilising the options market. In other periods, notably the winter season (November – March), all of the 2000 MW may have to be purchased through RCOM.

Actors whose bids are accepted in RCOM are obliged to bid into the regulation market for the period agreed, but there is no floor or cap imposed on the price.

In Finland, Fingrid relies mainly on gas turbines to be used as manually activated disturbance reserves. Fingrid directly owns most of this capacity (615 MW), but some capacity (204 MW) is contracted. There are also contracts with companies in wood processing, chemical, and metal industries for interruptible load (425 MW).

In Sweden, Svenska Kraftnät has long-term contracts for disturbance reserves of 1200 MW.

2.5 Pricing

Marginal pricing is used when the BSPs are remunerated for their services. When the delivery hour has passed, the price of the most expensive offer that has been activated in the balancing market becomes the so-called regulating price, which is the price paid to all activated offers. This mechanism is used to stimulate BSPs to submit offers.

When there is no congestion, the regulating price will be the same for the whole region. In the presence of congestion, offers must be accepted on the basis of geographical factors rather than price. In this case the region is split into smaller areas and there will be one regulating price for each area.

What the final regulating price for an hour becomes depends on whether the balancing offers accepted were used to handle a shortage or surplus of electricity (up or down regulation). If there are both up and down regulation during the hour, the dominating direction determines whether it is an up- or down-regulation hour. If the TSOs were net purchasers of electricity for the hour, then the lowest purchase price is used. Otherwise the highest sale (from TSO to BSP) price is used.

Special rules are used to determine if services that are activated in one hour and then extend into the following hour influence the regulation price of either hour. If a service runs for less than ten minutes in one hour, its price is not allowed to influence the regulation power price for that hour.

In the case of congestions, bids may be picked outside the merit order, e.g. to handle congestion (special regulation). These bids are not allowed to influence the regulating price for the hour. Furthermore, when a BSP is paid for balancing services that are used to handle congestion, the BSP receives what it asked for (pay-as-bid), unless the final marginal price for the hour turns out to be better, in which case the BSP receives the marginal price instead.

Even though congestion measures do not have a direct effect on the regulating price for an hour, they can still have an indirect effect on the price. If measures that may be used to normal regulation are instead used to handle congestion, they are no longer available for normal regulation, possibly forcing the TSO to use a more expensive offer the next time normal regulation must be applied.

Regulating prices and volumes are published at the Nord Pool spot web site within two hours of the delivery hour.

2.6 Settlement and cost allocation

Organising the market place for balancing services, and purchasing balancing power represents a cost for the TSOs. These costs are recovered through charges to the BRPs – the role of BRP implies a financial responsibility for the imbalances they are causing relative to their plans.

TSOs first settle overall differences between the countries. They define balancing power exchange between countries according to the Nordic Grid Code. Balance power is calculated as the difference between the measured exchange of power and the sum of all forms of agreed exchange (The main part of exchange being trade through NordPool and to a lesser degree Elbas), including such exchanges as have been agreed between the TSOs. Balance power between two subsystems is priced at the average of the regulation prices in these subsystems⁶.

Subsystem balance is calculated as the sum of the measured physical transmissions on the cross-border links between the subsystems of the Nordic system. Thus, there is a deficit if this sum shows that power is flowing into a subsystem and a surplus of power is flowing out of a subsystem. The total imbalance in each subsystem is normally relatively low, a few percent of the total consumption.

Each TSO then performs the settlement procedures with the BRPs and BSPs⁷ in its own country. The BSPs are obliged to plan themselves into balance between infeed and outtake of electricity.

Since the end of September 2009 the balance settlement has been harmonised across the Nordic countries with regards to cost base and pricing of imbalances.

The pricing and settlement procedures are as follows. The regulating prices that are computed for each hour are used in the imbalance settlement that follows the delivery hour. The balance settlement is related to the deviation between the BSPs

⁶ Special rules apply to the exchange of balancing power between Denmark West and Sweden and Norway. See the Nordic Grid Code.

⁷ The concept of BSP is not really used in the Nordic countries which generally require that those who supply balancing services are balance responsible parties. There some exceptions, though to this rule.

plans and actual generation/consumption. Generation and consumption are treated differently in the settlement. In each case plans are compared to actual values, and imbalances are charged accordingly, but whereas generators face a two-price settlement (the regulating price if the generator's imbalance increases the imbalance in the system, the spot price if the generator's imbalance reduces the imbalance in the system). This is in order to incentivise accurate production plans, consumers, on the other hand, are faced with a one-price settlement whether they "help" the system or not (the regulation power price).

Capacity- and availability payments represent fixed costs that TSOs need to recover. Currently the Norwegian RCOM market and Danish slow reserves are recovered through the grid tariff. Likewise the costs of peak load reserves in Finland and Sweden are covered by the grid tariff.

For automatic frequency reserves and disturbance reserves, a new model has been introduced as part of the common Nordic balance settlement. The intention behind this harmonization is that BRPs should pay the costs as far as possible for the balancing service, and that there should not be undue differences between the countries.

Thus, the total cost of automatically activated frequency controlled reserves for normal operation and 10-33 % of the costs of the automatically activated frequency controlled reserves for disturbances as well as the manually activated disturbance reserves are allocated to the BRPs. The use of reserves differs between the countries and, as does the fraction of costs levied on the BRPs: For Denmark, Norway and Finland the share is 10 %, while it is 33 % for Sweden.

