

Invitation for participating in consultation for a joint Nordic Balance Settlement

The Nordic TSOs hereby invite your organisation to a consultation on the report defining the overall design on a joint Nordic Balancing Settlement.

Background

Balance settlement is a natural monopoly and a necessary function in the Nordic electricity market. The Nordic TSOs, Statnett, Svenska Kraftnät, Fingrid and Energinet.dk, have the role as “Settlement Responsible” as well as “System Operator” in Norway, Sweden, Finland and Denmark respectively.

Currently there are only quite few retailers that operate in more than one of the Nordic countries, and only very few that operate in all these countries. Due to differences in the national end user markets, a Pan-Nordic retailer has to have parallel supply functions through most of the value chain. Balance settlement and reconciliation settlement are significant parts of this value chain, and different national rules and routines in this area represent barriers for entry.

The Nordic Council of Ministers has for several years supported a development of a common Nordic end user market for electricity. NordREG, the cooperative organization of Nordic energy regulatory authorities, has published several reports where a harmonized balance settlement function is suggested.

Based on this and with an independent objective of supporting a well functioning electricity market the Nordic TSOs have entered into a project where the purpose is to establish common market rules and a common unit for balance settlement in the Nordic countries, i.e. the NBS project. This project also reports to the NordREG project for a common Nordic retail market.

The first phase of this project has now been concluded with a report describing the overall design of NBS. This report is the subject for this consultation.

Consultation

This consultation has been sent to relevant stakeholders, i.e. retailers, balance responsible parties, grid companies, industry associations, Nord Pool Spot and regulators.

Svenska Kraftnät, Energinet.dk, Fingrid and Statnett will appreciate your view on the content of the NBS report attached to this letter. In order to have a joint Nordic Balance Settlement changes have to be imposed in all Nordic countries and for all actors. It is inevitable that some actors will, at least in the short run, define the changes as being negative. The Nordic TSOs welcome especially comments that are based on the knowledge that a joint Nordic Balance Settlement requires a "Nordic approach" and a broad perspective.

The consultation will be managed by each national TSO. Written feedback, **in English**, shall be sent to your national TSO (see list below) **not later than 28th of February 2011**.

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Contact

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The NBS report can be downloaded from each of the following sources:

<http://www.svk.se/Energimarknaden/El/Balansansvar/Aktuellt-om-balansansvarsavtal/>

http://www.fingrid.fi/portal/suomeksi/palvelut/tasepalvelut/nordic_balance_settlement/

<http://ny.energinet.dk/DA/El/Forskrifter/Markedsforskrifter/Sider/Markedsforskrifter-i-hoering.aspx>

<http://www.statnett.no/no/Kraftsystemet/Balanseavregning/Nordisk-balanseavregning/>

Statnett, Svenska Kraftnät, Energinet.dk and Fingrid would like to thank you in advance for participating in this consultation process.



Statnett



Nordic Balance Settlement (NBS)

Common Balance & Reconciliation Settlement

Design

January 26th, 2011

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Terminology

The project has used the following terminology in the report.

	<i>Definition</i>
Ancillary services	Ancillary services includes primary, secondary and tertiary regulation (cf. ENTSO definition) and other services for system operations managed by TSO
Automatic Meter Reading (AMR)	AMR is a system with meters and communication for remote reading/collection of metered data in metering points.
Balance Power	Amount of energy BRP has to buy from/sell to TSO to neutralize his imbalance.
Balance Responsible Party (BRP)	BRP is a player who has an agreement with the TSO (SR) obliging him to buy/sell balance power from/to TSO to neutralize his imbalances.
Balance settlement	Balance settlement is the settlement of balance power.
Balancing area	= bidding area
Bilateral trade	Bilateral trade is trade between BRPs reported before gate closure, except NPS-trade
CET	Central European time
Collaterals	Economic security, e.g. on demand bank guarantee
Datahub	A central it-platform through which all players communicate with each other instead of communicating bilaterally with e.g. 500 other players incl. DSO's.
Distribution System Operator (DSO)	DSO is the grid owner with the responsibility to transmit electricity from producers to customers. The DSOs have the responsibility to meter production, consumption and exchange and report the metered data to the stakeholders involved.
EDI	Electronic Data Interchange
EDIEL	EDIEL is the traditional kind of EDI using the Edifact standard. Alternatives are eg XML.
KPI	Key Performance Indicators measures performance
Load profile	The load profile is the total consumption in the MGA minus the consumption which is hourly metered and these hourly meterings are used in the balance settlement. .
Load profile share	The load profile shares ("andelstal") for a RE/BRP is the expected profiled consumption for that RE/BRP in the considered MGA
Metering Grid Area (MGA)	The MGA is owned by one and only DSO. Special MGA's are the transmission grid owned by or leased by the TSO All exchange with adjacent MGA's is hourly metered. There is only one RE/BRP for the MGA grid loss.
Metering Point (MP)	MPs are the points in the MGA where the DSO meters the electricity flow. MP is divided into exchange-, production- and consumption-MP.
Nord Pool Spot AS	NPS is the company who organise physical electricity markets in

(NPS)	the Nordic countries.
NordREG	Consisting of the four regulators in The Nordic countries
NPS trade	Elsport trade and Elbas trade
Profiling	Profiling in relation to PPC is the procedure to distribute the load profile among RE/BRP. In relation to FPC it is the procedure to distribute the metered value for eg yearly consumption to eg hourly values (estimates).
Final profiled consumption (FPC)	Estimate of profiled consumption pr, metering/RE on hourly basis used in reconciliation. It is calculated on basis of the metered values per metering point
Preliminary profiled consumption (PPC)	Estimate of profiled consumption per RE/BRP on hourly basis used in balance settlement. Estimated as the RE/BRP share of load profile.
Reconciled energy	The reconciled energy is the differences between the final profiled consumption and the preliminary profiled consumption
Regulation power (RP)	RP is activated by TSO in order to rebalance the electricity system.
Regulation power market	Regulation power market is organised by the TSO who receive bids from BRPs for up- and down regulation.
Retailer (RE)	A Retailer sells electricity to directly to final customers and buy electricity directly from producers.
Settlement	Settlement is the calculation of different actors' obligations in energy and costs. An important part is to QA the input data to the settlement. The national settlement in an electricity market is divided in the balance settlement and the reconciliation settlement.
Settlement Responsible (SR)	SR has the responsibility to operate the NBS settlement.
System operator (TSO)	TSO have the responsibility to supervise the balance of the electricity system and take actions to rebalance the system.

Table 1

Executive Summary

Background

Balance settlement is a natural monopoly and a necessary function in a commercial based electricity market. Svenska Kraftnät, Statnett, Energinet.dk and Fingrid have the role as “Settlement Responsible” as well as “System Operator” in Sweden, Norway, Denmark and Finland respectively.

Currently there are few retailers present in all the Nordic countries, and only some retailers operate in more than one country. Due to differences in the national end user markets, a Pan-Nordic retailer has to have parallel supply functions through most of the value chain. Balance settlement and reconciliation settlement are significant parts of this value chain, and different national rules and routines in this area represent barriers for entry. Rules for balance settlement also give guidance for other business processes such as supplier change, reporting of meter data as well as the relation between grid companies and retailers. A common balance settlement and reconciliation settlement is therefore a prerequisite for a common end user market.

The Nordic Council of Ministers has for several years supported a development of a common Nordic end user market for electricity. This has now been put in concrete form in a report from NordREG¹ that recommends a common end user market including common balance settlement. The Nordic Council of Ministers gave their support to the report on the minister meeting in October 2009 and now lately in October 2010. The declaration from the energy ministers meeting was:

“The natural continuation of the harmonization of the Nordic whole sale market for electricity is the development of a common Nordic end user market. The ministers have received a draft plan for implementation from the Nordic regulators. The ministers look positively on the content and the regulators ambitious time plan...”

A project aiming to find a common balance settlement was established in the first quarter of 2009 as part of the strategic cooperation between Statnett and Svenska Kraftnät, In the later part of the project it was decided to establish a new project where Fingrid and Energinet.dk was included in 2010.

Two meetings have been held with a reference group from the industry and the regulators during the project. The Reference group has also given written feedback to the NBS project. The feedback from the Reference group has been important, and will be considered together with the other feedback that will be received after an industry consultation during the first part of 2011.

This report summarises the NBS (Nordic Balance and reconciliation Settlement) design project, and is limited to describing the balance settlement and reconciliation settlement. Other harmonisation measures for creating a common Nordic end user market are touched upon, but are not considered part of the NBS project and therefore not covered in this report.

¹ NordREG consists of the regulators in Norway, Sweden, Denmark and Finland

Proposed model for a common balance settlement

The project proposes a model with the following main elements:

- Each TSO has the formal balance responsibility in the country they operate.
- A common operational unit responsible for settlement is established either as a separate company or transferred to a company performing the balance settlement and reconciliation on behalf of the TSOs. The actual organisation of the operational unit has not been concluded on yet. The settlement responsible unit performs the balance settlement and invoices the BRPs for imbalances, regulation power and reconciled energy.
- The DSOs have the responsibility to calculate the reconciled energy and report relevant data to the SR.
- Identical balance agreements for balance responsibility in different countries are established (different legal frameworks might demand formal differences in the balance agreement). Also a common handbook which contains all necessary information for balance and reconciliation settlement is to be established.
- Identical business processes for reporting, settlement; invoicing, collaterals and corrections will be established.
- Further development of a harmonised fee structure will be done. However different fee levels dependent on the real cost of balancing in each country.
- One common standard for electronic communication with the SR will be established, preferably in cooperation with NordREG.

The model ensures the requirements for a common balance and reconciliation settlement and supports a future end user market with equal treatment of all players independent of nationality and national markets. The model also secures a coherent development of the balance settlement in the Nordic countries in the future.

Essential changes

The NBS model encompasses several changes in the balance and reconciliation settlement. The changes are different in each country due to current solutions with different processes for the balance and reconciliation settlement. A harmonised Nordic solution will however require changes in all four countries. The most important changes are described below.

Change	Description
Balance settlement to be centralised in the Nordic countries.	A common unit (SR) will perform the operation of the balance settlement and invoicing of balance settlement and reconciliation. BRPs will thus have one contact point for the balance settlement.
Reporting by the DSO day after delivery day of aggregated meter values to the BRP for load forecasting purposes and to the SR for preliminary balance settlement purposes.	New requirement for DSOs in Norway and Denmark.
Corrections after the final balance settlement (9 working days) have to be done bilaterally.	Change from current solution in Sweden and Denmark where corrections of balance settlement can be done a long time after the balance settlement has

	been calculated.
All meter data to be used in the balance settlement have to be reported at the latest 9 working days after the delivery day.	NBS model will prolong the settlement in Norway and Denmark while reducing the time for balance settlement in Sweden and Finland.
Invoicing of the balance settlement is to be done on a weekly basis.	Change in Sweden, Denmark and Finland.
DSO to submit LPS before the start of the delivery month.	New tasks for the DSOs in Finland. Change in Norway from metering point to MGA and change from daily to monthly The datahub will handle this in Denmark.
Profiling of the preliminary profiled consumption (PPC) for the balance settlement.	New tasks for DSOs in Sweden and Finland. The datahub will handle this in Denmark.
Partly centralisation of the reconciliation settlement.	DSOs to report reconciled energy on an hourly basis to the SR who calculates and send out the basis for reconciliation to the BRPs. Reconciliation is then done between the BRP and the RE. This solution is new in all countries, but will especially entail more work for the DSOs in Sweden and Finland. The datahub will manage this in Denmark.

Table 2: Most important changes with the NBS model

Other main changes are described further in the report.

Process and Time Schedule

The NBS project suggests that the implementation phase start early 2011 and that the NBS could at the earliest be operational by the beginning of 2014. This requires that the regulators are able to change the necessary regulations during a one year period. The market players (DSOs, BRPs, REs) will have 18 months after the new regulation have been decided upon to adapt to the necessary changes.

The NBS system will have a two month market testing period before it is made operational.

Throughout the time until implementation the TSOs will inform the industry about the development and also inform potential IT vendors about the new solution for the balance settlement and reconciliation. With early information to IT vendors about system changes the development of new solutions may be done faster.

Reservations

This report assumes that the SR will invoice regulation power from start up of operation. Energinet.dk suggests that the invoicing of regulation power and other ancillary services should possibly be included, but that it requires some more analysis before it is decided.

1 Background

A common settlement solution in the Nordic countries is supported by the governments and regulators in the Nordic Countries.

Harmonising the balance settlement in Sweden, Norway, Denmark and Finland is regarded as an important step towards a fully functional common end user market in the Nordic countries. Existing balance settlement solutions in the Nordic countries have many similarities; however there are also some important differences concerning roles, processes and the daily operation.

A common balance settlement will lower the entry barriers for balance responsible market participants with an ambition of operating in several Nordic countries. Further, a common balance settlement is a prerequisite for a common end-user market, and finally, a common balance settlement can potentially lower the administration costs of the balance settlement operation in the long run.

This report aims to present the basic design for a joint balance settlement solution, and will provide a basis for further work in the implementation phase. Furthermore it shall give the management of the respective TSOs enough information in order to decide on implementation of a common balance and reconciliation settlement solution. In addition the documentation will be sent on consultation to external stakeholders and the industry for their views.

1.1 Scope of the Nordic Balance and reconciliation Settlement (NBS) model

The main function encompassed by the proposed model is the balance settlement. The Nordic Balance and reconciliation Settlement model is based on the present harmonised model with two balances, i.e. balance power for production and consumption are calculated and settled separately. In addition the NBS model includes the reconciliation, which is a settlement method that considers the differences between preliminary profiled consumption used in balance settlement and final profiled consumption. The abbreviation NBS will in the following be used in reference to common balance and reconciliation settlement.

The NBS-model is based on the general assumption that a common Nordic body, a so called Settlement Responsible (SR), performs the balance settlement and manages invoicing as well as collaterals towards the Balance Responsible Parties (BRP) on behalf of the Transmission System Operator (TSO) in each country.

All matters directly related to system operations e.g. procurement of balance regulation and primary reserves etc is outside the scope of the NBS project. But the NBS model will take such volume into consideration when calculating the balances. However, the SR will also invoice the regulation power market in the balance settlement. In the future it will be evaluated if settlement and invoicing of other ancillary services could also be managed by the SR.

In parallel with the establishment of a common Nordic balance and reconciliation settlement several other harmonisation processes has been initiated by NordREG. The ambition is to create a full Nordic end user market for electricity in the Nordic region. A harmonised balance settlement and reconciliation settlement is one part of this Nordic harmonisation. This report describes the balance settlement and the reconciliation settlement, and does not give answers to all harmonisation necessary to establish a common end user market in the Nordics. These harmonisation processes are outside the scope of the TSOs and the NBS Design project.

1.2 Benefits for the Nordic electricity market

The NBS project has described a platform for a common balance and reconciliation settlement in Sweden, Norway, Denmark and Finland. This means that a Balance Responsible Party (BRP) has one interface (the settlement responsible unit) and one set of rules when settling its' imbalances in the Nordic Countries..

The suggested model has several benefits for the electricity market:

- A common model that fully supports a common Nordic end-user market:
 - Lower entry barriers for new actors through equal rules in all countries
 - Harmonisation of laws, regulations, balance settlement agreement and rules will reduce the administrative cost for market participants and ease the operation for market players operating on a Nordic scale.
 - Supports an efficient electricity market in a wider market area
 - Supports efficient operation across national borders as it reduces cost of administrative systems as well as IT systems and reduces staff cost of serving several markets for the BRPs operating in more than one country
 - Cost effective solution in the long run for the settlement and invoicing of reconciled energy in the operation due to economy of scale in a set up with one Settlement Responsible unit.
 - There will be a cost of establishing the SR's IT-system. The benefit lies in utilising the SR's IT system on a larger scale, i.e. the same system is used in several countries. The economic effect will be achieved after some years when the current TSO systems have been phased out (initially the systems need to be operated in parallel).
- One counterpart in the reconciliation for BRPs or retailers (RE), i.e. only the SR unit instead of all Distribution System Operators (DSOs) or data hub.
- Reduces communication between BRPs and DSOs
- Reduces the complexity for BRPs to operate on a Nordic level.
- A common Nordic solution may serve as role model for European development

1.3 Commitment from the Nordic TSOs

The four TSOs will work for a common balance settlement and reconciliation settlement solution for Sweden, Norway, Denmark and Finland. The implementation of the proposed solution has to be done in close cooperation with the stakeholders in the electricity markets, i.e. BRPs, DSOs, REs and regulatory bodies.

