

**Affärsverket Svenska kraftnät
Statnett SF
Energinet
Fingrid Oyj**

**with the approval of
Kraftnät Åland AB**

**Agreement in Principle
for a new common balancing concept**

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- (1) **Affärsvrket Svenska kraftnät**, a Swedish state utility, having its registered office at P.O. Box 1200, SE-172 24 Sundbyberg, Sweden, registered under the number 202100-4284 ("**Svk**");
- (2) **Statnett SF**, a Norwegian state owned enterprise with limited liability, company registration number 962 986 633 and registered office at Nydalen Allé 33, 0484 Oslo, Norway ("**SN**", and together with Svk the "**Balancing Principals**");
- (3) **Energinet**, a state owned independent public enterprise incorporated under the laws of Denmark, having its registered office at Tonne Kjærsvej 65, DK-7000 Fredericia, Denmark, registered with the Danish Business Authority under number 28980671 ("**EN**");
- (4) **Fingrid Oyj**, a public limited liability company incorporated under the laws of Finland, having its registered office at Läkkisepäntie 21, FI-00620 Helsinki, Finland, and registered in the Finnish Trade Register with number 1072894-3 ("**FG**", and together with EN the "**Balancing Participants**", and together with the Balancing Principals, the "**Balancing Parties**"); and
- (5) **Kraftnät Åland AB**, a limited liability company established in Åland with its office at Elversgatan 10, 22100 Mariehamn, Åland, ("**KÅ**", and together with the Balancing Principals and the Balancing Participant, the "**Parties**");

have today theOctober 2017 entered into the following agreement (the "**Agreement**"):

1. BACKGROUND

The Parties hereto are the transmission system operators ("TSOs") in the Nordic power system.

System security in the Nordic power system is challenged by major changes, including increased volatility due to changes in the generation mix and increased HVDC interconnection capacity.

Major efforts are required to develop and implement new system and market solutions (including IT systems) in order to manage and accommodate accelerating technological change.

Additionally, implementation of a new European framework with i.a. regulations on network codes and guidelines, including the guideline of electricity transmission system operation ("SO GL") and the guideline for electricity balancing ("EB GL"), is a substantial task with demanding deadlines.

Under the System Operation Agreement dated 13 June 2006 between the Balancing Principals and the Balancing Participants (the "**Current SOA**"), the Balancing Principals are currently responsible for operational management of balancing in the Nordic synchronous system (the "**Synchronous Area**").

Jutland (DK1) is not part of the Synchronous Area, but participates in the Nordic regulating power market.

As provided for in the Current SOA, balancing in the Synchronous Area is currently based on frequency deviation.

A comprehensive revision process of the Current SOA has been ongoing since autumn 2013.

The Balancing Principals are willing to continue to be responsible for delegated operational tasks related to balancing in the Synchronous Area, but on a modified basis, as set forth in this Agreement.

Consequently, the Balancing Parties will, subject to regulatory approval, establish a LFC Block in accordance with art. 141 (2) of SO GL (the "**Nordic LFC Block**"), covering Norway, Sweden, Finland and DK2. With respect to Åland, Svk is responsible for balancing, as further described in art. 11.2.

2. PURPOSE AND MAIN GOALS

The purpose of this Agreement is in general to determine the main principles of the new balancing concept, how it shall be implemented and how the Parties shall work together to achieve this.

This Agreement will govern the cooperation in the Nordic LFC block agreement (see in particular art. 5) and also constitute the fundamental principles for the larger cooperation on Nordic balancing as described in this Agreement (see in particular art. 6).

The fundamentals of the Nordic balancing concept in art. 3 and the principles in art. 4 shall be respected by the Parties to this Agreement.

The main goals of the new balancing concept are:

- (a) Strengthening and improving the short and long term operational security in the Nordic LFC Block;
- (b) Allowing for integration with European market platforms for balancing products;
- (c) Improving efficiency in development, operations and decision-making;
- (d) Well-functioning and transparent markets to support security of supply and welfare-economic efficiency;
- (e) Improving clarity with respect to the delegated responsibilities to the Balancing Principals; and
- (f) Improving clarity for the Balancing Parties with respect to responsibilities and freedom of action.

In working towards these goals, the Balancing Parties shall work together on an equal basis, in a close and efficient manner.