In addition, there are administrative costs. The long term fixed costs should be levied on the BRPs as follows. A fixed fee, which should be the same for every BRP should cover one part of the cost. Another part should be based on volumes produced and/or traded. Finally there is a small volume fee on imbalances on the consumption side in addition to the price of energy in imbalance for the delivery hour when imbalances are settled.

The resulting fee structure is as follows:

Fees	Motive for fee	Fee level
Fixed fee on measured consumption	Fee for financing	Approximately 2/3 of the cost
Fixed fee on measured production	Fee for financing	Approximately 1/3 of the cost
Volume fee on imbalances in the consumption balance	Steering signal	Allowed span 0,1-0,5 Euro/MWh
Monthly fixed fee	Fee for financing	National span

Furthermore, if costs for peak power reserves are to be covered by balance responsible parties, this should have a separate and transparent fee. No other national fees should be used to cover the common cost base.

Settlement procedures still differ between the four countries, and in its report “Market Design, common Nordic end-user market”⁸ NordREG proposed a timetable for further harmonisation of balance settlement and other aspects of the balancing function which affect the possibility to create a Nordic retail market. This harmonisation work is part of the overall work towards one common Nordic retail market. The four TSOs are cooperating closely with a view to reach solutions for one common Nordic Balance Settlement (NBS).

⁸ www.nordicenergyregulators.org, report 3/2009

3 Integration of balancing markets in Europe

3.1 The vision of one European electricity market

Electricity is regarded as a commodity as any other commodity, even though it has certain features related to the fact that electricity cannot be stored. Thus, the vision is for an internal market for electricity in Europe. With this intention, EU-wide legislation has been introduced, in order to create a level playing field for the market players across Europe. Important features are the unbundling between the monopoly part of the operation – the grid and its operation, and the part subject to competition – production and trade and third party access to all grids. Another important part is to enable cross-border trade of electricity, both through new interconnections and through more efficient congestion management of existing interconnections. The road towards a truly liberated electricity market is under way, but there is still a long way to go. There is a complex interaction between the EU Commission, regulators and TSOs as well as important stakeholders in the design of new rules and the implementation of these rules – within regions and – eventually across Europe.

3.2 The third package

The so called third package replaces the Electricity Directive from 2003, as well as the cross border regulation from 2003⁹. In fact, the third package does not imply any direct changes for balancing. But, indirectly, the increased requirements of regulators and TSOs to cooperate will lead to an environment where changes can be expected to be faster than before. Thus, work done before the third package in this area is still valid. Here we choose to cite the new articles for reference. The Member States are obliged to implement the directive in national laws by 3 March 2011 and apply most of the measures in the Directive from the same date.

3.2.1 Directive 2009/72/EC

Article 15 in the new electricity directive¹⁰ deals with dispatching and balancing. According to point 6 “transmission operators shall procure the energy they use to cover energy losses and reserve capacity in their system according to transparent,

⁹ REGULATION (EC) No 1228/2003 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity

¹⁰ Directive 2009/72/EC of the European parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.

non-discriminatory and market based procedures, whenever they have such a function.”

Further, according to point 7, “rules adopted by transmission system operators for balancing the electricity system shall be objective, transparent and non-discriminatory, including rules for charging system users of their networks for energy imbalance. The terms and conditions, including the rules and tariffs, for the provision of such services by transmission system operators shall be established pursuant to a methodology compatible with Article 37 (6) in a non-discriminatory and cost-reflective way and shall be published.”

According to article 37 (6), “the regulatory authorities shall be responsible for fixing or approving sufficiently in advance of their entry into force at least the methodologies used to calculate or establish the terms and conditions for: ..(b) the provision of balancing services which shall be performed in the most economic manner possible and provide appropriate incentives for network users to balance their input and off-takes. The balancing services shall be provided in a fair and non-discriminatory manner and be based on objective criteria;”

According to article 37 (7) “the methodologies or the terms and conditions referred to in paragraph 6 shall be published.”

Article 37 (8) “In fixing and approving the tariffs or methodologies and the balancing services, the regulatory authorities shall ensure that transmission and distribution system operators are granted appropriate incentive, over both the short and long term, to increase efficiencies, foster market integration and security of supply and support the related research activities.”

These provisions are already there according to Directive 2003/54/EC.

The scrutiny by the regulators shall make sure that the balancing services shall be provided efficiently, in a fair and non-discriminatory manner and based on objective criteria, and that they are priced in a cost-reflective way. The scrutiny also needs to take into account any rules regarding the cross-border flow of balancing power.

According to article 38 (1) regulatory authorities shall closely consult and cooperate with each other. According to article 38 (2) regulatory authorities shall cooperate at least at a regional level to improve the conditions for efficient cross border-trade with electricity. This includes provisions for cross-border balancing.

The third package also includes the regulation (EC) No 714/2009 of the European parliament and of the council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003. The annexed guidelines are unchanged from the guidelines that are legally binding since 1 December 2006, and are as well as the regulation legally

binding and shall not be implemented in national legislation. According to article 19 of the regulation, “the regulatory authorities, when carrying out their responsibilities, shall ensure compliance with this Regulation and the Guidelines adopted pursuant to article 18. Where appropriate to fulfil the aims of this Regulation the regulatory authorities shall cooperate with each other, with the Commission and the Agency...”