Svenska Kraftnät, Statnett, Energinet.dk and Fingrid have strived to design an efficient solution, and have tried to reduce the number of special national solutions.

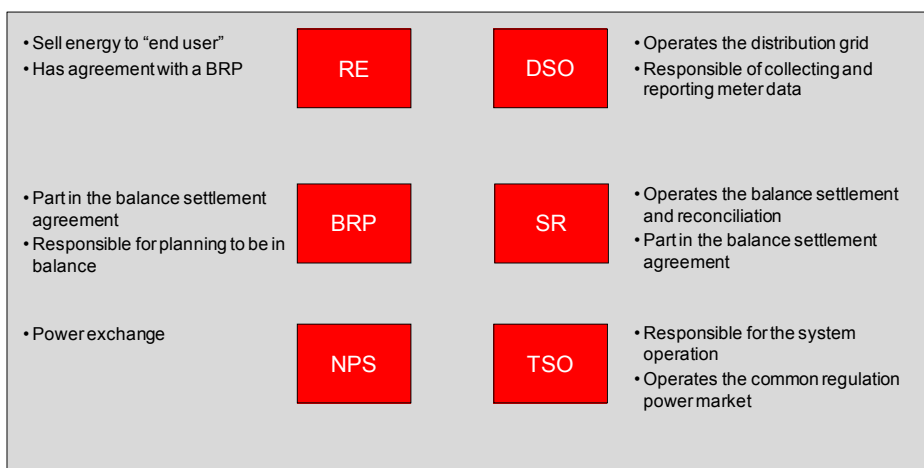
Implementation of a common settlement model is dependent on several changes to national laws and regulations as well as change of technical systems. The time table for implementation is therefore difficult to assess but it is the ambition to implement a common settlement during 2014 without jeopardizing the goal of implementing an efficient and good solution for the market.

2 Nordic Balance Settlement model

The NBS model which is proposed by Svenska Kraftnät, Statnett, Energinet.dk and Fingrid is described in more detail in this chapter. All time limits used in the report are in Central European Time (CET).

2.1 Roles and responsibilities in the NBS model

The roles of the different market players in the balance settlement are described in this chapter. The illustration below gives an overview of the different market players and their main role related to balance settlement.



The roles are described further in the following sections.

2.1.1 Settlement Responsible (SR)

A common operational unit (entity) is established, i.e. the Settlement Responsible. The SR is responsible for settlement of imbalances and reconciled energy. The SR performs services on behalf of the four TSOs. The SR's responsibilities are the following:

- The SR performs the balance settlement and invoices the BRPs for the imbalances and regulation power.
- On basis of the reconciled energy per RE and MGA the SR will aggregate and price the reconciled energy per BRP for invoicing
- The SR will set the collateral levels so that it covers the balance settlement and reconciliation settlement. The SR will collect and monitor the BRP's collaterals and take necessary actions to raise collaterals when needed.
- The SR will collect all the fees from BRPs.
- The SR shall monitor imbalances and assess whether they are in accordance with published guidelines and regulations
- The SR will publish a set of Key Performance Indicators (KPIs) to provide statistics on reporting and settlement

2.1.2 Distribution System Operator (DSO)

The DSO has several obligations in relation to balance settlement. The DSO's responsibilities are the following:

- Operate the metering system and submit metering data to the REs, BRPs and SR
- Calculate and report load profile shares
- Calculate the final profiled consumption and the reconciled energy when all metering for a grid area is completed.

If there is a data hub, the data hub will perform some of the tasks of the DSO, cf. above.

2.1.3 Balance Responsible Party (BRP)

The BRP's responsibilities regarding balance settlement are the following:

- The BRP must have a balance agreement with the SR and provide the required collaterals.
- The BRP is responsible for planning its balance schedules and ensure that they are in planned balance on an hourly basis.
- The BRP submits production plans to the TSO who will forward them to the SR.
- The BRP submits information of their bilateral trade.
- The BRP is the financial counterparty for the settlement of imbalances, regulation power and reconciliation.
- The BRP settles the reconciled energy per RE after the SR has settled the reconciled energy per BRP based on data on RE level.
- The BRP is also responsible for checking all relevant data reported from the SR, and notify deviations.

2.1.4 Retailer (RE)

The RE's responsibility regarding balance settlement is:

- The retailer must have an agreement with a BRP.

2.1.5 Power exchange

The responsibilities for Nord Pool Spot (in its role as power exchange) in regard to balance settlement are the following:

- NPS reports trade data for Elspot- and Elbas trade per BRP and bidding area to SR (and TSO if needed)
- NPS will also report cross border trade with other power exchanges (market coupling) to TSOs.

2.1.6 Transmission System Operator (TSO)

The TSO's responsibilities in relation to the balance settlement are the following:

- Balancing the production/import with the consumption/export during the delivery hour to meet the overall demand of frequency at 50 Hz.
- The Nordic TSOs set the outline for the terms of the balance settlement agreement. The national TSO will decide on the fee levels which the BRPs will be charged by the SR.
- The TSO calculates regulation prices per hour and determines balance prices.
- The TSO submits necessary information per BRP to the SR for the balance settlement of the BRPs; i.e. production plans, and activated regulation power and other power trades during the operation hour.
- The TSO is the financial counterparty towards the BRP for all ancillary services with the exception of regulation power which is handled within the SR.

2.2 Balance responsibility and agreements

The formal/legal balance responsibility for each Nordic country is held by the national TSOs. However, the parties of the balance settlement agreements will be the SR, on behalf of the TSOs, and the BRP, i.e. only one balance settlement agreement is needed per BRP irrespective of how many countries the BRP do business in. The scope of the balance settlement agreement will be limited to issues regarding the balance settlement, reconciled energy and invoicing of regulation power. Development of the Balance Settlement Agreement will be done in the implementation phase.

Furthermore, an agreement which regulates the tasks of the SR will be established between the TSOs and the SR. This agreement will also regulate the interface regarding ancillary services and the balance settlement.

There will be no contractual agreement related to the balance settlement between the TSO and the national DSOs, nor between the SR and the DSOs. All obligations related to reporting and calculation of reconciled energy which fall on the DSOs should be regulated in national laws or regulations.

2.3 NBS reporting structure

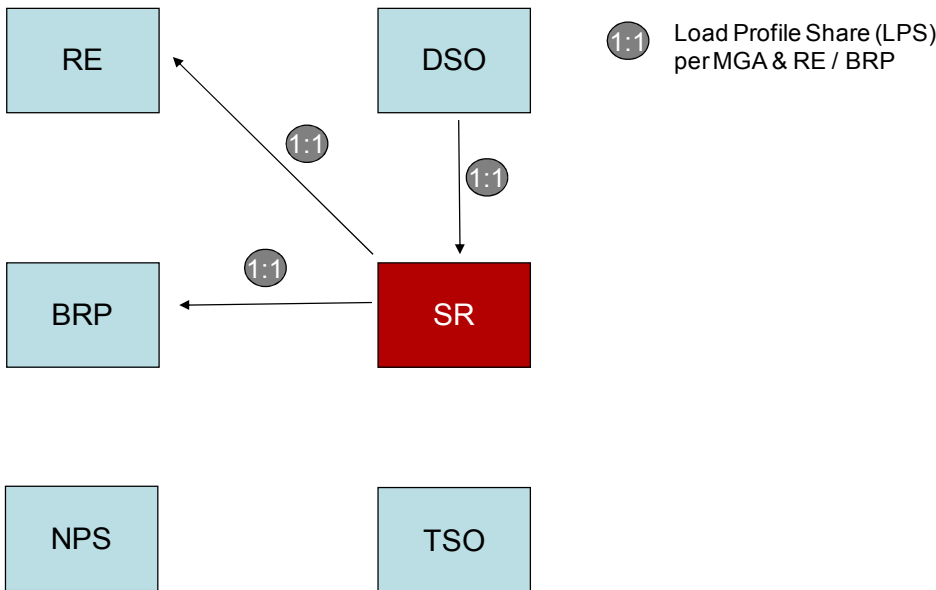
In this chapter the proposed structure for reporting in the NBS-model is described. The chapter is divided in different sections depending mainly on when the reporting takes place:

- Before the delivery month
- Before gate closure (delivery hour)
- After gate closure (delivery hour)
- Within 9 days after delivery day
- After the balance settlement
- For profiled metering points
- For reconciliation settlement

The reporting described in this chapter is the reporting required for the balance settlement and does not describe all reporting taking place for instance between the BRP and the RE.

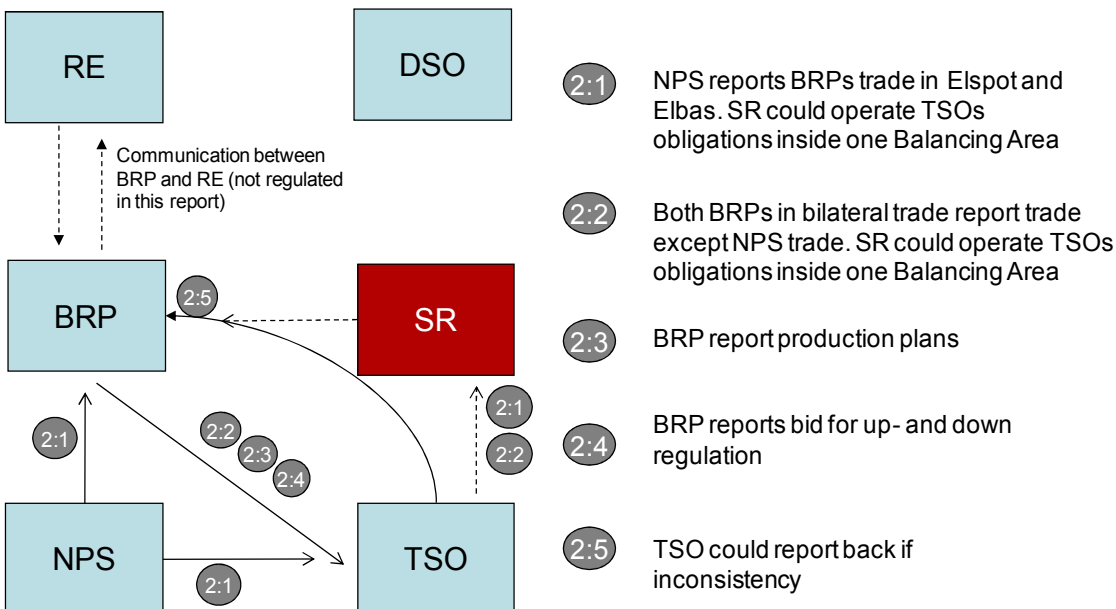
2.3.1 Before the delivery month

The Load Profile Shares (LPS) per Metering Grid Area (MGA) and RE/BRP must be reported by the DSO to SR who forwards the updated LPS to REs and BRPs at the latest 2 working days before the start of the delivery month. (The first LPS shall be sent 9 working days before the start of the delivery month). The DSO is responsible for the data quality of the LPS.



2.3.2 Before gate closure

- 1) Bilateral trades must be reported to TSO² according to the TSOs requirements. NPS reports all trades made in Elspot for the next day. Elbas trade is reported before the delivery hour³.
- 2) Production plans must be reported to TSO according to the TSOs requirements and at the latest before gate closure⁴ before the delivery hour.
- 3) Regulation bids must be reported to TSO according to the TSOs requirements and at the latest before gate closure⁵ before the delivery hour.
- 4) The national TSO can check consistency and can report back to the BRPs.



² Today bilateral gate closure for BRPs is 20 minutes in Finland and 45 minutes in the rest of the Nordic countries.

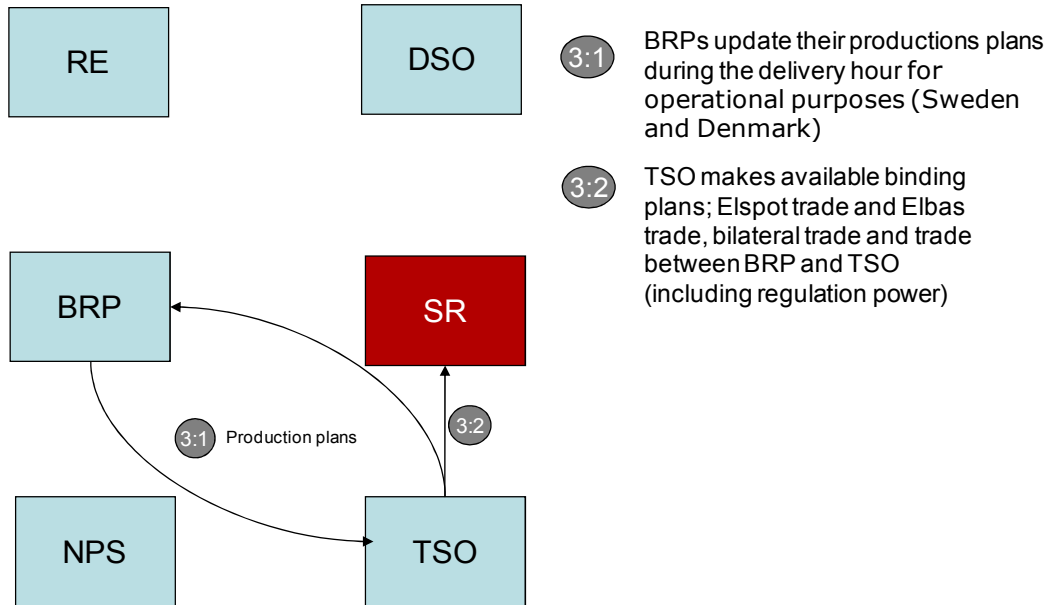
³ Today Elbas-market gate closure is 2 hours before delivery hour in Norway and 1 hour before delivery hour in the rest of the Nordic countries.

⁴ Today 45 minutes before the delivery hour..

⁵ Today 45 minutes before the delivery hour.

2.3.3 Short time after gate closure

- 1) All activated trades in regulation power market and any other agreed BRP-TSO trade in the delivery hour are made available from TSO to BRP and to SR.
- 2) Binding production plans are reported from TSO to SR (The level of details is not decided).
- 3) Binding bilateral trades and Nord Pool Spot trade are reported from TSO to SR.



2.3.4 Reporting metered data during day 1 – 9 after delivery day

1. DSO reporting of individual metered data before 10:00⁶ (CEI) with data for previous day:
 - a. Hourly metered data on production is reported to SR and RE per unit
 - b. Hourly metered data per consumption metering point is reported to RE

The actual requirements for production units and large consumption units is yet to be decided upon, and will be evaluated in the next phase of the NBS project.