This agreement is prepared with due regard to European and national regulation and thus complies with such regulation. Should nevertheless any provision of this Agreement be seen as contradictory to European or national law by competent authority or court, the law shall prevail. In such case the validity, legality and enforceability of the remaining provisions of this Agreement shall not be affected and they shall remain in full force.

3. FUNDAMENTALS

The new balancing concept shall be based on these fundamentals:

- (a) "Polluter pays", implying that each Balancing Party shall have adequate financial incentives with respect to system deficits or surplus originating from his control area;
- (b) Nordic cooperation which is beneficial for each country, as opposed to a "stand alone" concept;
- (c) The use of market based solutions and use of price signals should be increased;
- (d) Necessary compliance with SO GL and EB GL, including future amendments, as well as other network codes, guidelines and other new EU legislative instruments;
- (e) Allowing for integration with European market platforms for balancing products, once they become operational.
- (f) The requirements for each Balancing Party shall be realistic, so that it is possible for it to comply without inappropriate costs;
- (g) Securing efficient use of all available and differentiated balancing resources in the Nordic power system;
- (h) Open dialogue and early regional public consultation for stakeholders in order to secure an equal and efficient decision process;
- (h) The main IT platform for balancing shall be the 50-50 joint IT development venture established by the Balancing Principals ("**Fifty**") and which the Balancing Principals intend to convert into a 50-50

company by the end of 2017. The IT solutions by Fifty shall allow for connection with other TSO specific systems.

4. MAIN PRINCIPLES

This article determines the main principles for the new balancing concept, which shall be understood and applied on the background of the fundamentals in art. 3. These principles and fundamentals shall also be relevant for day-to-day operational balancing and the tasks and functions of Fifty pursuant to art. 8.2.

These principles will be pursued in the upcoming implementation of SO GL and EB GL following the processes applicable in these regulations.

4.1 Balancing concept

The new balancing concept for the Nordic LFC Block includes the introduction of modernized ACE ("MACE") as a central element.

Area Control Error ("ACE") is a measure of the instantaneous power imbalance in an area of the power system. ACE is calculated by comparing the flow on all borders of an area with the planned flows, correcting for flows due to the activated primary reserves and agreed balancing contracts. MACE uses modern IT solutions to combine the balancing needs, available transmission capacity and available balancing resources in a coordinated and optimal way.

The balancing concept rests on main design features (using the definitions in SO GL and the ENTSO-E glossary):

- (a) The Nordic LFC Block is divided into bidding zones corresponding to the main bottlenecks in the grid. Each bidding zone shall also correspond to an LFC area. The bidding zone constitutes the main building block in the Nordic LFC block balancing concept.
- (b) The balancing concept is based on a 15 minute balancing market, Market Time Unit, and a corresponding 15 minute Imbalance Settlement Period is applied for the Imbalance Settlement process.
- (c) Each Balancing Party shall ensure access to sufficient reserve capacity (according to Nordic FRR dimensioning rules to be described in the LFC Block Agreement (as defined in art. 5.3) in all Market time units and in all bidding zones within its control area. If necessary, market based procurement of reserve capacity and reservation of transmission capacity shall be used to ensure this, subject to regulatory approval.
- (d) The FRR dimensioning rules shall be based on historical imbalances and the dimensioning incident in each bidding zone. In addition each Balancing Party shall secure necessary reserves to handle congestions within the bidding zones of its control area. The FRR dimensioning rules shall accommodate proactive balancing of mFRR and reactive balancing done mainly with aFRR.
- (e) FRR dimensioning shall follow the below stepwise process:
 - (i) Dimensioning per bidding zone, based on above principles;
 - (ii) Sharing of reserves within each control area in the Nordic LFC Block;