Article 5 of the Guidelines deals with transparency. According to article 5.5 TSOs shall publish *all relevant data concerning cross-border trade* on the basis of the best possible forecast and the publication shall be subject to review by regulatory authorities. According to article 5.7 “the TSOs shall ...also publish *the relevant information necessary for the cross-border balancing market*.”

3.2.2 The transparency report

The regulatory authorities in the region Northern Europe: Nordic countries, Germany and Poland, have issued a report on transparency 13 September 2007¹¹, based on ERGEGs Guidelines of Good Practice for information management and transparency. This report has been the model for further regional transparency reports. The interpretations in the report have been thoroughly consulted with stakeholders.

¹¹ http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_INITIATIVES/ERI/Northern/Final%20docs/Report_on_Transparency.pdf

The report gives the following interpretation of article 5.7:

What information	Explanation and details (relevant to Nordic countries)
Volume of balancing power	Volume of balancing power contracted by TSOs via tenders, auctions or bilateral contracts as reserves, separately for each type of balancing energy (e.g. primary reserve, secondary reserve, tertiary reserve) per control area/bidding area at the latest 2 hours before the following procurement procedure and per balancing mechanism time unit. <i>According to comments publication time should in the Nordic area be interpreted as at the latest H+2.</i>
Average and marginal prices of bids/offers	<p>Relevant prices for balancing energy/reserve power, depending on pricing mechanism applied i.e.</p> <ul style="list-style-type: none"> • Anonymous list of bids and offers separated for each type of balancing energy or at least average price (in case of pay as bid) • Market clearing price for up and down regulation (in case of market clearing pricing) <p>This information shall be published per control area/bidding area at the latest H+2</p>
Imbalance prices	Imbalance prices per control area/bidding area including a definition of what is published, at the latest D+1
Control area imbalance volumes	Control area imbalance volumes, volumes of manually activated reserve used and of automatic reserves actually used, distinguishing between manual and automatic, at the latest H+2. This information shall contain the volumes of all types of balancing energy called by the TSO.
Financial balance of the market	<p>Expenses for balancing energy and power at the balancing market</p> <p>Payments resulting from imbalance pricing</p> <p>Differences between expenses and income</p> <p>This shall be published per control area and per month, to be updated until reconciliation in balance unit's economical balance sheet.</p>

Nordic TSOs have so far not been able to supply all information as requested. They have provided some information on how they plan to make the information available, but when it comes to details, there have been some problems in delivering the data, especially regarding balancing. This also means that it is not possible today to describe the scope of the Nordic cross border balancing using published figures.

3.2.3 GGP and PCG

Guidelines of good practice for balancing markets integration (GGP-EBMI) and the Target Model for capacity allocation and congestion management that also covers cross-border balancing lay down guidelines for integration of the balancing markets.

The revised GGP-EBMI was subject to public consultation early 2009, and a revised report is available on ERGEG's website¹². This was submitted to the Commission as the Regulators' advice and the intention is to use these guidelines as an input to third package Framework Guidelines.

At the Florence Forum in November 2008, it was decided to set up a common project, the so called Project Coordinating Group of Experts (PCG). It consisted of participants from all major stakeholder organisations including the European Commission and ERGEG as a chair of the Group. PCG was working on a Target Model for capacity allocation and congestion management for various timeframes including cross-border balancing. The outcome of the work of PCG was reported at the Florence Forum in December 2009. The Forum was also informed of the establishment of a new group AHAG (Ad Hoc Advisory Group of Stakeholders) to continue the work of PCG and three implementation projects dealing with capacity calculation, intraday market and day-ahead market coupling and the related governance issues were agreed to be launched.

The work in PCG has been pursued in parallel with the ERGEG work on GGP. There seems to prevail a common view regarding some important features of how cross-border balancing should be developed:

- TSO-TSO model, eventually with common merit order – the Nordic regulation power market complies with this
- No reservation of cross border capacity except for DC links under certain conditions – the Nordic situation complies with this
- Imbalance pricing should encourage players to be in balance before the operating hour – in place in the Nordic area
- Harmonised gate closures – in place in the Nordic area but not with neighbouring countries

3.2.4 Harmonisation within the region Northern Europe

A proposal to form an implementation group (IG) was given to the TSOs in the region at the Regulatory Coordinating Committee for region Northern Europe (RCC) meeting on 8th October 2009 in order to further at least a simple form of cross border balancing in the whole region. The TSOs requested to postpone the start of the IG until the fall of 2010 due to intense work load.

¹² http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/New%20GGP%20Balancing%20Markets%20Integration/CD/E09-ENM-14-04_RevGGP-EBMI_2009-09-09.pdf

3.3 EU sector inquiry

The EU sector inquiry, published in 2007 by DG COMP, has studied the competitiveness of balancing markets across Europe. The existence of cross-border balancing was at that stage rare in Europe, and in many control areas there was very low or non-existent competition among providers of balancing power. The sector inquiry stated that cross-border integration of balancing markets should be seen as an important way to increase competition and the effective use of generation resources.