2. DSO reporting of aggregated metered data before 10:00 (CEI) with data for previous day:
 - a. Per MGA aggregated metered data from exchange metering points is reported to SR
 - b. Per MGA aggregated hourly metered consumption data per RE/BRP is reported to SR
 - c. Per MGA preliminary profiled consumption per RE/BRP is reported to SR

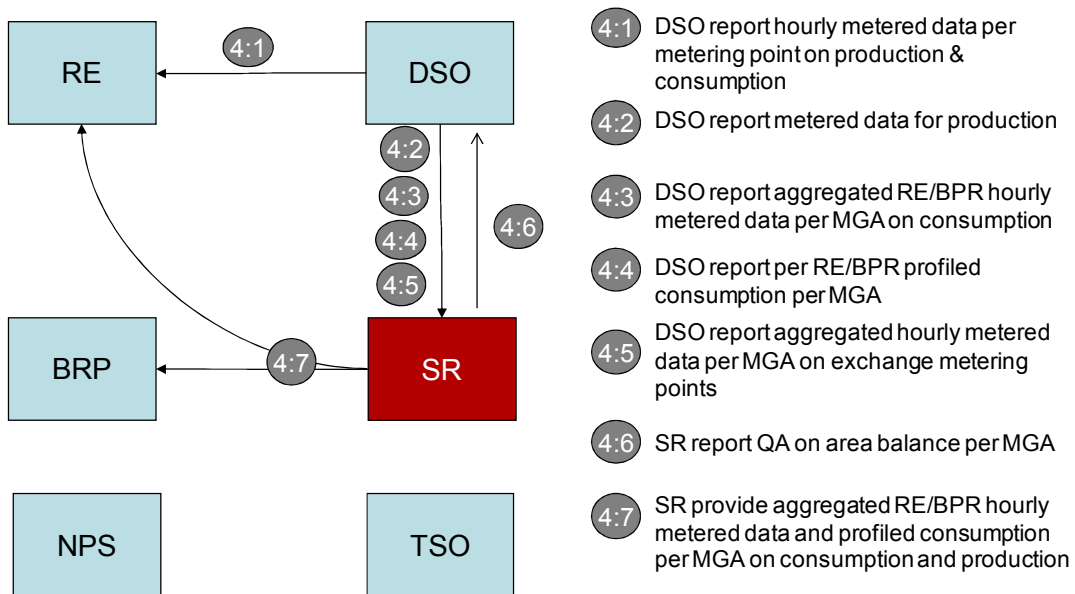
The metered data should be available at SRs database for BRP and RE as an aggregated volume per RE/BRP.

Missing daily collected metered data in a single metering point must be estimated before aggregation. Updated metered data should be reported before 12:00 p.m. of day 9.

If metered data is available and if the national regulation demands it, metered data in consumption metering points with main fuse below 63A shall be reported daily as well.

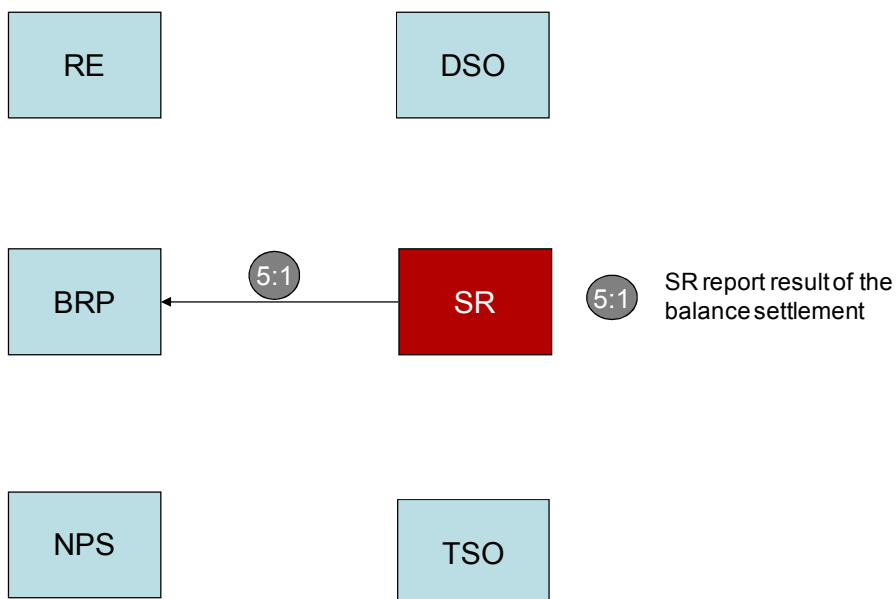
⁶ The time for reporting should be decided by the regulators

3. SR makes available quality assurance (QA, area balance etc.) data per MGA to DSO
4. SR provide per MGA aggregated metered data for RE/BPR to RE and BRP



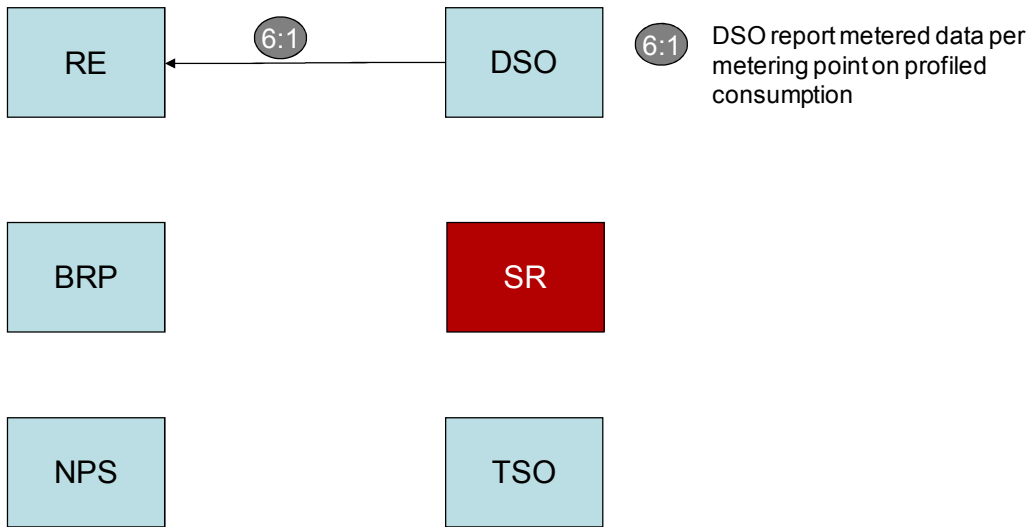
2.3.5 Balance settlement

- 1) The result of the balance settlement for a specific settlement day is calculated every day until the 9th day after the delivery day, thereafter the settlement is locked.
- 2) The invoice for one delivery week is sent electronically to the BRP the 10th working day after the end of delivery period.



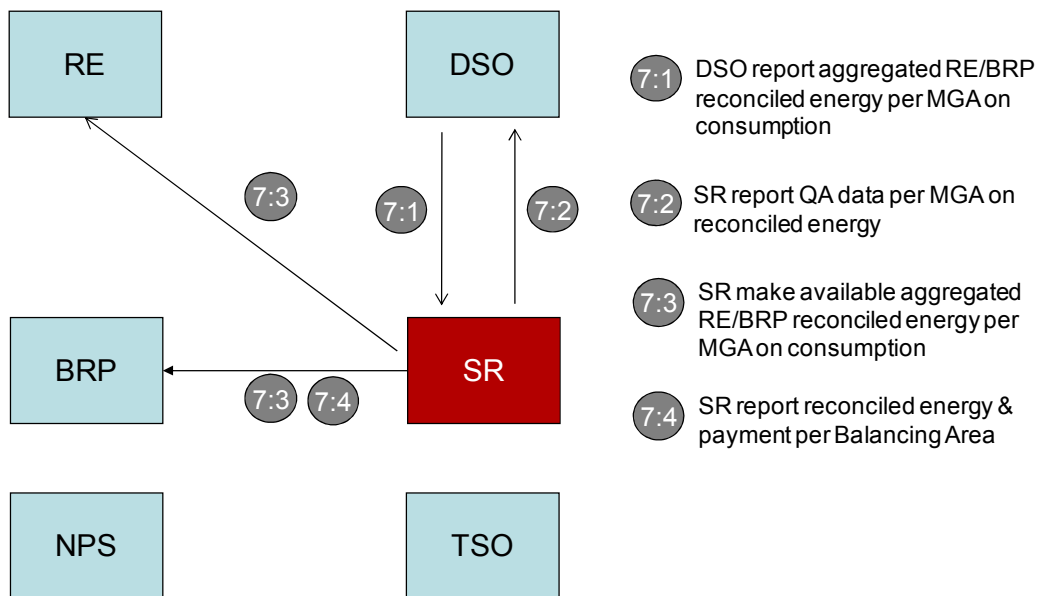
2.3.6 Reporting of metered data of profiled metering points

Collected metered data per consumption metering point is reported to RE



2.3.7 Reporting reconciliation settlement

- 1) Per MGA the DSO reports to SR the reconciled energy per RE/BRP
- 2) Per MGA, SR calculates the cost on the reconciled energy per RE/BRP and make the result available for the RE and BRP
- 3) SR will once a month invoice BRPs the reconciled energy



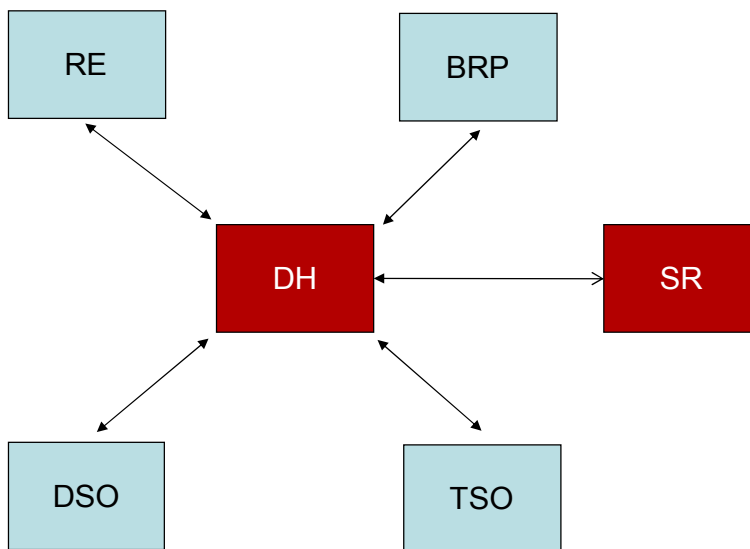
2.3.8 Reporting in Denmark with introduction of a Data Hub

The EDI reporting described in this chapter has not taken into account the Data Hub to be implemented in Denmark.

In Denmark all electronic data communication will go via the Data hub. This is done in order to have an efficient data communication solution in Denmark, and it is a consequence of establishing the Data Hub.

With respect to the NBS model described in this chapter it is only the routing of EDI communication that will be different in Denmark. The message content, formats and technology standard will be the same.

A simplified illustration of the EDI reporting in Denmark is shown in the picture below.



2.4 Metering

The metering is assumed to be established as follows:

All metering should be organised per Metering Grid Area (MGA). A MGA can only be situated in one price area. Aggregated meter data should be aggregated per MGA per RE / BRP. A RE can only use one BRP for consumption and one for production in the same MGA, however it could be the same BRP. A BRP can have more than one RE in the MGA. A RE can use different BRPs in different MGAs.

Different types of metered data:

- 1) Exchange metering point to other MGAs: Meters with hourly registers which are collected every day.
- 2) Production metering points: Meters with hourly registers which are collected every day⁷.
- 3) Consumption metering points which are collected every day. This comprise metering data above 63 AMP and all metering points max 63 AMP that should be collected on a daily basis according to national regulation. In Norway and Denmark the current threshold is 100.000 kWh per year. In

⁷ Production metering has to be harmonised on Nordic level regarding the requirements for size, type of production etc.. Today there are different solutions between the countries.

Finland there is no fuse size threshold as every metering point should be reported daily. Missed or out of range metered data should be estimated.

- 4) Consumption metering points with main fuse *max* 63 AMP with hourly registers which are collected at the latest once a week. The data should be estimated until data has been collected.
- 5) Consumption metering points with main fuse *max* 63 AMP with hourly registers which are collected monthly. Consumption in these metering points should be profiled according to the MGAs load profile and settled in the reconciliation.
- 6) Consumption metering points with main fuse *max* 63 AMP without hourly registers. Metered data should be collected according to national rules. Consumption in these metering points should be profiled according to the MGAs load profile.

The DSO should have the possibility on a voluntary basis to collect consumption metering points with main fuse max 63 A with hourly registers and settle the energy every day according to 3) or 4).

The MGAs load profile (LP) is calculated as a residual: LP = Sum of 1), 2), 3) and 4) above with the sign minus (- = consumption). For MGAs where all input and all output is hourly metered the residual is hourly calculated losses.

Example of calculation of a load profile share for a MGA:

Exchange metering point to other MGAs: 150.MWh

Production metering points: 400 MWh

Consumption metering points collected every day: 200 MWh

Consumption metering points with main fuse *max* 63 AMP collected at least weekly: 60 MWh

LP (MWh) = Exchange metering points to other MGAs + production metering points + consumption metering points + consumption metering points max 63 A = -150 + 400 + - 200 + - 60 = - 10,0

2.5 Automatic meter reading (AMR)

2.5.1 AMR in general

Automatic Meter Reading (AMR) is the technology of automatically collecting consumption data and status data from energy metering devices and transferring that data to a central database for billing, troubleshooting, and analysis. This advance saves the troubles of manual readings by the customers, eg long delays, or the cost of manual readings by the DSO at the location of the meter. Another advantage is that billing can be based on near real time consumption rather than on estimates based on previous or predicted consumption. This timely information coupled with analysis, can help both utility providers and customers to better control the use of electric energy.

2.5.2 Present status of AMR in Nordic countries

The AMR status at end-user level varies greatly throughout the Nordic countries. There are significant differences in how data are recorded (i.e. what kinds of registers are used, hourly or monthly energy data), how metered data are collected and used in the balance settlement and finally different invoicing process.

In Finland the AMR status is changing right now. The project has been ongoing during a couple of years and its' target is that almost all end-users are equipped with AMR so that all consumption (yearly consumption higher than 5000 kWh) are metered hourly. By the end of year 2013 almost 90% of the consumption energy will be recorded by using hourly metered data and all these energy data will be collected every day and submitted to the balance settlement. The need for load profiling and reconciliation is then next to insignificant.

In Sweden, AMR was introduced 1st of July 2009. However, the Swedish model is currently based on monthly meter collections for customers below the limit 63 Amp which mean that it differs from the soon to be implemented model in Finland which will be based on daily collected hourly data. However, many of the installed meters are able to collect hourly metered values. A project involving the regulator, the TSO and stakeholders has been looking into the possibility to lower the limit for hourly metering.

In Norway, the suggestion for AMR is a solution with hourly meters which are collected at a minimum once a week. The exact limit for requiring AMR is not set, but NVE has in the consultation opened for exemption for metering points with yearly consumption below 1000 kWh per year. All meters above this level shall then have AMR. The proposed implementation time is set to be 1.1.2018 whereby all required AMR shall be operational. The necessary regulations will be finalized during first half year of 2011.

In Denmark the mandatory limit for traditional hourly metering, i.e. collected daily and used in balance settlement, is 100.000 kWh/y, or app.1,5% of metering points. There are no firm national plans for extending AMR, but there is broad political support behind a “vision”, that all customers shall have some kind of AMR by 2020. The first step will probably be a limited reduction to 50.000 kWh/y for traditional hourly metering. Regarding the next step it’s a common opinion in industry that the optimal cost effective solution for small metering points is to let them remain profiled regarding balance settlement, but use the hourly data in the monthly reconciliation on hourly basis, i.e the same model as proposed by the Swedish regulator, Energy Markets Inspectorate (EMI), in Sweden, cf. above.

2.5.3 How AMR affects the NBS -model

AMR, with hourly data, influences to some extent the use of load profiles needed to be applied in the balance settlement and/or reconciliation since AMR makes it possible to use the hourly data. The idea of the NBS -model is that if hourly data is collected weekly and *within* the stipulated 9 working days (i.e. the balance settlement time limit), these data should be used in the balance settlement. However, if the hourly data is collected *less frequently than weekly* this part of the consumption will be included in the load profile. This rule is applicable for all consumption without respect to level of yearly consumption or the size of the main fuse.