- (iii) Sharing of reserves between control areas in the Nordic LFC Block, while respecting the responsibility of each control area for operational security.
- (f) The Balancing Parties shall develop a methodology to exchange balancing capacity. The exchange of balancing capacity shall be used as a tool to ensure sufficient balancing reserves in each bidding zone and to increase economic efficiency. The methodology shall respect capacity exchange limitations that stems from the control area responsibility to maintain operational security.
- (g) Exchange of balancing capacity shall be secured by reservation of transmission capacity. Countertrade is a supplementary tool and shall not be used as an alternative to reservation of transmission capacity.
- (h) The manual FRR product shall under normal operation be used to proactively balance the system and for congestion management purposes. Proactive balancing implies forecasted imbalances and to release expected automatic FRR activation. mFRR control requests from each bidding zone shall be coordinated by a central European or Nordic activation optimization function. The activation process shall be supervised by a Nordic security function.
- (i) Each Balancing Party is economically responsible for balancing of the imbalances within its own control area.
- (j) The automatic FRR product shall be used for reactive balancing and is activated based on aFRR control of each bidding zone, coordinated by a central activation optimization function which ensures a cross bidding zone border optimized aFRR activation in the Nordic LFC Block. Available transmission capacity, including potentially reserved transmission capacity between the bidding zones is utilized by the central activation optimization function to exchange aFRR balancing energy.
- (k) The Balancing Parties in the Nordic LFC Block shall establish joint balancing market underpinned by joint platforms for procurement and activation of balancing services. The balancing market design shall provide adequate price signals for balancing services and imbalance settlement for Balancing Parties, BSPs and BRPs, per 15 minute time period and per bidding zone. Scarcity pricing shall be applied. Scarcity situations shall be defined based on the FRR dimensioning rules.
- (l) The balancing process shall strive to be non-discriminatory and transparent in all activities established under the balancing process. This implies to publish relevant market information not later than 30 minutes after real-time as long as publication does not create system operational inefficiencies or any competitive advantages or disadvantages to any market participants.

In order to achieve system security and provide appropriate incentives, the products required to implement the above design features shall have specifications with respect to activation time, duration and other relevant aspects which

- (a) Allow for secure operation of the Nordic power system;
- (b) Minimize Nordic costs; and
- (c) Makes it possible for all Balancing Parties to comply with their obligations without excessive costs.

All Balancing Parties shall comply with the reserve obligations and other requirements of LFC Block Agreement. In the LFC Block Agreement there should be described a mechanism ensuring a financial compensation which provides an efficient, robust but not unproportional incentive to comply.

After the Nordic reserve requirements have been met, and provided other relevant requirements (regulatory, contractual or otherwise) are complied with, each Balancing Party shall have no restrictions under this Agreement with respect to any remaining reserves/potential in its country.

4.2 Roles and responsibilities under the new balancing concept

The various roles and responsibilities with respect to balancing in the Synchronous Area are summarized in the matrix below.

This Agreement provides for delegation of the responsibilities within the LFC block agreement according to art. 119 in SO GL.

Some of the tasks mentioned in this matrix are subject to approval by all TSOs in the synchronous area (e.g. SO GL art 118 and EB GL). For these tasks the roles described in the matrix should be seen as common positions for the wider discussions within the Synchronous Area, as set forth in greater detail in art. 6.

Roles	Responsibilities
Balancing Party (Svk, EN, FG and SN)	Design the Frequency Containment Process and potential links to the Frequency Restoration Process
	Design the Frequency Restoration Process and potentially RR process including needed specification for the relevant products
	Design common Nordic FCR markets
	Design common Nordic FRR markets (capacity and energy)
	Design potential common Nordic RR markets
	Develop appropriate capability for each bidding zone within its Control area
	Continuously calculate ACE for each bidding zone within its Control area and send to Balancing Principals
	Predict, secure reserves for and handle congestions within bidding zones included in its control area
	Secure adequate FCR and FRR capacity for each bidding zone within its control area according the methodologies described in the New SOA (as defined in art. 5.3) and LFC Block Agreement, it being understood that the New SOA shall only deal with issues relevant at the Synchronous Area level
	Continuously follow and predict future imbalances in each bidding zone within its control area
	Request FRR activations at relevant activation platforms in order to aim for ACE = 0 MW for all bidding zones within its control area
	Act as interface between BSP/BRP within its Control area and relevant multinational capacity and activation platforms
	Keep Balancing Principals informed about requests and bids for FRR activation as well as ATCs for different products

Balancing Principal (Svk and SN)	Facilitate common Nordic FCR markets
	Facilitate common Nordic FRR markets (capacity and energy)
	Facilitate potential common Nordic RR markets
	Act as interface between Balancing Parties and European platforms when necessary to secure Nordic system security
	Act as back-up for European platforms
	Coordinate redispatch and countertrade within the Synchronous Area and with other synchronous areas if two or more Nordic Control areas are involved
	Supervise Nordic operational security (N-1) and coordinate measures in case of insufficient reserves on Nordic or control area level, while respecting the operational agreement of the Nordic RSC.
	Activate FRR and potentially RR on Nordic level including responsibility for the MACE controller
	Act as Frequency leader in alert/emergency state
Balancing Participants (EN and FG)	Responsibilities equal to Balancing Party