3.4 The role of regulators in balancing

According to the general provisions of the new directive (Article 33) the powers and independency of regulators according to the old directive were not adequate. According to Art. 34 energy regulators need to be able to take decisions in relation to all relevant regulatory issues if the internal market in electricity is to function properly.

Specifically, according to Art. 35, “in order to ensure effective market access for all market players, including new entrants, non-discriminatory and cost-reflective balancing mechanisms are necessary. TSOs should also facilitate participation of final customer and final customers’ aggregators in reserve and balancing markets.”

Still, balancing mechanisms are a tool for the TSOs in deregulated markets to carry out one of their most important tasks, to make sure that there is a balance every moment between demand and supply. In liberalised electricity markets, the flows of electricity are not very predictable, since the players endeavour to use the lowest cost resources to carry out their responsibility. This may change between the hours of the day, creating a complicated pattern of flows and cross-border trade. Therefore, cross-border trade increases challenges of the TSOs in their balancing function. Cross-border trade and cross-border balancing can also increase security of supply, but the level of cooperation between TSOs and the level of transparency needed has increased enormously over the last years and will increase even more in the future. An important feature is the growing use of intermittent generation.

The cooperation of TSOs needs to be facilitated by regulators and by Member States through harmonising the legal framework. It is important for the regulators to study the differences in legal framework and propose steps towards harmonisation. The increasing cross-border trade also means that the need for transparency and the need for common understanding of definitions have increased. Also here, the regulators have important roles. Finally, cross-border balancing requires harmonisation between the rules applied in different countries. This requires a mutual understanding of the reasons for differing rules. Competition may be a huge concern in one country while availability of reserves may be a bigger concern for another country. Some differences may be there just out of habit. It is important that regulators take on a broad understanding of similarities and differences between the markets concerned.

4 Nordic integration of balancing markets

4.1 Recent harmonisation

Integration and harmonization of the balancing mechanisms in the Nordic region have progressed relatively far, but still further work is needed. A number of new measures, both short term and long term, are being discussed.

The balancing mechanisms in the Nordic region have been gradually integrated and harmonized over the years. The most recent harmonization measures were put in place in 2009 and include:

1. Elbas, the intraday market, is now in use in all four countries.
2. Balancing services that are used for special regulation are remunerated using the higher of the two: asking price (pay as bid) or the marginal price for the hour.
3. Rules for minimum volumes of offers have been partially harmonized. In Sweden, Norway and Denmark the minimum volume is 10 MW. In Norway, the minimum volume for an offer is 25 MW, but Statnett has put mechanisms in place for allowing smaller offers on a case-by-case basis.
4. All countries allow for partial activation of offers provided the BSP that submitted the offer accepts this.
5. The set of valid prices for balance service offers has been harmonized. An offer to sell electricity to the system has to be between the spot price for that hour and 5 000 euro / MWh. Similarly, an offer to buy electricity from the system has to be between zero and the spot price in that hour. Offers to sell above 5000 euro / MWh and offers to buy below zero are rejected, whereas offers to sell below the spot price and offers to buy above the spot price are automatically adjusted to the spot price. Offers that are adjusted to the spot price in this manner are not prioritized over offers that were priced at the spot price from the start. This is to avoid strategic behaviour from BSP actors. In Norway, an additional mechanism allows the TSO to question offers that are conspicuously high compared to the spot price. The other TSOs do not have the power to do this in their own countries.
6. Balancing service offers have normally been priced in the local currency of the BSP making the offer. This has recently been modified so that BSPs are now allowed to price offers in Euro if they wish.

The road towards this harmonisation has been furthered by the Nordic Council of Ministers (energy) who has taken on the vision of an integrated Nordic Retail Market. Balance settlement was identified as an important part of this work. Following proposals by the TSOs, NordREG was given the task to evaluate Nordel's proposals. In NordREG's final report, "Towards Harmonised Nordic Balancing Services"¹³, NordREG gave its support to Nordel's work. The report also included the needs for regulatory changes in order to implement the proposals. Finally, the report also included a suggestion of further harmonisation. These suggestions were repeated in the NordREG report "Market Design – common Nordic End-user market"¹⁴ as a way to a Nordic retail market. In this report

¹³ www.nordicenergyregulators.org, Report 3/2008

¹⁴ www.nordicenergyregulators.org, report 3/2009

NordREG also identified harmonised balance settlement as an important feature of a level playing field, i.e. it should be possible for a supplier to sell to the entire Nordic Market from one legal entity and using only one system for customer management and reporting. An important feature of an efficient Nordic balance settlement would be that it would be attractive even for small actors to be balance responsible, i.e low barriers to entry for both consumers and small producers.

From this point of view the following features were identified:

Hourly metering: The deployment of hourly meters creates possibilities to limit the scope of profiling and enables new products which might increase customer activity.

Balance settlement: Whereas the cost base and imbalance pricing has been harmonised, the process of balance settlement including the time to settlement and the conditions for corrective settlement still differ. This process affects the situation for suppliers and large customers in different countries. These processes could be harmonised, and the four TSOs are cooperating to find procedures for common Nordic balance settlement (NBS)..