2.5.4 AMR in the future

Due to the fact that the level of AMR is different in each Nordic country, the NBS model is in this respect a compromise as the model needs to suit all countries AMR-systems. It is of great importance that the regulators agree on a harmonization of the AMR structure and the demands for data collection from these meters as this issue is an important key issue when considering the well functioning of the Nordic retail market. The NBS project recommends the Nordic regulators to harmonise AMR with respect to data resolution and frequency of collection in the Nordic countries. The present different rules are an obstacle to “deep” Nordic harmonisation. Increased implementation of AMR with hourly meterings collected in due time will reduce the need for profiling and reconciliation and will to a certain limit increase the socio-economic efficiency.

2.6 Balance settlement

The calculation of balance settlement in the NBS-model is identical with the present common Nordic model that was implemented during 2009 in all Nordic countries⁸).

A short summary of this model is:

⁸https://www.entsoe.eu/fileadmin/user_upload/_library/publications/nordic/market/071116_entsoe_nordic_ProposedPrinciplesCommonBalanceManagement.pdf

There are two balances:

- 1) Production balance = Metered production - planned production (+ / -) production regulation power
- 2) Consumption balance = Planned production + metered consumption + actual trade (+ / -) all consumption regulation power

using the sign convention: consumption & sales = negative, production & purchase = positive.

The “consumption balance” is actually a balance for both consumption and trade.

The production balance power is priced according to the spot price in the balancing area, but if the imbalance cause regulation in the system the production balance power is priced with the marginal regulation price. This is called the two price model

The consumption balance power is always priced according to the regulation price in the price area. This is called the one price model

The SR will conduct preliminary balance settlement once a day starting from the day after the day of delivery until nine working days afterwards.

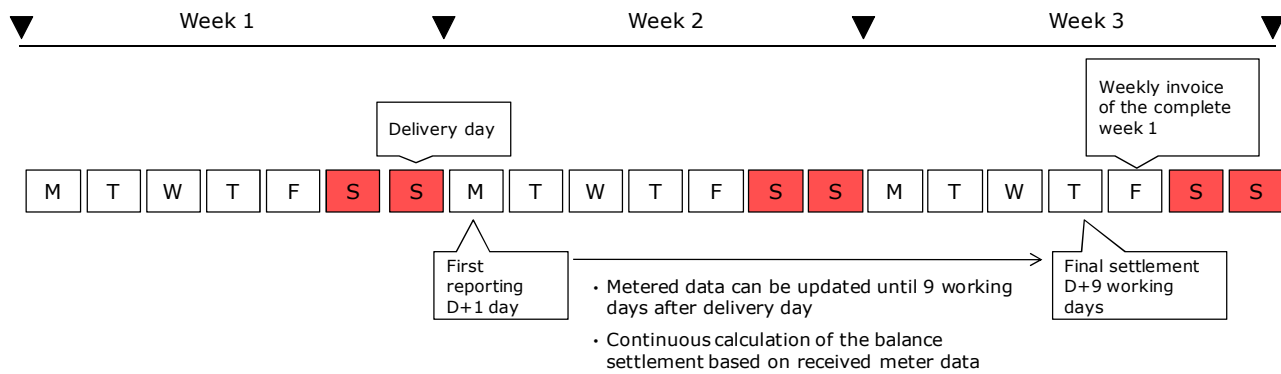
The input data to the settlement will continuously be made available for the BRPs through an application which will allow the REs, BRPs and DSOs to follow and control the data and their position. The BRPs and the DSOs can also monitor and control the data which is calculated by the SR. Energy volumes and amounts will also be published. The players will only have access to their own data. Reporting of settlement data to the stakeholders should be possible to provide.

The BRP should control the input data to the balance settlement before D+9 and dispute faults to the party concerned for corrections before the invoicing take place. Metered data should be disputed to the DSO. The DSO has at most 9 working days to correct erroneous metered data before the SR invoices the balance power.

No corrections of the balance settlement will be made by the SR after the invoice has been produced. An exception is if the SR has committed errors or due to extraordinary circumstances. Subsequent bilateral correction of balance power settlement is outside the SRs scope but has to be harmonised and standards and procedures should be developed by the industry together with the regulators.

Prices and amounts in the balance settlement will be in EUR. The invoice on the other hand could be set up in the currency chosen by the BRP (i.e. EURO, DKK, NOK or SEK). Invoicing in other currencies than Euro will be charged a service fee (covering currency risk and administrative costs).

The invoicing will be made weekly. The balance settlement process is described in the illustration below. It is supposed that all Monday-Fridays are working days.



Metered data for Sunday in week 1 should at the latest be updated 9 working days after delivery day, i.e. on Thursday week 3 in the illustration above. On Thursday all metered data for the whole week 1 have been possible to update and the whole week is settled. Invoicing can then take place on Friday week 3. The reporting requirements is defined by number of working days in order to ease the work pressure for the DSOs and BRPs in the holiday seasons, especially at Christmas, Easter, Whitsun and Midsummer. A Common Nordic calendar will be developed.

2.6.1 Preliminary profiling

In relation to balance settlement the consumption can be separated in two groups according to the type of metering:

1. Hourly values are collected at least weekly. This is called non-profiled consumption
2. All other metering points, incl. AMR with hourly values collected e.g. monthly. This is called profiled consumption, and the total profiled consumption in grid area is called the load profile (LP)

For the first group the collected hourly values are used in balance settlement. For the second group estimated hourly values called preliminary profiled consumption (PPC) per BRP is used in the balance settlement.

The PPC for a BRP in the considered grid area is calculated according to the following procedure:

- 1) During the delivery month the load profile on hourly basis is calculated on basis of net exchange with surrounding grid areas incl. transmission grid, local production and total non-profiled consumption.
- 2) The load profile is shared among the RE/BRP using shares that are calculated before the start of the month and constant during the month except in very special cases, cf below.
- 3) These shares (e.g. 0, 12345....) for each RE/BRP are calculated as the ratio between the expected profiled consumption (LPS) for the RE/BRP and the LPS for the load profile of MGA. This is done by aggregating the LPS for the relevant metering points in the DSO database with this and other info per metering point
- 4) The LPS for the load profile and for each BRP/RE is calculated and reported by DSO to BRP/RE for checking 9 working days before the start of the month (assuming a future common deadline for request of change-of-supplier on 10 working days before).
- 5) The distribution of metering points among RE on the first day of month is used, incl. all approved changes of RE before this day.

- 6) If errors are detected the LPS shall be updated by DSO and resent to RE/BRP until 2 working days before the start of the month, i.e. in sufficient time for BRP day-ahead load forecasting, cf. chapter 2.3.1.

The LPS shall always be in kWh per month. The calculation will be different in the four countries due to different available data resolutions etc

LPS per metering point and for the load profile is always constant during the month. The same applies normally to LPS per RE/BRP, but these can optionally be changed (redistribution) during the month in case of bankruptcy.

The RE/BRP receives the relevant LPSs and shall calculate their own shares of the load profile themselves. This procedure improves transparency and minimizes rounding problems.

Grid loss is part of the profiled consumption and shall be represented by a “virtual” profiled metering point. The LPS for this metering point shall always be reported separately but apart from that it is handled as normal profiled consumption.

2.6.2 Bilateral trade

All bilateral trade should be reported before gate closure.

Corrections in bilateral trade

NPS-trade is - like today cf. NPS/player agreement - assumed to be correct which means that trade reported by NPS will be used for the settlement of the BRP.

Bilateral trade is reported by both BRPs. In case of inconsistency it can be updated until next working day after gate closure in case of errors to give the BRPs the opportunity to correct the data. It will only be possible to update the trade to match the other BRPs reported trade value. Corrections will then be done to one of the initial reported volumes.

Bilateral trade on external interconnections (outside NPS area)

Bilateral trade on the interconnectors DK1- Germany, Finland-Russia etc is handled differently in every country. The important feature here is that TSOs often do not guarantee capacity.

A certain degree of harmonization should be discussed further.

2.6.3 Balance power on interconnections

Balance power referring to balance on interconnections should not be included in the SRs scope since it is a TSO issue and will be settled separately between the TSO and the counterparty that have the contract abroad. Exception exists for some small interconnectors. Harmonisation need to be discussed. Balance power on interconnections is calculated as metered data on the interconnection and the exchange plan (= trade) on the interconnection. The balance power is priced according to agreement with the counterparty who imports or exports on the interconnector. Changes in the power flow after gate closure leads to balance power on the interconnector and will be invoiced to the responsible party.

2.7 Reconciliation settlement

2.7.1 Introduction

In the balance settlement, estimates for the profiled consumption (preliminary profiled consumption, PPC) is used because actual meterings are not available in due time.

When the metering data become available a new and improved estimate (final profiled consumption, FPC) on hourly basis is made.

- 1) For all meters without hourly values the FPC per hour is calculated by profiling the metered consumption with the load profile in the metering period. The FPC is consistent with the actual metered consumption in the metering period but is necessarily a more or less incorrect estimate regarding the distribution over time.
- 2) For all meters with metered hourly values, these values are used directly in FPC. Here FPC is also correct on hourly basis.

In the reconciliation settlement the difference between FPC and PPC is settled using Elspot prices. In this way the error in the balance settlement due to incorrect estimates of the profiled consumption is partly or fully corrected, apart from the different pricing in the two processes.

2.7.2 Procedure for reconciliation

Meter data are collected at least once a year and in addition in case of:

- change of supplier
- movings
- when the metering point switches between the profiled and non-profiled consumption
- change of meters

The reading of meters without hourly/daily values is always by definition made at midnight the day of reading or collection. In case of deviation between nominal and actual time of reading, corrections can be necessary according to national rules or future common NordREG rules.

The principles for the proposed reconciliation are:

- 1) The reconciliation is done on hourly basis
- 2) The reconciliation is invoiced on monthly basis within 2 months after all necessary meterings are available (cf. national rules) so the grid loss can be calculated. Thus the timetable for reconciliation depends on how the metering is organised.
- 3) For meters without hourly values the FPC for that metering point since the last registration is calculated by profiling the metered consumption since last registered data to hourly basis using the hourly distribution of the load profile. The FPC per metering point is aggregated to RE-level.
- 4) For meters with hourly values these values are used directly as FPC and aggregated to RE-level
- 5) The FPC for grid loss is calculated as the load profile used in the balance settlement minus the total FPC for all the normal metering points, i.e. as a residual. In general grid loss shall be handled separately on RE-level, i.e. data for grid loss must not be mixed up with data for “normal” consumption in the RE-aggregates.
- 6) The reconciled energy is calculated per RE as FPC - PPC on hourly basis.
- 7) The reconciliation is for practical reasons invoiced via the BRPs. For this reason alone the reconciliation in EUR per RE is aggregated to BRP-level. The attached documentation comprises the calculation on RE-level per grid area, cf. above.

More description and calculation examples are to be found in appendix to this report.

2.8 Settlement of ancillary services

Definition of ancillary services:

Reserves	Description
Primary reserves	Automatically activated Frequency Controlled Normal Operation Reserves Automatically activated Frequency Controlled Disturbance Reserves
Secondary reserves	Load Frequency Control
Tertiary reserves	Manually activated Fast Active Disturbance Reserves Manually activated regulation bids

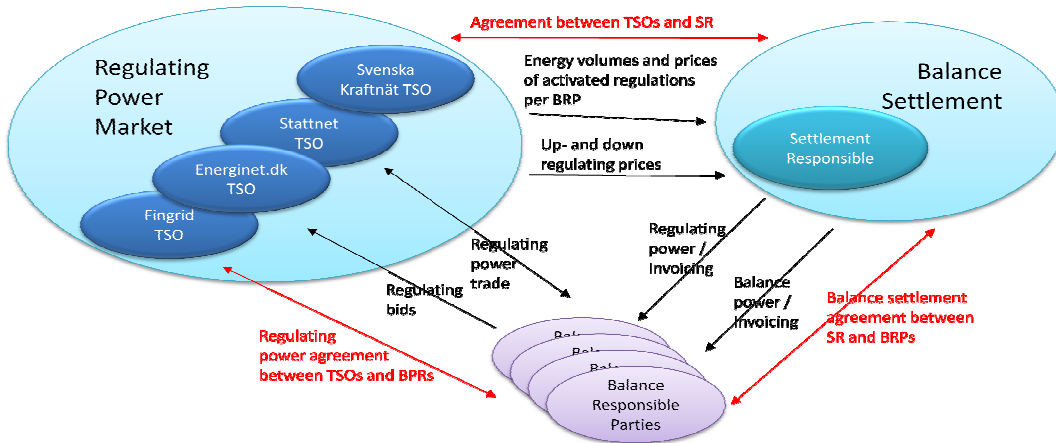
Table 3: Description of ancillary services

Some of the ancillary services have a direct impact on the BRPs balance settlement. Trades via the regulating power market (tertiary reserves) are settled in the national balance settlement since those trades influence the BRPs production and/or consumption balance and thereby the amount of imbalances.

In the NBS-model it is proposed that the SR will handle trade of regulation power energies (tertiary reserves) via the regulating power market in the balance settlement. SR will also handle the invoicing of regulation power trade with BRPs.

The primary reserves are handled differently in the Nordic system today, when it comes to balance settlement. In Norway the activated volume of primary reserve is estimated and used in the calculation of the production imbalance. The activated volume is taken out of the imbalance and settled as regulation power, not as an imbalance. In Sweden the contribution from the primary reserves is settled as a production imbalance, but a separate economical compensation for the regulation is calculated which also ensures that the activation is not “punished “by the two-price model. In principle the financial result for the BRP in Norway and Sweden is similar, but some differences when it comes to pricing of the activated volume exist. In Finland a combination of the Norwegian and the Swedish model will be introduced from 2011. The calculation itself will be made as in Sweden, but the estimated volume is kept out of the imbalance settlement as in Norway. In Denmark there is no special compensation for activated primary reserves, and the activation result in a cost for the BRP that must be covered through an availability payment.

How to settle activated primary and secondary reserves has to be evaluated further early in the implementation phase. This includes who should settle and invoice these activated reserves, and to what extent the volumes should be included in the balance settlement calculation.



The activated regulation bids in the regulating power market influence the balance settlement between the SR and the BRP. Invoicing of regulation power trades towards the BRP will be managed by the SR.

3 Common framework for market surveillance

Currently the Nordic TSOs have different roles and responsibilities in the national electricity markets regarding market monitoring. The NBS model entails that a common framework for monitoring imbalances is established.

3.1 Market surveillance

3.1.1 Introduction

Market surveillance has two main purposes in all Nordic countries. The TSO follows the BRPs' imbalances to make sure that they are kept at reasonable levels. The second purpose is control of possible utilization of market position and misbehaviour in the regulation power market.

Since January 2009 a Nordic Monitoring group is continuously working on analyzing and monitoring the development of the common Nordic balancing market. The group supplies analytical input for discussions regarding market design and improves knowledge sharing between the Nordic TSOs.

3.1.2 Market surveillance in the NBS model – imbalances and the regulation power market

For the common framework for market surveillance it's important to determine the roles and the tasks for the SR.

It will be the task of the SR to follow imbalances, assemble data and publish them in a similar and transparent way. The SR will have the task to enquire why large and systematic imbalances occur and subsequently to contact relevant BRPs. The BRP's imbalance will be published publicly in a similar way as is the practice today in Norway.

Another means for the SR to make sure the BRPs keep their imbalances to a minimum is to let the SR impose economical sanctions on those BRPs who have systematic imbalances. In current regime only the TSO/Regulator can impose sanctions on the different players. The SR can only investigate and ask for information about the players positions. A dispute has to be escalated to the TSO who can impose other sanctions on the player. A Nordic method to solve such situations should be developed in order to manage similar situations the same way in all countries.

Control of possible abuse of dominating market position in the regulation power market may also be an issue for the SR.