SO GL contains a number of provisions where one TSO in an LFC block or a synchronous area shall be appointed by other TSOs to perform certain tasks. The Parties agree that in cases related to the Nordic LFC Block this TSO shall be Svk/SN, as agreed between the Balancing Principals. In cases related to the Synchronous Area the relevant TSO must be appointed based on the specific articles in SO GL. Such appointments are subject to the provisions of art. 6.

4.3 Settlement

General

The activation and settlement processes for balancing energy as well as imbalance settlement in general are highly influenced by the European framework stipulated directly by the EB GL or methodologies jointly developed by the European TSOs to fulfill EB GL requirements. This means that the Balancing Parties have a set of parent key design principles to take into account when designing the settlement processes in for the Nordic LFC Block and the Nordic synchronous area. The settlement of balancing capacity is to less extent regulated by a European framework.

Each country shall benefit from each market solution.

The main principles for settlement shall be:

- (a) Adequate economic signals shall be provided to all the Balancing Parties, BRPs and BSPs.
- (b) The settlement processes should be transparent and non-discriminatory and be designed to avoid any market distortions.
- (c) The settlement rules shall be compatible with relevant articles of EB GL.

- (d) The exchange of balancing services shall be based on a TSO-TSO model.

Exchange of balancing capacity

The exchanged volume shall be calculated and priced separately for upward balancing capacity and downward capacity, i.e. the volumes should not be netted within the imbalance settlement period.

Exchange of balancing capacity shall be secured by reservation of transmission capacity before clearing of the day-ahead market. Transmission capacity can only be reserved if the value of using transmission capacity for balancing capacity is likely to be higher than the value of using transmission capacity in the day-ahead market on the margin.

Settlement of procured balancing capacity shall be based on marginal pricing towards the BSPs unless market imperfections justifies otherwise. The exchange of balancing capacity between the Balancing Parties is settled to the average of marginal bid values in importing and exporting areas (middle price). If there is no bottleneck in exchange of the products, the full exchange of the product will be settled to the purchase price.

There is a lot of special cases in TSO-TSO exchange of balancing reserve products. More detailed agreements for settlement will need to be developed between the Balancing Parties in accordance with these general guiding principles.

Exchange of balancing energy

Each balancing activation shall be settled between the requesting and providing Balancing Parties.

Settlement of procured balancing energy shall be based on marginal pricing towards the BSPs unless market imperfections justifies otherwise.

The exchange of balancing energy between Balancing Parties is settled to the average of the marginal prices in the importing and exporting area (middle price). If there is no bottleneck in exchange of the products, the full exchange of the product will be settled to the purchase price. There is a lot of special cases in TSO-TSO exchange of balancing reserve products. More detailed agreements for settlement will need to be developed between the Balancing Parties in accordance with these general guiding principles.

Exchange resulting from imbalance netting

The benefits of imbalance netting are avoidance of aFRR activations. The settlement of exchange resulting of imbalance netting should lead to a distribution of benefits giving each Balancing Party an economical advantage of participating in a cost efficient solution for imbalance netting.

Exchange for other purposes than balancing

The marginal price towards BSPs of a balancing product shall as far as possible reflect all activations, also activations for other purposes than balancing the Nordic Synchronous Area.

Settlement of unintended energy exchange

The settlement rules for energy due to imbalances not managed by activation balancing products and deviation between the measured and planned flows shall ensure a distribution of costs and benefits between Balancing Parties that gives each Balancing Party financial incentives to reduce imbalances in its control area.

The price of unintended exchange should reflect prices for upward and downward energy dependent on flow direction.

The volume of unintended energy exchange should be calculated with as fine time resolution as technically possible and thereby avoid netting of flows as far as possible.

4.4 Jylland / market extension

With respect to Jylland (DK1) which is part of the continental synchronous area and where the continental balancing requirements apply, the Balancing Parties confirm that current arrangements with respect to regulating power ("regulerkraft"), may continue until any of the Balancing Parties connect to the European platform for mFRR activation. In case of an early establishment of a Nordic platform as a development step towards a European platform, the arrangements can continue, but will be redesigned in order to accommodate exchange on the European mFRR platforms.