In their past cooperation within Nordel, the Nordic TSOs have published several reports related to the harmonisation of the regulation power market /the balancing function¹⁵. In November 2007, Nordel published “Report on Proposed Principles for Common Balance Management”. This report can be seen to conclude the task to harmonise the Nordic balance settlement thus fulfilling the Nordic Council of ministers’ vision of a common end-user market. In April 2006 Nordel published a proposal to harmonise parts of the balance management, which in a modified form was approved by the Nordel Board in February 2007. The November 2007 report presented the final proposal of the Nordic TSOs, and the proposal was later approved by the Nordic national regulators. The proposals have been implemented, while some of the issues for further consideration still need to be elaborated. That relates to issues about hidden production, pricing of balance power in critical situations, use of euro as currency on the regulation power market, monitoring of imbalances and common balance agreement. These needs have been recognised by the TSOs.

The TSOs have also published the report “Harmonisation of Balance Regulation in the Nordic Countries” on 12 December 2008. This report summarises the status of harmonisation in most of the earlier identified areas. Some of these areas are already harmonised or at least sufficiently harmonised.

In this report, the TSOs highlight real time measurement of regulating objects as an issue. In Norway small generators are not required to have real time measurement, since such a requirement can be seen as a barrier to entry into the balancing market for small generators. Ex post measuring is sufficient for small units. In Sweden there are also several units without real time measurement, but these are only to be used for special regulation and are not to be bid into the balancing market (NOIS list). This different treatment of similar resources could be an issue for harmonisation.

It is possible for small generators to cooperate and get together to form larger bidding units.

¹⁵ The Nordel reports can be found at www.entose.org

Furthermore, regarding required bid information, a discussion is going on, which also relates to what the NOIS list is supposed to be. Currently there are many different types of resources on the NOIS list. Is it workable to have different kinds of resources in the same list?

This is an issue which is also related to reserves. Here the TSOs recommend that peak load reserves should be made available for balance regulation. If the need for activation is known the day ahead, the rules for peak load activation¹⁶ state that the reserves should first be bid into Elspot. Furthermore, operational reserves like the contracted reserves in Denmark should be included in the NOIS list but not activated until all commercial up-regulation bids have been used. All reserves in the Norwegian RCOM are obliged to bid into the balancing market (NOIS list).

To conclude, there has been work going on for a long time in order to harmonise the Nordic balance settlement and the balancing market. The TSOs have had a leading role, and the regulators have supported their work by evaluating and eventually finding ways to approve the proposed changes. As can also be seen in the above, there is still work to be done.

NordREG continues to support the work of the TSOs in the harmonisation process. The role of NordREG and the national regulators is to evaluate and to make implementation possible by a joint view of the proposals, creating ways to getting to common positions on the way forward. This said, the following areas relating to the regulation power market need consideration:

4.1.1 Transparency in the balancing market

Within the regulatory cooperation in the region Northern Europe a transparency report has been produced, which has also been the model for further regional transparency reports. In 2007, the Regional Coordination Committee (RCC) published the report on Transparency, here referred to as the NERI report.

The Nordic TSOs have through Nordel agreed to the requirements in the NERI report. The Nordic TSOs have made a common interpretation of the NERI report – this interpretation needs to be evaluated by the regulators, who are responsible for the monitoring of transparency. So far, the Nordic TSOs have not been able to supply all data required. They therefore have suggested certain compromises. While their suggestion might fulfil the NERI requirements, it can be argued that more data is needed for the efficient monitoring of the Nordic balancing market and for the sufficient information to market participants.

The Nordic TSOs have discussed problems related to the delay between selection and activation of a balancing service, and the time when information about prices and volumes of balancing services are published at Nord Pool Spot.

The TSOs have stated that it would be technically feasible to publish information about a selected balancing service as soon as it has been selected. However, since the marginal price for the delivery hour cannot be known until the hour has ended, the value of such

¹⁶ Rules for activation of peak load reserves in Finland and Sweden. See Nord Pool Spot: http://www.nordpoolspot.com/Market_Information/Exchange-information/No-042009-Peak-power-reserves-in-Finland-and-Sweden-to-be-made-available-for-Elspot-from-19-January-2009/

real-time publications has been questioned by the TSOs. Nordel instead proposed that information about selected balancing services is still published after the balancing hour, but much faster than today. Nordel also believed that a realistic first goal would be publication at Nord Pool Spot in no more than one hour after the end of the delivery hour.

Nordel also suggested that TSOs should publish the reason for selecting balancing services out of price order whenever this occurs.

Furthermore, Nordel proposed specific measures to encourage consumption side actors to submit offers to the balancing market. Such actors normally place a high value on uninterrupted supply, and Nordel believed that such actors could only be persuaded to participate if they receive market information that indicates that they would receive a very good price for offers to reduce consumption.

Nordel also expressed interest in measures that send signals to the market that there is an urgent shortage of balancing services.

NordREG considers it important to be able to follow the development of the Nordic balancing. This means the flow of balancing power between the countries and the net imbalances in each country. Without this information it is difficult to assess the value of the common balancing mechanism. This kind of data should be published in Nordic Market Report, which NordREG publishes annually¹⁷, to make it easy to monitor the balancing service. It is an issue for the 2010 market report.