3.2 Key performance indicators (KPIs)

Key Performance Indicators (KPIs) is another way to measure the performance of different players. KPIs is a transparent way to display how TSOs, DSOs and BRPs carry out their respective responsibilities. If designed properly and with the right incentives KPIs can ensure the data quality.

It is not within the scope of the first phase of the NBS project to describe KPIs in detail. The KPIs need to be discussed and developed further later on. Examples of KPIs could be:

- How well do the TSOs and DSOs meet the deadlines for reporting data
- Quality of reported data
- Some kind of imbalance index for each BRP

Currently there are different kinds of KPIs in use in the Nordic countries. They need to be evaluated further to establish which ones will suit the purposes the best.

In Denmark, Energinet.dk calculates so called IFIM-numbers which indicates the quality of the data, incl. delays, sent by the DSOs to Energinet.dk.

IFIM measures the relative error/delay in reported metered data between the deadline and the final (second) balance settlement taking into account how long time passes before wrong/delayed data are corrected to final data. The IFIM-numbers can be found at:

http://www.energinet.dk/DA/El/Engrosmarked/Aktoerer/Sider/_layouts/integrationer/el/ifim/IFIM_top.htm

In Norway, Statnett prepares a monthly report on imbalances which also indicates how well a BRP maintain their balance. The reports can be found at:

<http://www.statnett.no/no/Kraftsystemet/Balanseavregning/Manedsrapport/>

In Sweden, Svenska Kraftnät prepares statistics on missing data series from DSOs,

<http://www.svk.se/Energimarknaden/El/Rad2/Resultat-2009/>. There is also an imbalance index for BRPs but the publication is made on an anonymous basis.

Fingrid does not publish any KPIs today.

Bad data quality makes it difficult for BRPs to make dependable forecasts and for that reason it is often stated that the TSOs or the SR ought to impose a sanction on the DSOs. However, as it is not legally possible for any of the Nordic TSOs nor the SR to impose sanctions on the DSOs the idea is that the KPIs calculated by the SR could be used by the national regulators to issue economical sanctions for those DSOs which do not live up to predefined minimum levels.

4 Data Communication

With respect to electronic data exchange each country has currently its own standard when it comes to balance settlement and these are not compatible with each other. A common data communication standard shall be decided, and developed for NBS. The purpose of the common standard is to ensure that balance settlement information (plans, trades, deliveries, meterings etc) is based on the same

communication technology and formats so that balance settlement information can be sent between parties in different Nordic countries.

The selected or developed data communication standard has to have enough capacity and ability to transmission a huge number of time series between the parties. The amount of time related information has also been increased and the data communication standard needs to have enough capacity for fast data transmission between the parties.

Establishing a common standard for data communication is linked to other processes in the Nordic harmonisation supervised by NordREG. If the Nordic standard is not developed prior to the NBS implementation the NBS system should be designed so that it will be compatible with the future Nordic standard.

A part of the balance settlement information can be published via different kind of web applications. For example data concerning the BRPs' balance power and price information is planned to be published preliminarily via the Settlement Responsible's (SR) web application service. One issue which needs to be ensured is that all relevant market parties have a possibility to use the web application service with standard IT specifications and software. Another issue which needs to be ensured is the possibilities of two way data exchange between the parties.

The Nordic Balance Settlement project proposes that a separate working group (Nordic TSO EDIEL group) should look at the communication standards during the next phase in the NBS project.

5 Handbook

In order to implement the same principles and routines in all Nordic countries a common balance settlement agreement will be developed. In addition, some changes or modifications of the present regulations are needed. However, there will remain some national particularities which may not be possible to harmonise, at least not within the discussed timeframe. The regulations provide additional information which is not mentioned in the common balance settlement agreement. The national regulations are written in the respective Nordic language which entails that companies from other countries may have difficulties in finding and understanding the information. To remedy this problem a handbook for balance settlement will be developed in English.

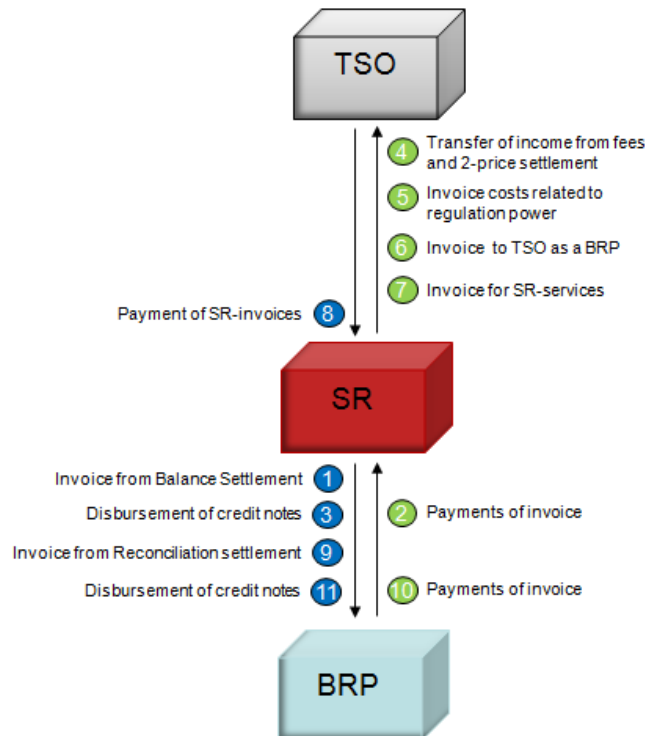
The handbook will encompass rules related to balance settlement which a BRP/RE need to know in order to operate in the Nordic countries. Example of contents in the handbook could be:

- Relevant information connected to balance settlement which can be found in national regulations, for instance rules for metering and sending data, time schedule etc
- Rules/standards for bilateral correction of the balance settlement
- Rules/standards for estimation of missing metered data
- Information on national particularities which need to be considered, for instance peak power reserve financing in Sweden

6 Financial issues

6.1 Model for handling revenues and costs

In the proposed NBS-model the SR is performing some services on behalf of the national TSOs. These services will initially mainly be calculation and invoicing of imbalances and invoicing of regulation power and reconciled energy. The four TSOs are still legally responsible for the balance settlement, including setting the rules for the calculations and the applied fees and fee levels.



Description of financial model

In the proposed solution the SR-unit will invoice the balance settlement weekly. The invoice is a combination of sold and purchased energy at a given price and fees. The invoice will include both balance power (imbalances) and regulation power. Only manually activated regulation power (tertiary reserves) will be invoiced by the SR. Remaining ancillary services will be invoiced by each TSO.

Most of the generated cash flow from the balance settlement is between BRPs, but passes through the SR who guarantees the financial settlement. The income from fees and two-price settlement (production imbalances purchased and sold at different prices) is collected by the SR on behalf of the TSO, and will be transferred to the respective TSO periodically. Costs related to special regulations will be invoiced the TSOs by the SR.

The imbalance within a balancing area will be invoiced the TSOs as a BRP by SR. Imbalances between balancing areas is settled bilaterally between the TSOs. This will apply both for cross border trade within the Nordic region and towards TSOs in other countries.

The balance settlement carried out by SR is not supposed to generate any income for the SR. To cover the operational costs, SR invoices the TSOs monthly. This will be done based on a yearly approved budget. If the actual costs are higher than budget, extra funding to cover costs must be approved by the board. In order to achieve transparency and sufficient control, there must be separate accounting for the SR-function if it's integrated in a service provider.

Each TSO must also keep a separate accounting for the Settlement Responsibility, giving a transparent overview of income from the balance settlement collected by SR and costs allocated to balance management.

The reconciliation settlement is not assumed to generate any cash flow between SR and TSOs. The reconciliation is a zero sum game where money is transferred between BRPs through the SR.

6.2 Invoicing

6.2.1 Format

The BRP will receive one invoice from the SR although the BRP is active in several balancing areas. The invoice will be electronically and will comply with the legal requirements depending on where the SR will be placed. The invoice will contain the following information per balancing area (volumes and amounts):

- Fee on production
- Fee on consumption
- Fee on consumption imbalance
- Monthly fee
- Currency fee
- Bought imbalance production
- Sold imbalance production
- Bought imbalance consumption
- Sold imbalance consumption
- Purchased regulation power
- Sold regulation power

Detailed information of the calculations will be available for the individual BRP on the SR web site.

6.2.2 Currency

Euro is the base currency and settlement is done in Euro. However it is possible for the BRPs to choose settlement in DKK, NOK or SEK by paying an additional fee. This fee will cover the SR's currency risk.

When the settlement is done in Euro there will be a currency risk for both the BRPs and the TSOs who don't use Euro as their main currency. This is because the BRPs settle their costumers in local currency and the TSOs buy reserves in local currency. When settlement is done in Euro it will be up to the TSOs and BRPs to handle the currency risk themselves.

6.3 Costs and income

6.3.1 Costs allocated to balance settlement

The costs allocated to balance settlement which are to be financed by the BRPs are in principle as agreed on in earlier harmonisation. The national cost bases should include the following elements:

- 1) Administration of balance settlement
 - i) Operational cost of running the joint settlement unit (SR), and some TSO operational costs related to the balance settlement as the formally responsible parties.
- 2) Costs related to balance management
 - i) A share of the operational costs for acting as TSO, administration & IT
 - ii) An agreed share of the national reserve costs
 - (1) Automatically activated Frequency Controlled Normal Operation Reserves
 - (2) Automatically activated Frequency Controlled Disturbance Reserves
 - (3) Manually activated Fast Active Disturbance Reserves

6.3.2 Estimation of operational costs for joint SR unit

The chosen organisation model will affect the cost level of the SR unit. The two different alternatives are SR as a separate entity or SR integrated in a service provider. Approximate estimates of the yearly costs (personnel, office cost, IT-cost and administration) for the two alternatives are:

- As a separate entity: 2,2 MEURO
- SR as part of an existing service provider: 1,9 MEURO

The personnel costs, the office costs and other administrative costs will be somewhat lower if SR is integrated at a service provider, and especially if SR will have the same office location as the service provider. The other costs, generated by the IT- system depreciation and IT-system maintenance will be approximately the same, irrespective of the chosen model. The difference between the yearly costs of the two models is small and not considered significant even though the yearly costs for the SR integrated in a service provider are a little lower.

6.3.3 Operational costs for TSO when a joint SR is operational

The national TSO will still have some costs related to balance settlement that will be financed from the BRPs. The TSOs are still formally responsible for the balance settlement, and will have some costs in this relation. Depreciation cost for the existing IT-systems in all countries except Norway will still be allocated Balance settlement for some time ahead.

6.3.4 Saving potential

By operating a joint settlement unit, SR, it's estimated that the four TSOs will reduce their personnel and IT costs by about 2,2 MEUR per year in total. For most of the TSOs the reduction is not very significant. This is mainly because the IT-system used for balance settlement is integrated systems used also for other tasks. These systems will therefore still be used, and the immediate savings will only be some reduced maintenance costs. In a longer term the cost reduction will be higher, as a future IT-system will be less complex.

6.3.5 Fee structure

The NBS project proposes to keep the harmonised fee structure which was implemented in the Nordic countries during 2009. An additional currency fee will be introduced, section 6.2.2.. The fees will cover the national cost base which encompasses costs for operating the SR as well as costs for balance regulation (reserves etc.) operated by the national TSO, see section 6.3.1. The following fees are suggested:

- *Fee on actual production:* the fee is mainly for financing the national cost base for balance regulation and settlement
- *Fee on actual consumption:* the fee is mainly for financing the national cost base for balance regulation and settlement
- *Fee on all imbalances within the consumption balance:* the fee will function primarily as an incentive for the BRPs to plan their balance (even though the fee also contributes to the national financing of the cost base for balance regulation and settlement). The fee is levied on consumption imbalances in each bidding area.
- *Monthly fee:* this fee contributes to financing the balance settlement performed by the SR. This fee is charged per country, i.e. maximum fee for a BRP active in all bidding areas in the Nordics will be 4 times the monthly fee (and not one monthly fee per bidding area)
- *Currency fee (new):* this fee will be charged to those BRPs who choose settlement in NOK, DKK or SEK instead of EUR. The fee will cover the currency risk.

In addition the balance settlement results in a significant income from the two price settlement of the production balance per balancing area. This income is contributing to covering the national cost base just as the fees.

In addition to the harmonized fee structure there will however remain one additional fee related to financing the Swedish peak power reserves. These are levied on BRPs active in the Swedish balancing area (and in the future balancing areas) and will be invoiced by SR on the behalf of Svenska Kraftnät.

6.3.6 Fee levels

The fees for actual production and actual consumption will vary between the different countries as the cost bases are national. These fees will be calculated by each TSO considering the national cost base which is to be financed subtracted by the two price income on production, the income from the monthly fee and the imbalance fee on the consumption balance. The remaining costs will be covered by the fee on production balance (1/3 of the costs) and by the fee on consumption balance (2/3 of the costs).

The NBS project recommends that the monthly fee and the imbalance fee are harmonised across the Nordic countries. The fee levels cannot be finally determined for 2014 at this point in time so the proposed levels may be adjusted later. Currently the imbalance fee varies between approximately 0.1 €/MWh and 0.5 €/MWh. However, the NBS project proposes to set the imbalance fee to approximately 0.3 €/MWh. The reason for this higher fee level (compared to current level in Denmark, Norway and Sweden) is as stated previously to give the BRPs an economic incentive. The monthly fee is proposed to be set to approximately 200 €/month. This fee level is deemed to be low enough not to be a barrier for entering the market.

The fees should be possible to change with a 3 months' notice if necessary, but the ambition is to have a yearly overview of the fee levels.

6.3.7 Surplus/deficit

On a yearly basis the income generated by the fees can substantially overrun or fall below the costs. In such a case it is recommended to transfer the excess or the debt to the next year. Thus the TSOs will calculate the fees and notify SR to reduce or increase the fee levels from year to year.

6.4 Risk management and collaterals

6.4.1 Risk management

The Settlement responsible is the financial counterparty in the balance settlement towards all the BRPs. This implies a significant counterparty risk. Sufficient collaterals need to be put up for the security of the SR's activities and financial situation in the balance settlement and electricity market. The demanded collaterals and related rules will be described in the balance agreement.

BRPs shall make sure that their collaterals cover the collateral requirement continuously. If the collateral requirement exceeds the posted collateral, BRP shall increase the amount of the collateral immediately at its own initiative. Not to put up the demanded collateral is considered a breach of the balance agreement and SR will have the right to terminate the agreement with the BRP.

The counterparty risk for SR will vary a lot during the year, depending on price levels and imbalance volumes. An additional risk is due to the reconciliation which also raises the operational costs for the

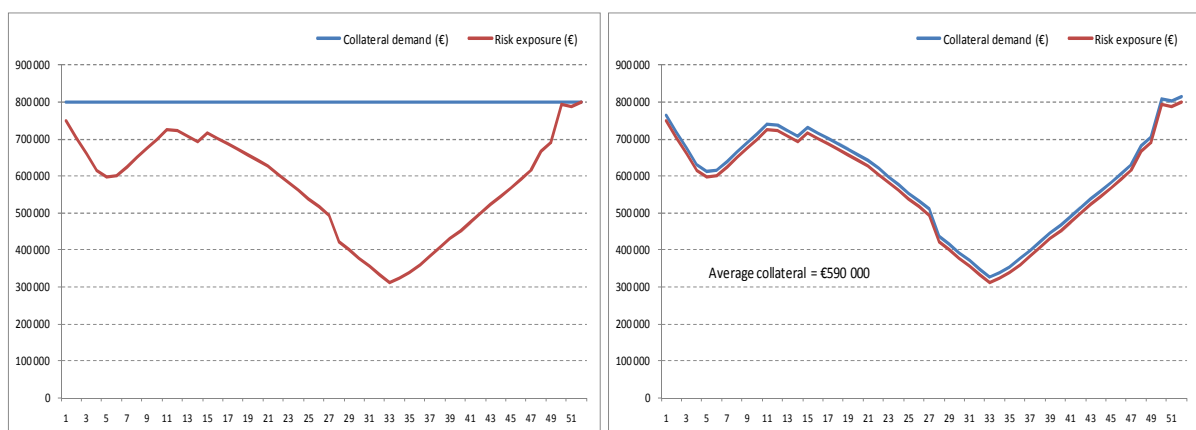
SR. To be able to guarantee the financial settlement, SR needs sufficient collateral at any time, and collateral to cover both normal situations and possible speculative behaviour.