As for participation by Jylland (DK1) in the Nordic aFRR capacity market, the Balancing Parties are in principle positive.

The Balancing Parties shall look favourably upon extension of the market solutions beyond the Nordic countries, including extension to additional territories such as the Netherlands, the Baltic countries, Great Britain, Germany and Poland, subject however to relevant requirements being met.

5. GOVERNANCE RELATING TO THE LFC BLOCK AGREEMENT

5.1 General

The governance arrangements specified here in art. 5 shall apply to all decisions relating to balancing, including system and market design/development, pre and post spot planning, operative phase and post-operation analysis, including without limitation determinations for the purposes of SO GL art. 119 and other relevant provisions related to the obligations stipulated in art. 119.

There are three main levels with respect to governance:

- (a) Project/working group level
- (b) Steering groups, consisting of 2 (or such number the Balancing Parties agree upon) representatives from each Balancing Party
- (c) CEO meeting (consisting of the CEOs of the Balancing Parties)

Voting is only applicable at level (b) and (c). Regardless of this, the Balancing Parties shall strive to reach consensus on all matters.

The voting powers are:

Svk	33 1/3 %
SN	33 1/3 %
EN	16 4/6 %
FG	16 4/6 %

The majority requirement is 65 %.

All decisions taken in the decision-making process shall reflect the provisions of this Agreement and shall not contravene any provisions hereof. Further, such decisions shall comply with the following general principles:

- (a) Efficiency on a Nordic level;
- (b) Non-discrimination; and
- (c) Objective and transparent solutions and criteria.

The governance provisions of art. 5 shall not apply to discussions and decisions at the European level in ENTSO-E relating to balancing. However, the Parties agree that common positions are preferable and shall seek to find such positions.

5.2 Participation by the Balancing Participants

The Balancing Participants have the right to participate on an equal basis in all design and development issues relating to balancing at all three levels identified in art. 5.1, until a final decision has been made. This however does not apply for operational decisions or decisions relating to implementation of designs/ developments prepared on an equal basis as stipulated above in art 4.2 (the matrix).

The involvement of the Balancing Participants shall be carried out through equal participation in joint committees, working groups and projects in system design and development relating to balancing and balancing markets/products, based on the following principles:

- (a) "Merit order" for projects/work scope should be agreed upon by Balancing Parties subject to the voting procedure in art. 5.1 if no agreement is reached;
- (b) The Balancing Principals shall have the right to lead committees, groups and projects working on balancing;
- (c) The Balancing Principals shall after duly involvement of the Balancing Participants determine process and time plan of such work;
- (d) All inputs from the Balancing Participants shall be duly considered by the Balancing Principals; and
- (e) Lack of involvement from the Balancing Parties shall not slow down the process.

5.3 Process description – market and system design

The function of the working groups/project is to develop proposals for issues submitted to them by the Steering Group, and to propose to the Steering Group issues to be addressed.

The Steering Group shall seek to establish consensus if the representatives seem to fail to agree on a single alternative. If the representatives still fail to reach agreement, a vote shall be carried out, applying the voting power and majority set out in art. 5.1

For all proposals that have to be submitted to national regulators for approval, the Balancing Party losing the vote shall have the right to escalate the issue to the CEO meeting. Unless written notice of such escalation is given within 5 business days, the decision shall be considered final, and submissions shall be made to the national regulators on that basis, by all Balancing Parties.

In the event that a decision by the Steering Group is escalated to the CEO meeting, the following provisions shall apply:

- (a) The escalating Party shall prepare an alternative proposal, indicating why such proposal should be preferred.
- (b) If the escalating Party believes that the majority proposal is illegal or contravenes the fundamentals or principles of this Agreement (or any other provision hereof), it shall indicate to the other Balancing Parties the basis for such belief. In such case, the non-escalating Parties shall provide their view as to why the proposal is not in contravention.
- (c) The documentation in items (a) and (b) shall, if possible, be provided together with the notice of escalation, and in any event not later than 2 weeks after the notice.
- (d) The CEO meeting shall be held as soon as possible, so also to allow any applicable submission deadlines to be met.
- (e) The CEO meeting shall strive to reach consensus.
- (f) If consensus is reached, the decision shall be final and constitute the basis for the submissions to the national regulators.
- (g) If no consensus is reached, the submissions to the national regulators shall reflect this. They shall identify the issues where no agreement was reached, the positions and perspectives of the Balancing Parties and their reasoning.