4.1.2 Monitoring/surveillance

Monitoring of the balancing market and its actors, namely BRPs and BSPs, is mainly done by the TSOs in order to make sure that the players follow the rules. In an interconnected and harmonized market, cross border monitoring is also needed. This is foreseen in the European legislation but not yet in a concrete way. The Nordic energy regulators have been invited by EMG, the electricity market group tied to the Nordic ministers, to look into the issue of monitoring of the Nordic regulation power market.

The Electricity Directive and as a consequence of its implementation also the national legislation mandates regulators to fix or approve, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for the provision of balancing services. Furthermore, the electricity cross border regulation and the annexed congestion management guidelines assign the regulators with the duty to make sure that the cross border regulation is being followed, and the conditions for balancing are part of this obligation.

As regulators end up as the final regulatory and supervisory authority, then what should be the scope of their regulatory oversight? Should they concentrate on regulating and supervising the TSOs as explicitly required by both the Electricity Directive and the regulation with the annexed guidelines and let the TSOs monitor the BRPs and BSPs? Or should the regulators monitor actors such as BRPs and BSPs directly?

¹⁷ Nordic Market report 2009 can be downloaded from NordREG's website:
<https://www.nordicenergyregulators.org/upload/Reports/Nordic%20market%20report%204-2009%20%20final.pdf>

In the report “Monitoring of the Nordic regulation Power Market”¹⁸, the Nordic regulators have described the present level of monitoring of the Nordic regulation market as well as possible ways to develop the monitoring of this part of the Nordic market. The conclusions of this report state:

Transparency – there is a need for increased transparency of the regulation power market. A detailed description of the existing rules and operations of the market should be published by the TSOs.

Nordel published on 31 March 2008 the report “Harmonisation of balance regulation in the Nordic Countries”¹⁹. This report gives a good description of the situation when the report was written. The development is fast in this area, and several of the differences among the Nordic countries listed in that report have now been harmonized. In addition to this, there is the NERI report of Transparency. Transparency about operations and prices is vital for the market’s functioning. It is therefore important that the fulfilment of the transparency report is ensured.

Monitoring framework – monitoring of the regulation power market might need to be more harmonised in order to secure equal treatment of the market participants and to get a better overview between the different electricity markets. Not desirable arbitrage between the markets might exist and the abuse of market power must be avoided.

NordREG also notices that, according to Nord Pool Spot market surveillance, that Nord Pool Market Surveillance receives the information needed from the TSOs, when asking for additional information about activities on the Nordic regulation power market.

In the further work NordREG intends to address e.g.

- Roles and responsibilities in monitoring
- Level of cooperation between TSOs, regulators and competition authorities
- Requirements for reporting and data flows among TSOs, regulators, competition authorities and Nord Pool Market Surveillance
- Needs for common rules and reactions towards the participants not following the existing market rules

An increased level of harmonisation might be a necessity both to improve the functioning of the market and in order to be able to monitor the Nordic regulation power market.

NordREG proposes the following issues to be further elaborated by the TSOs in cooperation with NordREG:

- Common bidding rules, i.e. duration of bids, how near the operational hour should it be possible to change bids, activation time, firmness, conditions for acceptance of bids
- More standardised products
- Interaction between regulation power market and primary reserves, i.e. procurement of all reserves (voluntary vs. mandatory bidding)

¹⁸ NordREG report 6/2007

¹⁹ www.entsoe.org

Since the report was written, the market has developed further. With regard to transparency, there is now a framework to implement transparency requirements according to the NERI report. Most of the requirements are already implemented, but there is still further work to be done regarding transparency in the balancing market.

With regard to monitoring, the most urgent part seems to be to make sure that the TSOs really implement the harmonised rules decided and follow them. This would probably require further coordinated follow-up by the Nordic Regulators. The role of Nord Pool Market Surveillance is being discussed in the task related to the monitoring of Nord Pool Spot.

4.1.3 Duration of balancing services

TSOs sometimes activate offers so that they start in one hour and extend into the next hour. This is typically done to avoid having many services starting at the same time at the start of one hour. Instead some offers are activated a few minutes before the hour starts. These services then start in one hour and extend into the next hour. The question then arises, should the price of the service affect the marginal regulation price of both hours or only one of them? The TSOs plan to harmonize rules for this and their proposal states that the price of a measure can only affect the marginal price of an hour if it runs for at least ten minutes in that hour. So if a balancing service is activated at 13:54, it will not affect the price in the hour 13:00-14:00.

4.1.4 Out of price-order activation

Activation time is not a required attribute of balancing service offers to the regulation power market. In Sweden it is possible to include such information, but only if the activation can be shorter than the standard 15 minute activation time.

Nordic TSOs have expressed an interest in handling special offers that have nonstandard activation times and nonstandard volumes in a more transparent way. Specifically, the Nordic TSOs are interested in allowing TSOs to select offers with large volumes and/or short activation times in preference to cheaper offers during special emergency situations. There is also an interest in presenting offers with slower than normal activation times in a special NOIS list dedicated to offers suitable for special regulation measures. Today there are no clear rules except in Norway for what bids should be used for special regulation. In all countries it is clear that special regulation shall not directly affect regulation power price.

Again, the TSOs believe that whenever a decision is made to select an offer on criteria other than price, the reasons for doing so should be made publicly available at Nord Pool spot.