High collaterals constitute a threshold for becoming a BRP. Therefore the collateral level should be kept as low as possible within acceptable limits. In the balance settlement the SR unit has a significant time period with uncertain exposure. Continuous surveillance of trades in relation to expected obligations is essential, as well as keeping a close eye at other market development, especially the price levels. But also other properties of the model affect the risk and thereby collateral levels. Longer invoicing periods, or credit times affect the risk level. From a risk managing perspective, using settlement accounts is considered as an interesting option. A similar solution is used by Nord Pool Spot today where charges are done automatically instead of by electronic invoicing. Such a solution would have a high risk reducing effect if daily settlement was to be introduced. The NBS-model opens for daily settlement as the calculations are done almost daily. This will reduce collaterals and also the need for working capital.

6.4.2 Collateral model

Two alternative collateral models have been considered, a static and a dynamic model.

1. In the static model the collateral is calculated so the collateral level of the BRPs will be high enough to cover the risk at any moment in a longer period. The static model needs less administration than the dynamic model, as it is not necessary to recalculate collaterals every week and following up the BRPs and the collateral banks. The downside for BRPs will be locking up more of their capital. The collateral will be enough to cover the maximum risk during the year, while the risk most of the year might be significantly lower. When special situations arise, the static model is less flexible to handle this situation both when it comes to SR's ability to spot risky situations and the BRP's ability to put up extra collaterals on a short notice. An insurance model could be interesting to look further at but the model implies socialization of costs where the participant won't cover their own risk.
2. In the dynamic model the collateral will normally be recalculated every week. However, daily calculations and continuous monitoring will be performed and extraordinary collaterals demanded when necessary. The dynamic model is more administratively heavy and thereby costly compared to the static model. But the dynamic model gives a "correct" collateral level related to the risk over time and less capital must be locked up during long periods. The dynamic model is also more flexible when it comes to handling extreme situations.



Example of the static (left) and the dynamic (right) collateral model.

The project recommends the use of a dynamic model as this is a more flexible solution. Even though the administration is somewhat more costly, less of the BRP's capital is locked up. More detailed collateral descriptions will be developed in the implementation phase of the NBS project.

6.5 Need for funding / working capital

A joint SR will have a need for working capital to fund the SR's operation. Working capital must be available at any time and will from time-to-time be used. Providing working capital implies a cost for the SR. This cost must be financed through the BRPs as a part of the operational cost of SR. Several matters affect the need for funding:

Time differences between payments and disbursements

As the regulation power is proposed to be settled by the SR, the need for capital for the SR is reduced compared to other solutions. In periods with a lot of special regulations, this will cause a need for capital if the TSO is not invoiced the cost of special regulations before payouts are made to the BRPs.

Delayed payments

Most of the money passing through the SR unit is received from one BRP and paid out to another. But as the SR is guaranteeing the financial settlement, the SR will have to make the payout to the BRPs in a net sale position even though the money necessary haven't been received from all BRPs in the opposite position. From time to time these misalignments can be significant, millions of Euros. The SR needs working capital to handle these situations from week to week. Incentives for paying invoices before due date will reduce the problem, i.e. punishing the BRPs for delays in payments through extra collaterals. Another option to reduce the need for working capital is to introduce earlier due dates for invoices than credits.

Operational costs

The SR is paid by the TSO monthly upfront to cover the budgeted costs but the SR need funds to cover unexpected costs and ensure their running operation.

Starting capital

Before SR is getting operational, significant investments must be made. Investing in a settlement system is the most considerable cost, but other investments like hiring people etc also need funding. These funds must be made available from the TSO.

7 Legal Considerations

NBS, as described elsewhere in this report, will have legal consequences with respect to current national legislation and regulation. Therefore the project has investigated the major legal implications of NBS and the following issues will be discussed in this chapter.

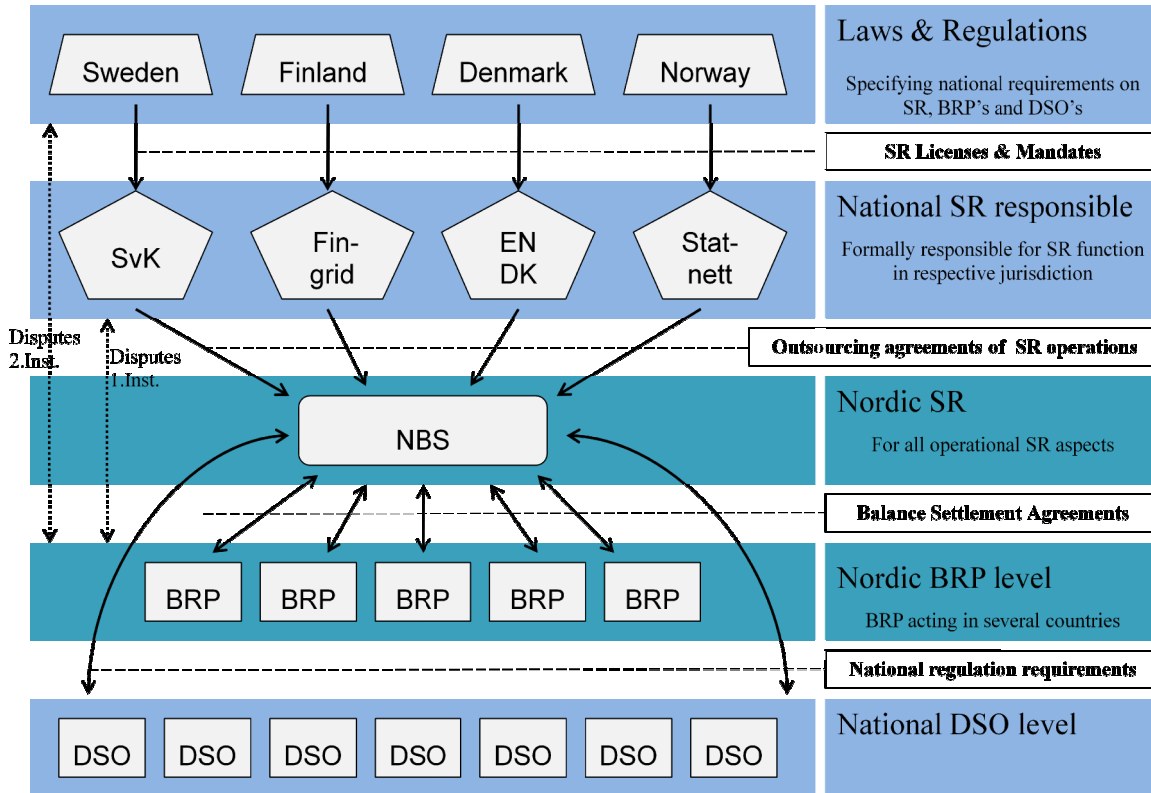
7.1 Corporate model

A major challenge is that NBS will be a natural monopoly acting on a Nordic level whereas no common Nordic regulation exists. Therefore NBS must be regulated nationally and then these regulations should be harmonised so that NBS can treat all BRPs the same way.

The project suggests a corporate model where the TSOs outsource their respective operational tasks concerning their role as national SR to a common unit; either a separate company or part of a service provider. Legally this is considered the most practical approach with respect to required changes of national legislation and regulation. Each TSO will then be responsible for conducting their SR role according to national regulations and make sure that the common NBS model and organisation fulfils such regulation. In this way the current relation between the law, the regulation and the SR function on

national level will be maintained. The TSOs will have to enter into separate agreements with the common Nordic SR. The Nordic SR will have one balance settlement agreement with each BRP that makes sure that SR and BRP behaviour is in line with laws and regulations independent of which country power is bought/sold. The DSOs will have to report required meter data to Nordic SR.

The following figure describes the main relations in such model:



Such model will require changes:

- National laws must allow for outsourcing of the SR functions from the national SR (TSO) to a Nordic SR unit
- National laws must be consistent with the NBS model
- National regulations must be consistent with the NBS model
- The national SR (TSO) must enter into outsourcing agreement with the Nordic SR
- The national SR (TSO) act as 1. instance dispute resolution
- Nordic balance settlement agreement between the Nordic SR and the BRPs.

The model above allows for the Nordic SR to be located in any Nordic country.

When it comes to collateral requirements for the BRPs, the Nordic SR can then net all Nordic positions before the requirement is set.

7.2 Changes to national laws

7.2.1 Finland

In Finland the Energy Market Act (EMA, the Act) says that in Finland there is one system responsible with responsibility also for balance settlement. EMA has appointed Fingrid as the one system

responsible. So, the Act must be changed allowing Fingrid to outsource the operational SR task. Such law change is expected to take 1 year.

If the Act allows that the Nordic SR can handle the settlement, also the two government degrees (regulations given by the government) concerning these issues will have to be changed.

7.2.2 Sweden

The law has to be changed so that SvK can outsource the operational SR task. Such law change is expected to take 1 year.

Energy tax is collected by the REs. This should be changed so that is done by the DSO's

7.2.3 Denmark

Energinet.dk's authority and responsibility related to regulation of BRP's (tasks, obligations and so on) regarding balance settlement is imposed by national law. Such authority stipulated in a national law can not be delegated to third parties e.g. a SR in another country. Further, the responsibility for the DSO's to submit Metering data to the TSO is stipulated in national legislation. This responsibility can therefore currently not be stretched outside Denmark to a SR outside Denmark.

Change of the Act on electricity is therefore required. Such law change is expected to take ½ year.

7.2.4 Norway

As long as all public authority will remain within Statnett very few changes will have to be made in the Norwegian legislation. Statnett will then formally exercise public authority and the "footwork" will be done by the Nordic SR instead of by Statnett.

In Norway a company has to be registered in Norway as a Norwegian company, this is not the case in the other Nordic countries. This should be equal for all countries and Norway should adapt to the other countries.

7.3 Changes to national regulations

All national regulations must be changed in order to support the described NBS model and organization. A detailed list of changes to each national regulation will be developed in the implementation phase of NBS.

7.4 Agreement between TSO and Nordic SR

Individual agreements between each TSO and the Nordic SR must include (amongst other):

- Description of tasks to be outsourced to the Nordic SR
- Obligations on the Nordic SR to fulfil national legislation and regulation
- Payments for regulation power and primary reserves.
- Outsourcing fee to the SR.

7.5 Balance Settlement Agreement

One common balance settlement agreement must be developed. The balance settlement agreement must support the NBS model and will be developed in the implementation phase of NBS. From a legal point of view such agreement must take special care of:

- Liability of the Nordic SR
- Collateral requirement
- Procedures when contract is breached by the BRP
 - Procedures for expulsion
 - Expulsion from all Nordic balancing area
- Law and place of court

7.6 Taxes

Several services are conducted by a Nordic SR and thus several types of cash flow:

- Settlement of balance power between the BRPs via the SR
- Settlement of regulation power between BRPs via the SR
- Fees from BRPs covering administration costs and share of national reserves
- Payment from TSOs to SR
- Payment from SR to TSO

It is assumed that the general principle of VAT can be applied on all cash flows, e.g. similar to the VAT regime implemented at NPS. That means that VAT will be paid in and out from SR for BRPs registered in the same country as the SR. All other BRPs must handle the VAT issue with their national VAT authority.

Nevertheless the NBS implementation phase must elaborate in detail the various cash flows based on where the SR will be located. This should then be evaluated by a VAT expert in order to assess the correct and most practical set-up of the VAT regime.

For all countries except Sweden, energy tax is collected by the DSOs so it will not be an issue concerning a Nordic SR. In Sweden, energy tax is collected by the REs and this must be changed.

8 Organisation and operation of NBS

In the future with a common settlement model in Sweden, Norway, Denmark and Finland it is envisaged that the most efficient organisation model would be to let a common Nordic entity perform the balance settlement and reconciliation settlement. The Settlement Responsible shall be set up with necessary resources to perform all necessary tasks in the balance settlement and reconciliation settlement. Hence functions will be moved from the TSOs to the new entity.

It is assumed that a common entity performing the settlement would have the benefit of being more cost-effective in the long run and should also give scale advantages compared to having four separate settlement systems. Changes to a common Nordic balance settlement will in the future be easier to implement, market players will have the SR as their counterpart irrespective of which country they are operational.

8.1 Common entity to manage settlement

Some assumptions had to be made in order to make an evaluation of the different options available. The following prerequisites were set up.

- The settlement will be performed in the same way in the participating countries. Some national differences will still exist (e.g. datahub in Denmark) and the SR unit will adapt to these differences.
- A separate company/entity shall perform services for the TSOs regarding balance settlement and reconciliation.
- The SR will have a separate agreement with the different TSOs. These agreements regulate the relation between the SR and each TSO. Among others such agreements concern formal responsibilities, financial relations and operational procedures.
- The SR shall operate according to respective national legislations for balance settlement and reconciliation.
- The SR will be counterpart in the balance settlement agreement towards the respective BRP's.
- The SR will define the requirements for the BRPs to participate in the balance settlement through the balance settlement agreement.
- The SR will manage *one* IT-system which stores and manages all relevant data in one place.
- Independent of organisational model the SR shall have separate accounting – costs and income shall be reported to TSO per control area (country).
- The SR shall manage the customer support serving all four countries where all four national languages will be represented in the organisation.
- The SR should operate the balance settlement in EUR and as a service offer the BRPs to use national currency against a service fee.
- The SR shall have normal operational hours e.g. 08-17 CET.
- The SR shall be able to collect special fees on behalf of the TSOs (e.g. financing of peak power reserves through fees collected from BRPs in Sweden).

The SR shall be set up so that in the future it can invoice and collect fees for other ancillary services on behalf of the TSOs. In addition, the SR could perform other services for the TSOs if it is found rational and efficient.

8.2 Resource and competence

8.2.1 Operational tasks and processes to be managed by the SR

The settlement responsible unit will mainly have the following operational tasks:

- Daily processes
 - Daily collection and verification of data (schedules, price information, metered data)
 - Control of master data and to make the data available for the players
 - Conduct preliminary balance settlement
 - Follow up and correct data
 - Final balance settlement (conducted 9 working days after the delivery day)
- Weekly processes
 - Invoicing of the balance settlement (invoice for one week period)
 - Invoicing of other fees collected on behalf of TSOs
 - Control collaterals and follow-up of BRPs in relation to risk and collaterals
 - Cash management (conduct payment processes)
- Monthly processes
 - Data collection of reconciled energy
 - Conduct the reconciliation settlement
 - Invoicing of the reconciliation
 - Develop, publish and follow-up of KPIs for the balance settlement process. Some KPIs could also be developed on daily or weekly basis
- Continuous processes
 - Market monitoring
 - Customer support (business to business support)
 - Reporting of results and in-data

This listing represents the main repetitive tasks but all tasks are not described.

8.2.2 Support functions in the SR organisation

To support the core processes several support functions are needed in the SR. The most important support functions are:

- Management of the SR entity
 - HR
 - Budget / accounting
 - TSO interface
- Office support / facility management
- IT support
 - Daily support to the operations of the systems
 - IT operations (running the hardware and communication systems)
 - IT development
 - Support to reporting technology (currently EDI)
- Business development
 - Process efficiency
 - Service development
 - Communication
- Legal support
 - Follow-up of agreements
 - Disputes
 - Adjustments of the legal agreement framework

The support functions are either to be organised internally within the SR or to be provided through external resources (outsourcing). The number of resources (internal/external) is dependent on which organisational model which is to be implemented for the SR. With respect to the support functions

listed above it is assumed that the SR will leverage on such functions if integrated in an existing organization. If the SR is to be established as a separate entity the need for resources will therefore be larger than if the SR is integrated in an existing organisation.