5.4 Process description – operational tasks

All Balancing Parties shall be allowed to participate in working groups discussing and developing operational procedures. The function of the working groups/project is to develop proposals for issues submitted to them by the Steering Group, and to propose to the Steering Group issues to be addressed.

In case of disagreement within working groups the provisions of art. 5.1 and 5.2 and the fundamentals of art. 3 shall be guiding and the for the following discussion in the Steering Group– however respecting the delegated operational decision power to Svk/SN.

5.5 IT implementation

Common IT implementation work will be handled by Fifty, and with appropriate transparency and in accordance with applicable procurement law. Involvement of the Balancing Participants will be based on the following principles (it being understood that the governance provisions of art. 5.1 and 5.2 shall not apply to IT implementation):

- (a) The Balancing Principals will, through Fifty, offer common IT solutions to the Balancing Parties, generally on the basis of "software as a service" or alternatively through one of the Balancing Principals, embedded in a wider service, such as the operation of a market, or as traditional license-based software.
- (b) Each Balancing Party shall be responsible for their own necessary local implementation projects, but may request assistance from Fifty.
- (c) The Balancing Principals will, through Fifty, establish an "IT balancing forum" where all Balancing Parties take part, receive information and contribute. The work shall include necessary coordination with respect to local integration projects. In order for this forum to be effective, the principles of trust, openness, loyalty and confidentiality

shall apply to the work in the forum. If appropriate, more detailed procedural rules may be developed, reflecting the above.

- (d) The Balancing Participants shall participate in relevant testing activities.
- (e) The Balancing Principals will share relevant information of IT enterprise architecture of balancing in appropriate Nordic forums.
- (f) Lack of involvement from the Balancing Parties shall not slow down the implementation processes- and projects.

Separate service level agreements shall be entered into with respect to each IT project.

5.6 Organizational matters

The Balancing Principals will form a joint, virtual organization for the purpose of management of the Nordic balancing function, based, among other things, redundancy with respect to system, resources and personnel. The cooperation is governed by a cooperation agreement between them. No company will be formed for these purposes; the Balancing Principals will remain responsible.

This organization shall supplement and support the cooperation between the Balancing Parties but shall not have any powers to derogate the decisions, principles etc. agreed and implemented among the Parties.

Fifty will be a separate organization that will work in an integrated manner with the balancing organization in implementation projects in order to assure high quality delivery of balancing capabilities.

6. GOVERNANCE RELATING TO ISSUES OUTSIDE THE LFC BLOCK AGREEMENT

This art. 6 determines the principles that shall apply to the negotiations for

- New SOA according to art. 7.3; and
- other operational agreements as set forth in art. 7.4 relating to balancing.

The Balancing Parties shall strive to act together in a coordinated manner in such negotiations ("speak with one voice"), based on consensus. They shall as far as possible seek to obtain agreement on the implementation of the fundamentals (art. 3) and the principles (art. 4) of this Agreement, to the extent they are relevant for such agreements mentioned in the previous paragraph.

7. IMPLEMENTATION

This art. 7 determines how the new balancing concept shall be implemented.

7.1 Time schedule

The basis for the implementation is the high level implementation roadmap as set forth in Attachment 1. If so warranted by developments after the date hereof, the Balancing Principals may adjust the roadmap; the provisions of art. 5 shall apply.

All Parties commit to working diligently to ensure implementation in accordance with this roadmap.

All Parties acknowledge that implementation will occur in a step-wise fashion, with substantial activities in parallel, and that the actions described in the provisions below of art. 5 will not be sequential.

7.2 Notification of control structure

The control structure for the Synchronous Area set forth in art.1 last para and art. 4.1 third para. (a) above shall be notified by the Parties to the national regulators as a common proposal for approval in accordance with SO GL art. 141 (2).

The Parties shall ensure that the notifications shall be submitted before 14 January 2018, which is the deadline specified in SO GL art. 141 (2).

Additionally, the notifications from each Party to ENTSO-E under art. 16 (2) of SO GL shall reflect this Agreement and the Operational Agreements from time to time.