4.1.5 Currency

Starting in 2009 BSPs are allowed to quote the price of an offer in Euro or the local currency (this distinction does not exist in Finland, of course). However, the Nordic TSOs believe that it is inevitable that all prices will be only quoted in Euro in the future.

4.2 Further issues

4.2.1 Supporting small bids

If a BSP (generator) is to receive payment for activating a balancing service, the TSOs must have ways to measure energy flows between the plants of the BSP and the grid. The TSOs need to know that the correct volumes were delivered at exactly the right time.

Energy flows from large generating plants have always been measured in real-time so these present no problems in collecting proof that BSPs have delivered what they were paid for. When it comes to smaller plant [smaller than 5 MW] Norway allows for ex post measurement. Since settlement is ex post, this difference should not pose difficulty for integrating the markets in this respect.

There is a possibility for smaller generators to join together to submit combined offers.

Combined offers can be made up of services from geographically dispersed sites, and this makes it difficult to assign a location to such offers, unless the offer is tagged with the geographic location. However the offers which are combined need to be located within the same network area in order for the TSOs to select offers for congestion management and other special regulation measures where location is important.

The Nordic TSOs have discussed alternative ways for BSPs to prove that they did indeed provide the balancing services that were submitted and accepted. The TSOs suggest working out a standard documentation that could be used to prove that the services were delivered, but as far as NordREG knows there are no conclusions to this yet.

The TSOs have also discussed the use of cheap communications solutions in the wake of the automatic metre reading and speculate that in the future it might become cost effective to measure flows from smaller and smaller power plants, thus pushing the volume limits lower and lower, and thus expanding the set of actors that can submit offers to the balancing market.

Further, the TSOs mention that future automated selection of balancing services will make acceptance of low volume offers more cost efficient.

4.2.2 Reference prices

Today the boundaries for the prices for balancing service offers are harmonized. Offers where BSPs sell electricity to the TSOs have to lie between the spot price for the hour and 5000 euro/MWh. Offers to buy electricity from the TSOs have to lie between zero and the spot price.

The price from the spot market thus acts as a reference price that controls the range of valid prices in the balancing market. The TSOs have discussed replacing the spot price with the price from the intraday market instead. The TSOs have concluded that doing this is not yet realistic since trading volumes in the intraday market are still much lower than the volumes in the spot market. Only when trading volumes in the intraday market increase significantly will it be possible to consider this measure again.

Another problem mentioned if prices from the intraday market would be used is that this market seems to run in parallel with the balancing market. For most of the time when it is possible to put bids on the balancing market, the intraday market has not closed yet,

which should make it difficult to know which price on the intraday market to use as the reference price. A similar problem might already exist today, at least in Sweden where it is possible to submit balancing offers to the real-time balancing market up to 14 days in advance. This means that offers for a particular delivery hour can be submitted long before the spot market has closed for that hour. These bids will be automatically corrected in case the bid is below the spot price.

4.2.3 Pricing and activation of disturbance reserves

The fast active disturbance reserves are designed to restore the frequency controlled disturbance reserve. They are manual reserves and shall be activated within 15 minutes. They can be exchanged between the subsystems on the joint Nordic balancing market or as so called supportive power (in this case there is no clear pricing rule). They are included in the NOIS list with a tag.

The Nordic TSOs are aware that the inclusion of the disturbance reserves in the NOIS list is problematic. There are no clear rules for how these reserves are selected or priced and it is important for such rules to be established in the near future.

4.2.4 Automatically activated reserves

Increased fluctuations in power flows due to the liberalization of the Nordic and North European electricity markets have caused some new challenges to the TSOs. New trading patterns when the flow of energy shifts direction several times a day, cause larger frequency deviations. It is important to avoid frequency drops under 49,9 Hz under normal operation. Using this criterion, the quality of frequency has been impaired during the last 10 years and this trend seems to continue. For reasons of operating security, further automatically activated reserves in addition to the present automatically controlled frequency reserves for normal operation would probably be beneficial. A more sophisticated control function is investigated by Statnett and Svenska Kraftnät, which would allow for a better performance in complicated situations current frequency controlled reserves which simply reacts to frequency changes. This function is called LFC (load frequency control). The requirement of the current frequency controlled reserves is 600 MW in the synchronous area and shall be regulated within 3 minutes if the frequency drops to 49,9 Hz. The intention is to investigate the need for increased automatic reserves. Furthermore, the balance between the simple frequency controlled reserves and the more advanced LFC is also investigated, as well as the issue of how the reserve shall be divided between the Nordic countries. LFC may have a longer activation time than the current frequency controlled reserves (see Figure 1 Resources for balance regulation).

In order for these reserves to be exchanged across the borders, it would be necessary to reserve capacity on the interconnectors. There is a broad agreement among regulators that transmission capacity should not be reserved for balancing purposes. However the GGP-EBMI from ERGEG open up for the possibility of reserving capacity for balancing services on a case by case basis on DC lines if and when a clear increased social welfare can be demonstrated.

It needs to be discussed whether it is acceptable to increase the transmission reliability margin (TRM) for the purpose of exchanging balancing services. Thus, criteria need to be established. For the time being, these issues are studied bilaterally by Statnett and

Svenska Kraftnät, but the intention is that the solution shall eventually be a solution for the Nordic synchronous system.