8.2.3 Current resource use for the balance settlement

The existing balance settlement functions are organised differently by Fingrid, Energinet.dk, Svenska Kraftnät and Statnett. In Statnett the balance settlement function is set up as a separate unit with clearly defined separation towards other TSO tasks and with dedicated resources and accounting. In Svenska Kraftnät, Energinet.dk and Fingrid the Balance settlement operation is currently integrated with other TSO operations. Personnel are in a lesser extent dedicated only to the balance settlement.

Currently the resources used for the balance settlement are:

- Statnett (4-5 man-years)
- Fingrid (3 man-years)
- Svenska Kraftnät (6 man-years)
- Energinet.dk (2 man-years)

In addition some support functions are used for legal-, IT, and office support etc.

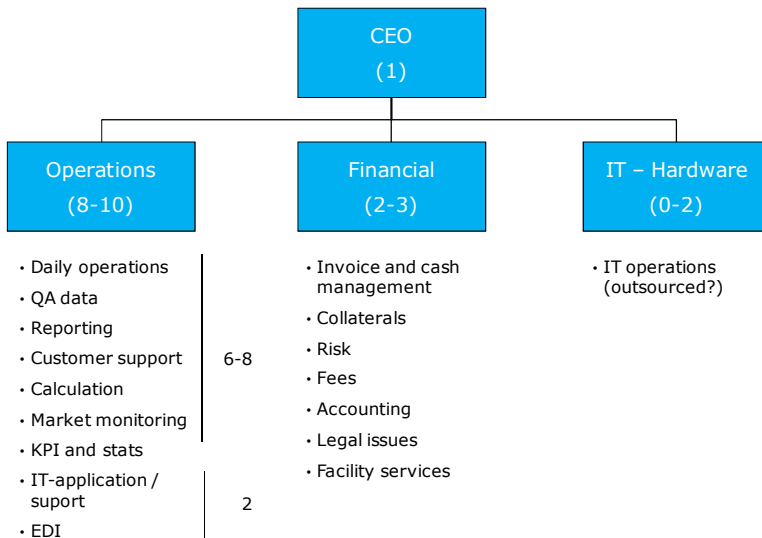
8.3 Two organisational models evaluated as the most likely

The project has evaluated several organisational models and two models have been singled out being considered as the best alternatives. The two models which have been evaluated are:

1. The SR unit is organised as a new and separate company owned directly by the four TSOs. The SR will as a separate entity operate the balance and reconciliation settlement for the four TSOs.
2. The SR functions are outsourced from the TSOs to another existing company which are in position to perform the SR services on behalf of the TSOs. This company should today perform similar services and be operational.

8.3.1 SR as a new and separate company owned by the TSOs

The location of the company could be in any of the four countries. It could also be closely linked to one of the four TSOs, which take a special responsibility for the balance settlement in the Nordic countries. A separate entity could be managed by 11-16 full time posts. The estimated allocation of resources is shown in the figure below.



8.3.2 SR functions operated by a third party

This solution implies that the SR functions are “outsourced” to an already existing company which performs the balance and reconciliation settlement on behalf of the Nordic TSOs.

An agreement between TSOs and the service provider has to be developed regulating the responsibilities, deliverables and service level (Service Level Agreement). The SLA will also regulate the payment for the services delivered by supplier.

Integration of the SR in an existing company could give the possibilities to utilise synergies on systems, resources and existing infrastructure. Especially could the SR function utilise existing support functions in the organisation that will provide the services. Examples of such functions are financial, general management, accounting, IT and HR.

It is not decided which model to use when the SR shall be implemented, this will be decided early in the implementation phase of the NBS.

8.4 IT solutions (high level)

It is clear that NBS will require extensive IT systems in order to make it work effectively. Such an IT system will to a certain degree be unique, but it could be based on similar systems used by TSOs both in the Nordic countries as well as other countries.

An IT system for NBS must not necessarily be built new from scratch. There are several existing solutions that could be built upon. But to establish a well functioning IT system will require a rather large IT project that will include a significant development part in order to cover all functions.

It is difficult to give precise estimates for the costs of a NBS IT system. Precise estimates can only be established based on the outcome of a tender process.

8.5 Interface SR – TSOs

The SR will perform the balance settlement and the reconciliation settlement and shall be performed on non discriminatory terms. There exists several formal and operational interdependencies and interfaces

between the SR and the TSOs that has to be managed through a separate agreement between the SR and the TSOs.

The TSO and the SR will enter a Service Level Agreement which regulates the services the SR shall perform. The service level (quality) is described as well as the amount the TSO shall pay for the service delivered by the SR. The SR should not have other income for operating the balance settlement than the payment regulated in the SLA. Potential new services should be presented to the TSOs which have the right to decide if these services should be offered to the market.

The TSOs decide on the framework for the balance agreement, while the SR is the formal legal party in the balance agreement towards the BRPs.

The TSOs will have formal decision rights on how the fee structure shall be set up and collected.

The TSOs will be part of the balance agreement as a BRP.

The SR is obliged to, on a regular basis, report to the TSO on the functioning of the balance settlement operations. This includes financial reporting as well as reporting of market monitoring and the economical risk exposure in the balance settlement.

The SR is further obliged to report to the TSOs special incidents in the balance settlement. This could for instance be customer complaints, economical risk related to specific players or misbehaviour in the market. The SR will not be in the position to suspend a market player from the balance settlement, however the SR should inform the TSOs if suspension of a market player should be evaluated. The TSOs/regulators are in a position to take the decision about suspension of market players from the balance settlement.

8.6 Governance

The SR function could be located in all Nordic countries as there are no reasons to favour localisation in one country before another. The localisation of the SR will be decided according to a cost evaluation, and dependent on what are the best for the market players and the TSOs.

The TSOs have the overall responsibility for the balance settlement. The SR will perform the balance settlement and reconciliation on behalf of the TSOs.

The SR will be part of the balance agreement with the BRPs. Changes in the balance agreement shall be decided by the TSOs.

8.7 Regulation of the SR

The balance settlement and reconciliation are regarded as regulated business and are regulated by the national regulators today. By transferring the balance settlement to a new SR unit with services in four countries a proper regulation has to be developed independent on chosen organisational model for SR.

The following principle models for regulation of the Nordic Balance Settlement could be further discussed and adopted:

- The NBS is regulated as today by national regulators. The required terms (or changes to terms) for the operation of the SR and the balance settlement agreement will be managed by the

national TSOs. Co-operation among the regulators are then needed to secure “equal” decisions influencing the whole Nordic market. Special national adaptations should be avoided.

- A possibility could be that the regulation of the SR is managed by the regulator in the country the SR is located e.g. Nord Pool Spot⁹ is today supervised by the Norwegian regulator (NVE).
- Another model could be that the Nordic regulators agree on a Nordic regulation model for the SR. All regulations should then be co-ordinated for instance through NordREG but since NordREG is not a formal organisation with authority it will be demanding to establish such a solution. However, a similar solution as currently discussed by NordREG and Nord Pool Spot could be a possible alternative.

A dialog with the regulators to verify the regulation model should be done in the implementation phase. The regulation model for SR should be developed and finalised in the period June 2011 to May 2012.

9 Cost benefit considerations for SR

9.1 The cost and benefit of establishing SR

For the Nordic TSOs an estimate of the cost of establishing a common Nordic balance settlement and reconciliation settlement has been estimated. The yearly operational costs have also been estimated.

The initial cost elements of establishing the NBS for the TSOs are:

- Project cost (manpower, travel etc)
- IT investment (settlement system and other IT-support)

The total set-up cost is estimated to be in the magnitude of 7-8 MEUR over a 3 year period.

The balance settlement processes operated by the TSOs today are quite efficient, and there will not be significant yearly savings for the TSOs by establishing a common SR. The benefit will be that the BRPs have one entity to relate to and that the operation and the future development of the balance settlement is centralised.

The TSO yearly benefit of creating a common SR unit with lower operational cost is estimated to be approximately 1,0 MEUR. In the short run only Statnett's IT settlement system can be decommissioned. The settlement systems for the other TSOs are integrated with other processes which will continue and the IT-cost for Energinet.dk, Fingrid and Svenska Kraftnät will not be reduced in the short run.

In the longer run the cost savings will increase as current TSO IT-system used for the balance settlement can be decommissioned. Reduced operational cost could in the long run give lower fees for the BRPs.

The cost savings of NBS should not be decisive for creating a harmonised Nordic Balance Settlement solution. The implementation is more a result of the ambition of creating a common Nordic end user market, and that creating a common unit will ease the balance settlement process for the market.

The political environment, the regulators and large parts of the energy industry support the concept of a common end-user market. The ambition is that it will contribute to increased competition, less

⁹ The Nordic regulators have taken a step towards a more Nordic cooperation in the regulation of Nord Pool Spot as they have sent a letter to Nord Pool Spot 2010-12-08 proposing a regulatory body.
http://www.ei.se/upload/Aktuellt%20fr%c3%a5n%20inspektionen/Letter_from_NordREG_to_Nord_Pool_Spot.pdf

administrative cost and ease the operation across national borders. The actual cost-benefit of a common end-user market for electricity in the Nordic countries has, to the knowledge of this project, not been calculated in detail.

Introduction of a common end user market in the Nordic countries will have some costs and benefits. A harmonised Nordic balance settlement is one of the prerequisites for achieving the political goal of a common end user market in the Nordics. An isolated evaluation of the cost of the balance settlement shows that the cost for operation and set-up of a Settlement Responsible is negative in the short run, but will reveal benefits in the longer run.

However, the NBS project is aware of that the change of reporting requirements, routines and IT-systems for the industry players could be costly. These costs have to be evaluated against the benefit of the Nordic harmonisation process lead by the Nordic regulators on behalf of the political leadership in Sweden, Norway, Denmark and Finland.

9.2 The Nordic socio-economic cost of a common Nordic end-user market

The main reasons for establishing a common Balance settlement solution is the creation of a competitive end user market. Lack of end-user competition in the Nordic electricity market gives a loss for the society. Increased competition and reduced margins for the electricity sellers will give a socio-economic efficiency gain.

NordREG summarised its view on the cost and benefits of a common Nordic retail market in a paper to the Nordic Council of ministers 12.10.2009. The overall conclusion in the report was:

“General retail market development leading to harmonized solutions in all Nordic Countries will most likely lead to substantial benefits through efficiency improvements, reduction of operational costs and increased innovation in all the Nordic retail markets.”

NordREG presented a report in 2007, “Cost and benefits of Nordic Retail market Integration”. Based on the report NordREG concluded that the benefits from the Nordic retail market integration most likely would outweigh the costs.

NorREG has also contributed to two reports developed by YTT and Econ. Both reports indicated that the benefit could be beneficial, and that the cost could be significant. Especially IT-costs could be large. Both reports also stated that consumers would benefit from an integrated Nordic end-user market. None of these reports were able to calculate the actual costs and benefits, and the conclusions were taken based on qualitative reasoning.

Based on the NordReg reports it is likely to assume that the socio-economic benefit is positive from creating a common end user market for electricity in Sweden, Norway, Denmark and Finland.

10 Necessary harmonisation work to be decided by the Nordic regulators

To develop a well functional Nordic balance settlement and reconciliation settlement some important aspects should be harmonised on a Nordic level. This harmonisation is outside what the Nordic TSO can decide upon. The NBS project strongly advice the Nordic regulators to develop solutions which will support a Nordic energy market.

10.1 Automatic metered data collection

Current regime for meter collection is not harmonised in the Nordic countries. The differences in the regulation of meter collections and introduction of AMR in the Nordic countries make the Balance Settlement solution less optimal. Different meter collection regimes in the different countries imply that a full harmonisation is not possible to achieve and that country specific adaptations has to be developed.

If one strictly looks at the balance settlement and the reconciliation process, the best solution would be that all metering points are collected frequently (daily or at least weekly) with an hourly resolution. This will reduce uncertainty for the players in the balance settlement and reduce the need for reconciliation. The threshold for meters which should have AMR has to be decided by the regulators and should be harmonised in the Nordic region.

An implementation of AMR throughout the Nordic countries with frequent collections has a cost for the electricity users which should be considered.

10.2 Decision on the threshold for reporting D+1 for forecasting purposes

Nordic regulators should harmonise the requirements for reporting D+1. A common threshold for this reporting should be established by the regulators. In the NBS model a threshold of 63 AMP has been used.

10.3 Reporting of data per metering point to RE

The NBS project ask the Nordic regulators to make common rules for DSO reporting of data per metering point to RE.

10.4 Nordic regulation of the balance settlement

The Nordic regulators should assure that the national regulations relevant to the balances settlement and reconciliation settlement are according to the requirements in this report.

The regulation of the balance- and reconciliation settlement is currently regulated through the national TSOs who have the formal responsibility. In Finland the reconciliation settlement is not currently regulated through the national TSO.

10.5 Harmonised data communication standards

It is possible to develop a Balance settlement and reconciliation settlement solution which interprets different standards as EDIEL and XML at the same time. However it would be of large advantage if a common Nordic communication standard was decided on as soon as possible so that the SR could develop the necessary IT systems in an efficient manner based on the future standard.

The DSOs and the BRPs have, as part of the reference group, expressed clearly the need for a common communication structure in the Nordic region as a prerequisite for establishing a common end user market. Necessary changes to the industry players' IT-systems have to be developed, and the communication standards should be in place before large changes are made.

The NBS project asks the regulators to secure that the communication standards (especially standards between DSO and RE) are developed as soon as possible through the organisation for establishing a common Nordic end user market.

11 Preliminary time table for implementation

A preliminary time table for implementation of NBS has been developed by the project. A common Nordic balance and reconciliation is a prerequisite for creating a common Nordic end user market. The plan is developed such that NBS is operational prior to Nordic harmonisation of the entire end user market in the Nordic region.

Given the timetable below the NBS could be operational at the earliest at the beginning of 2014 given that the formal regulations are in place during the spring of 2012. This time table will give the industry an 18 months period to change the IT-systems and the work processes.

The most important milestones in the critical time line are:

- Hearing process on the NBS design report in February-March 2011
- Market rules subject for regulation developed and presented to the regulators by August 2011
- Change of national regulations and laws by the regulators by June 2012
- 18 months transformation period for the industry to adapt to new regulations by December 2013
- Market testing period during January and February 2014
- NBS implemented and operational in March 2014

The timetable is shown in the time table below:

	2011												2012												2013												2014											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Hearing process NBS design	[Grey bar]																																															
Market rules subject for regulation	[Grey bar]												[Grey bar]												[Grey bar]												[Grey bar]											
Setting up the SR and make ready for operations	[Grey bar]												[Grey bar]												[Grey bar]												[Grey bar]											
Change of national laws and regulations													[Red bar]																																			
Regulation of SR (regulator decide regulation model)													[Red bar]																																			
IT-specification													[Blue bar]												[Blue bar]																							
IT-development													[Blue bar]												[Blue bar]												[Blue bar]											
Work process adaptation													[Blue bar]												[Blue bar]												[Blue bar]											
Market testing																									[Grey bar]												[Grey bar]											
NBS operational																																					[Grey bar]											

The TSOs could be finished with the set-up of the SR, developing the market rules and balance agreement and as well develop the SR's IT-system and work process before start of 2014. The long implementation time of NBS is partly related to the need for changes of market rules and regulations. A critical time consuming tasks are the regulators change and approval of necessary changes to regulation. It is important that the Nordic regulators prioritise this work and thereby secure the necessary changes.

The DSOs, BRPs and REs will have 18 months to change their work processes and IT-systems before the market testing start December 2013.

12 Changes introduced by NBS settlement model

The NBS model will require some changes in all countries, this chapter describes current national solutions compared to the NBS proposed model. It also includes a description of the most important changes.

12.1 Comparison of NBS model and current national solutions

For the balance settlement the current national solutions and the proposed NBS model is shown in the table below:

	NBS model	Denmark	Finland	Norway	Sweden
Reporting structure for the balance settlement	Reporting of metered data on RE/BRP level	Reporting on BRP-level. DK Datahub will make aggregation from metering point level	Reporting on RE-level	Report mainly on RE-level (else BRP-level).	Reporting on BRP-level. Meterdata updated by the DSO in master database. Masterdatabase updated in the control room on plans etc. BPR update bilateral trade in masterdatabase
Balance power calculation	Calculation on BRP-level. Daily calculation until 9 working days after delivery day	Calculation on BRP-level. Final calculation 5 working days after delivery day.	Calculation on BRP-level. Calculation daily. Final calculation after 1,5 month.(2011)	Calculation on BRP-level. Continuous calculation. Final calculation done Thursday for the delivery week.	Calculation on BRP-level. Daily calculation until correction of balance settlement (10 months). Invoice period is frozen.
Corrections of balance settlement	No corrections of the balance settlement after 9 working days	Correction settlement 3 months after invoicing (4 months after delivery month)	No corrections of the balance settlement after 1,5 month(2011)	No corrections after the final balance settlement (weekly)	Correction of balance settlement is made 1,5 month after delivery period plus if asked for 10 months after delivery period
Invoicing schedule	Weekly invoices (electronic invoice)	Monthly (electronic invoice)	Monthly (electronic invoice)	Weekly (pdf file)	Half monthly (2 times a month) (paper invoice)

Table 5

Regarding profiling and reconciliation a description of the NBS model and current solutions are listed in the table below:

	NBS model	Denmark	Finland	Norway	Sweden
Profiling	Load profile shares in monthly resolution is calculated by DSO per MGA before the delivery month starts based on national rules. DSO calculates RE/BRPs profiled consumption per MGA.	Load profile shares is calculated before the delivery month starts by DSO per DSO (DK1/DK2) based on annual consumption. EN.dk calculates BRPs profiled consumption per MGA. Datahub calculates LPS from 2012	Synthetic profiles per metering points. DSO and Retailer (supplier) responsibility	Load profile shares in daily resolution is calculated by DSO per metering point based on annually consumption. DSO calculates BRPs profiled consumption per MGA	Load profile shares in monthly resolution is calculated by DSO per MGA before the delivery month starts based on monthly consumption. SvK calculates BRPs profiled consumption per MGA. BRPs settle their RE.
Reconciliation	The DSO calculates the final profiled consumption and reconciled energy per RE/BRP in daily resolution. SR aggregates the reconciled energy per RE/BRP to price area level and calculates the cost. The BRPs are the financial counterparts for Res and SR.	Profiled consumption have at least annual meter reading. Reconciled energy calculated in daily resolution by DSO and aggregated to RE/BRP-level. REs are the counterparts in the economical transaction. Data hub takes over the mentioned DSO-tasks in 2012.	Profiled consumption have annually meter reading. DSO responsibility. REs are the counterparts in the economical transactions	Profiled consumption have annually or quarterly meter reading. Actual metered data is redistributed in daily resolution by DSO per metering point. DSO calculates REs reconciled energy per metering point in daily resolution and is the counterpart in the financial transaction.	Metered data for profiled consumption is collected monthly. Actual consumption is aggregated as "Final load shares" in monthly resolution 2 months after delivery month by DSO per MGA. SvK calculates BRPs reconciled energy in monthly resolution 3 months after delivery month and is the counterpart in the economical transaction. BRPs settle their RE.

Table 6

Finally the reporting is described below for the NBS model and current solutions.

	NBS model	Denmark (2012)	Finland	Norway	Sweden
Reporting of individual meter data for hourly metered production and consumption to RE	Dependent on the outcome of NordREG work	3 working days after the delivery day, final 5 working days after delivery day to be used in the balance settlement	Next day after delivery day, final 1 month after delivery day. Decided to shift to 14 days by 2011	3 working days after delivering week	Five days after delivery day
Reporting of meter data to RE which was included in the profiled consumption	Dependent on the outcome of NordREG work	Five weeks	Next day after delivery day	Maximum 3 weeks after meter reading	Monthly and 5 working days after delivery month
Reporting of LPS to SR	First report 9 working days before start of delivering month, updates at latest 2 working days before delivery month	First report 13 working days before start of delivering month, updates at latest 2 working days before delivery month	No reporting today	3 working days after delivering days (JIP)	Preliminära andelstall is reported the 24 th in the month before the delivery month
Reporting of MGA aggregated metered data for production and consumption to SR	Before 10:00 AM the day after delivery day, update within 9 working days by 12:00	5 working days after delivery day.	Monthly (31 days) Decided to shift to 14 days by 2011	Weekly reporting and settlement	Before 10:00 AM the day after delivery day, updates within five working days
Reporting of result from balance settlement from SR	Made available daily to BRP before 14:00 (final settlement after 9 working days)	Daily, five working days after delivering day	Monthly results after 1,5 Month	Weekly	Daily reporting at 12:00 and updates at 14:00 the day after delivery day thereafter once a day
Reporting of reconciled energy per MGA after final meter reading	To SR within two months after final meter reading of profiled metering points	To SR(datahub) within approx. 2 months	Reconciliation per metering point from DSO to RE, managed yearly after meter reading	Reconciliation per metering point from DSO to RE, after meter reading and minimum yearly	Slutliga andelstall is reported by DSO within 2 months. SvK report reconciled energy to BRP within 3 months after delivery month

Table 7

12.2 Important changes in the balance settlement and reconciliation

The most important changes encompassed by the NBS model are described below.

Change	Description
Balance settlement to be centralised in the Nordic countries.	A common unit (SR) will perform the operation of the balance settlement and invoicing of balance settlement and reconciliation. BRPs will thus have one contact point for the balance settlement.
Reporting by the DSO day after delivery day of aggregated meter values to the BRP for load forecasting purposes and to the SR for preliminary balance settlement purposes.	New requirement for DSOs in Norway and Denmark.
Corrections after the final balance settlement (9 working days) have to be done bilaterally.	Change from current solution in Sweden and Denmark where corrections of balance settlement can be done a long time after the balance settlement has been calculated.
All meter data to be used in the balance settlement have to be reported at the latest 9 working days after the delivery day.	NBS model will prolong the settlement in Norway and Denmark while reducing the time for balance settlement in Sweden and Finland.
Invoicing of the balance settlement is to be done on a weekly basis.	Change in Denmark, Sweden and Finland.
DSO to submit LPS before the start of the delivery month.	New tasks for the DSOs in Finland. Change in Norway from metering point to MGA and change from daily to monthly The datahub will handle this in Denmark.
Profiling of the preliminary profiled consumption (PPC) for the balance settlement.	New tasks for DSOs in Finland and Sweden. The datahub will handle this in Denmark.
Partly centralisation of the reconciliation settlement.	DSOs to report reconciled energy on an hourly basis to the SR who calculates and send out the basis for reconciliation to the BRPs. Reconciliation is then done between the BRP and the RE. This solution is new in all countries, but will especially entail more work for the DSOs in Sweden and Finland. The datahub will manage this in Denmark.

Table 8

13 Issues to be evaluated further for NBS

There are identified some issues regarding the NBS settlement model that the project has no concluded on. This is partly due to lack of time and partly because these issues preferably should be discussed with other stakeholders. The most important issues are described below.

	Issues to be evaluated further	Description	Described in report	Responsible
1	The actual reporting requirements for production units and large consumption units	How should production plans be reported to TSO and followed up. What detail level should be used in the balance settlement by the SR	Chapter 2.3.4	TSO
2	Trade on interconnections not included in NPS trade	How should trade on interconnectors like DEN-GER, FI-RUS etc be managed in the model	Chapter 2.6.2	TSO
3	Inter Nordic TSO trade	Include TSO – TSO settlement of imbalances between balancing areas (cross border trade in the Nordics)	Chapter 6.1	TSO
4	Sign convention	Harmonise the sign use of consumption and the production in the Nordics	Chapter 2.4	TSO
5	SR-TSO interface	Information flow, cash flow etc.	Chapter 2.6	TSO
6	Exceptions for small scale production (different rules in different countries)	The requirement for metering and reporting of small scale production should be harmonised in the Nordics	Chapter 2.4	TSOs/ Regulators
7	Develop one common balance agreement	New common Nordic balance agreement to be developed	Chapter 2,3	TSOs
8	Develop detailed overview of necessary legal changes	Prepare for new regulations and change of laws	Chapter 7	Regulators
9	How to handle primary and secondary regulation	To be handled as trade or not. Should it be taken care of in the production balance power calculation or not	Chapter 2,9	TSOs
10	Settlement and invoicing of all ancillary services.	Future harmonisation could facilitate invoicing by SR. This will be evaluated further	Chapter 2,9	TSOs
11	AMR	Harmonisation of AMR requirements in the Nordics would be an advantage, but not a prerequisite. The Nordic regulators should address this issue	Chapter 2.5	Regulators
12	Common Nordic register for RE and BRP and DSO	Who should develop and maintain a common Nordic register to identify the players	NA.	TSO/Regulators

Table 9

14 Appendices

14.1 Basic principles of profiling in NBS

Profiling of consumption without daily collected hourly metering is necessary for the reason that no metered data for these metering points is available in due time for the preliminary balance settlement starting D+1.

There are 4 kinds of meters

- 1) hourly meters collected daily
- 2) hourly meters collected at least weekly
- 3) hourly meters collected at least monthly
- 4) other meters, i.e. manual meters

Profiling is used both in balance settlement and reconciliation:

Balance settlement

In the preliminary balance settlement an estimate of the profiled consumption per BRP on hourly basis has to be used for group 2) and 3)+4) above.

The estimate is called preliminary profiled consumption (PPC). The PPC for group 3)+4) is also made on RE-level.

When the metered values for group 2) are collected before final balance settlement these metered values replace the PPC for group 2).

Reconciliation

When the metering for group 4) are collected (up to 1 year later dependant on country) the metered consumption per metering point since last reading is profiled to hourly basis and aggregated to RE-level. This is called the final profiled consumption (FPC). For group 3) the metered hourly values are used as FPC instead of profiling eg monthly values to hourly basis.

After calculation of FPC the difference between the FPC and PPC per RE on daily basis is calculated and multiplied with an average Elspot-price and the amounts are settled between the REs.

Below, the proposal for profiling and reconciliation is illustrated with a very simplified example. To simplify matters it is supposed that

- the considered DSO only has one MGA
- the MGA has 3 “normal” metering points and 1 “virtual” metering point for the grid loss
- there are 3 RE and 3 BRP; each RE only uses 1 BRP, and each BRP only serves 1 RE.
- the RE for grid loss is not a RE for “normal” customers

- hourly metering is always collected daily and all other meters are yearly read manual meters

The delivery month is supposed to be September 2011. The following abbreviations are used:

- MGA: metering grid area
- MP: metering point
- LP: load profile = profiled consumption
- LPS: load profile share

14.2 Calculation of LPS

Below it is assumed that the future common deadline for asking for change-of-supplier is 10 working days before the day of the change.

On this assumption the DSO shall report their “draft” load profile shares (LPS) on RE-/BRP-level for September 9 working days before September 1st. After correction for any errors the final LPS are reported to parties at latest 2 working days before September 1st.

All DSOs have a database with certain info on all their MPs, e.g. LPS, present and future retailers etc, cf. Table 1.

Table 1. Some basic data per metering point in late August.

Metering point	LPS (kWh/month)	S = Share of total LPS	Present RE	RE on 1. September
1	4000	0,4	1	1
2	3000	0,3	2	2
3	1000	0,1	2	1
Gridloss	2000	0,2	3	3
Total	10.000	1,0		

It is seen that there is an approved change of supplier on MP3 between late August and 1. September. It is the RE-status on the 1. day in next month that is decisive for aggregation of LPS to RE-/BRP-level, cf. table 2.)

Table 2. LPS per RE by 1. September.

RE	LPS (kWh/month)	S(x) = Share of total LPS
1	5000	0,5
2	3000	0,3
3 (gridloss)	2000	0,2
Total	10.000	1,0

What matters in Table 2 is only the shares S(x) per RE/BRP, cf. next section. It's only due to transparency that the DSO reports the LPSs to the RE/BRP, who then can calculate their shares themselves.

The LPS on metering point level cannot be changed afterwards, but they might be redistributed between RE-/BRP during the month case of bankruptcy (details still need to be developed).

14.3 Calculation of PPC

While metering per metering point is not available for the profiled consumption before balance settlement another matter is the total profiled consumption = load profile (LP). The LP on hourly basis for the MGA can already be calculated/estimated the day after delivery day as:

- 1) LP = total net exchange with neighbour MGA (incl. transmission grid) + total local production – sum of hourly metered consumption used in balance settlement, i.e. the meter groups 1) and 2) .

The PPC can then be calculated for each BRP as the LP multiplied with the shares S(x) in table 2. PPC is not calculated on metering point, only on RE/BRP-level.

Table 3 shows the calculation of PPC for the 3 BRPs during some random hours on 10. September

Table 3: LP and PPC in some hours on September 10th.

	S(x) cf. Table 2	Hour 6	Hour 12
LP	1	10	20
PPC(1)	0,5	5	10
PPC(2)	0,3	3	6
PPC(3)	0,2	2	4

DSO shall report PPC to SR within the same deadline as hourly metered data, i.e. at latest 9 working days after delivery day.

Another matter is that the BRPs day-ahead shall make their best possible estimate of PPC before trading on NPS etc. The estimation can be based on information about LP and the BRP's share S(x), which the BRP calculates using the LPSs provided by the DSO.

14.4 Calculation of FPC etc

Calculation of FPC for meters in group 4) can be done when the metered consumption since last reading has been collected. In addition to the normal e.g. yearly or monthly collection, it shall always be collected in case of change of supplier, moving, change of meter etc.

The metered consumption since last collection shall be profiled on daily basis between the two collections and aggregated to RE/BRP level. For grid losses the FPC is calculated as a residual. Table 4 shows the FPC and PPC in hour 6 on 10. September, cf. table 3.

Table 4. FPC and PPC hours on September 10th

RE	FPC	PPC, cf. table 3	Difference= Reconciled energy
1	3	5	-2
2	6	3	+3
3	1	2	-1
Total	10	10	0

The reconciled energy is settled in the reconciliation settlement. It is seen that for 10. September RE and 3 shall pay while RE shall be paid.

The sum of reconciled energy is 0, ie. the reconciliation is a redistribution between the REs, which corrects for errors in the shares $S(x)$ in table 2 and 3. These errors can eg. be due to changes of supplier, movings etc that were not taken correctly into account in PPC.

Another matter is that after balance settlement there can be corrections in the load profile due to corrections in the hourly meterings used to calculate the load profile. This is handled by bilateral correction where the RE for gridloss always is one of the two involved RE's, cf example in table 1. In this example there is + 10 MWh/hour correction in local production in the considered hour.

Table 5. Example of error in calculation of load profile (MWh/h)

	Data in row 1-3 as used balance settlement	Corrected data in row 1 (local production +10)
1) Total consumption	100	110
2) Non-profiled consumption	60	60
3) Load profile	40	50
4) FPC for "normal" consumption	42	42
5) FPC for gridloss	-2	8

As illustrated this situation is handled as follows:

- The load profile and PPC's used in reconciliation is the same as used in balance settlement,
- Instead the RE for grid loss pay the local producer for 10 MWh according to normal rules for bilateral correction

- At the reconciliation the RE for gridloss are paid for 2 MWh, i.e. he net pays for “correct” 8 MWh.