In the continental system (former UCTE) activation of balancing services is in many cases automatic when the same purpose in the Nordic countries is served by manually activated reserves. In western Denmark, which belongs to the continental synchronous system, automatic activation is used. In eastern Denmark, and the rest of the Nordic region, automated activation is not used.

The form of automated activation that is used in the continental system does not normally allow flow of balancing power across borders and several Nordic actors have noted that integrated balancing might become more difficult when automated activation is used.

5 Conclusions and recommendations

The guiding principles for the balancing market are market based methods, non-discrimination, transparency and fair rules.

As has been described in the report, the Nordic TSOs have come a long way to harmonise the common Nordic balancing market.

From a regulatory point of view, there are still a few issues that call for attention. These have to do with lowering the barriers for entry and with increasing clarity and transparency of rules, criteria and procedures:

- Transparency in terms of publication selection criteria and methods
- Transparent processes for the purchase of automatically activated reserves and disturbance reserves
- Transparent rules, especially in the grey area between balance regulation and regulation for grid reasons – One or several merit order lists?
- The possibility of increasing the number of balance service providers (lowering the barriers to entry)
- The balance between automatic and manual reserves and how that might affect the issue of cross border capacity
- The distinction between disturbance reserves and normal reserves should be made transparent

The regulators wish to point out that transparent and clear methods are important for handling all types of balancing bids and offers, regardless of whether the resources are flexible or inflexible, and regardless of their use, be it for handling disturbances or “normal” deviations from the schedule.

For securing sufficient balancing reserves in the short term, the TSOs must have transparent procedures for procuring and activating these. Also after activation, transparency must be ensured.

The transparency requirements in the NERI report have not yet been fully implemented in the area of balancing, since the Nordic TSOs have not yet been able to supply all the agreed data. There are also differing views with regards to some of the requirements. It is important to have a common interpretation, and that the regulators share this view. It is also clear that this is an area where monitoring by regulators is required.

Transparent rules, especially in the grey area between balance regulation and regulation for grid reasons are necessary from a regulatory point of view.

A clear definition of the Nordic regulation power market is desirable with harmonised requirements regarding bids and offers with regards to real time measurement, definition of regulation objects, the possibility for combined bids, locational information etc.

The possibility of increasing the number of balance service providers is important. The present rules regarding size of bids and real time measurement have the effect that most small generators do not participate in the balancing market. What could be done to simplify their participation and thus increase competition? This would also relate to consumption bids. The issue is clearly related to the question of how to define the balancing market and how to incentivise active participation.

The balance between automatic and manual reserves and how that might affect the cross border capacity is important. As well as the issue of which criteria should be applied to the calculation of TRM – probably the most important for the regulators.

The requirements for BSPs need to be clear and justified according to the needs of the TSO and the requirements of the market.

The distinction between disturbance reserves and normal reserves is another issue where transparency should be increased. It seems that the rules and criteria are not harmonised between the countries and this could lead to a lack of transparency and a certain arbitrariness in both bid selection and pricing.

Monitoring of the balancing function can be seen as two parts. One is the monitoring of the players bidding and the risk for abuse across markets. In this case NordREG recommends a double solution where the TSOs continue to make sure that the players follow the rules. In addition to this, it should be possible for NordPool market surveillance to get all information needed when there is a suspicion of market abuse.

Based on the Electricity Directive, the electricity cross border regulation and the annexed congestion management guidelines the energy regulators have a mandate to regulate and ensure that the rules on balancing and the decisions that they have assigned on TSOs regarding the terms and conditions for providing the balancing services are complied with. There may thus be a need to monitor the TSOs to ensure compliance. In the first step it is important to ensure a transparent and fair market where market participants have equal access to information.

Regulators will cooperate across the borders as the balancing market is Nordic instead of national one.

In assessing the need for harmonisation NordREG wants to put the attention to what is the role of the regulators and what is the role of the TSOs. It is the role of the TSOs to propose more efficient processes for balancing market including its further harmonisation if necessary. It is the role of the regulators to monitor and evaluate the propositions of TSOs and to make sure that the TSOs are heading in a way that will further a single European market. With the new Agency for Cooperation of Energy Regulators that is being established, the Agency together with national regulatory authorities will work on the framework guidelines for specified issues. These issues include also balancing. It has been envisaged that work on a framework guideline on balancing market could be initiated already in 2011. The framework guideline would then be followed by the preparation of the related network code by the European TSO organisation ENTSO-E.

To enable the regulators to work on the further requirements for developing the balancing market the regulators need information on how the market works and on the flows and prices. This information should be available to all players as well. The regulators also

need to make sure that there are effective processes for market monitoring. Increasingly important will be for the regulators to make sure that decisions regarding harmonisation of balancing arrangements are complied with in all respects. This puts the regulators in a role where they need to monitor also that the TSOs follow the common rules.

There are several work streams among Nordic TSOs aiming at more harmonised rules for the balancing market, and as part of the work towards a common Nordic retail market. NordREG supports their work and look forward to seeing its results. The Nordic regulators will follow the work, and aim at coordinating a response to the TSOs' suggestions. This coordination also needs to take into account the path towards a single European electricity market and the framework that will be prepared by regulators in this context.



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