7.3 LFC Block Agreement and New Nordic system operations agreement

The Parties shall prepare and execute an LFC block operational agreement ("LFC Block Agreement") based on the terms and conditions of this Agreement, which shall also include the provisions mandated by SO GL art. 119, as well as such other provisions of SO GL that may be relevant and related to the obligations stipulated in art. 119.

The Parties further shall prepare and execute a new Nordic system operational agreement ("New SOA") shall include the provisions mandated by SO GL art. 118 in respect of synchronous area operational agreements, as well as such other provisions of SO GL that may be relevant and related to the obligations stipulated in art 118, based on the terms and conditions of this Agreement.

The revision process of the Current SOA is based on the concept of a short main body, and one annex per network code or guideline. It is recognized that some elements of the Current SOA, which are to be carried forward, are not covered by any network code or guideline.

The current intention is that the New SOA with a full set of annexes will become effective in the first quarter of 2019. Alternatively, it could become effective on an annex-by-annex basis as the annexes are finalized. The Parties approve this approach.

The Parties commit to finalizing and executing the LFC Block Agreement as well as the main body and annexes of the New SOA based on this Agreement and the decisions made pursuant to it, within the 12 month time limits specified in SO GL art. 119 and 118.

As set forth in art 9.1, the execution of the LFC Block Agreement shall mean that the more detailed provisions therein shall apply instead of the more general provisions on the same matters herein. The same principle of priority shall also apply with respect to the other Operational Agreements (as defined in art. 5.4).

The Parties may agree, to merge the LFC Block Agreement and the New SOA into a single agreement prior to execution.

7.4 Other Operational Agreements

Besides the provisions stipulated above and in addition to the LFC Block Agreement and the New SOA, the Parties commit to such other agreements as may be necessary for the implementation of the new balancing concept, including but not limited to (such

agreements together with the LFC Block Agreement and the New SOA being referred to as the "**Operational Agreements**"):

- (a) Monitoring area agreement, as per SO GL art. 121;
- (b) Imbalance netting agreement, as per SO GL art. 122;
- (c) Cross-border FRR activation agreement, as per SO GL art. 123;
- (d) Cross-border RR activation agreement, as per SO GL art. 124;
- (e) Sharing agreement, as per SO GL art. 125;
- (f) Exchange agreement, as per SO GL art. 126; and
- (g) The Amended aFRR Agreement, as per art. 5.6 below.

Additionally, SO GL contains a number of provisions where one TSO in a LFC block or a synchronous area shall be appointed by other TSOs to perform certain tasks. For tasks and procedures known at the stage of signing this Agreement the Parties agrees that this TSO shall be Svk/SN, as agreed between the Balancing Principals.

7.5 Infrastructure and monitoring

All Balancing Parties shall procure and install, at their own cost, such metering systems and communication functions as may be necessary to obtain the relevant flow data.

All Balancing Parties shall ensure that an ACE controller is installed and operational for each bidding zone in their control area, and which communicates with the central MACE controller.

The Balancing Principals shall establish a monitoring function that i.a. verifies that reserves has been obtained as required and calculates reserve volume requirements on a continuous basis. The monitoring function shall operate in compliance with the requirements of SO GL.

7.6 aFRR

On 7 November 2016 the Balancing Parties entered into an Agreement on a Nordic Market for Frequency Restoration Reserves with automatic activation (aFRR) (the "**Initial aFRR Agreement**"). Appendices 1 containing definitions and 2 determining the main features of the aFRR capacity market were agreed and included. The Balancing Parties and FG were to agree, at a later time, on the remaining appendices (as well as five revision documents relating to the appendices):

- App. 3 The aFFR energy activation market;
- App. 4 Other agreements, including market operator agreement, hosting agreement and implementation;
- App. 5 Technical product specification for delivery of aFRR and settings for frequency controller;
- App. 6 Schedule for implementation.

The Balancing Parties to proceed with the aFRR project based on the Initial aFRR Agreement, but with some modifications set out in Attachment 2 hereto.

Attachment 2 also specifies how the incomplete elements shall be handled.

7.7 mFRR

The steps with respect to development and implementation of mFRR arrangements and markets are set out in Attachment 1.

Each Balancing Party shall have their own interface to the common Nordic/European platform, including requests for activation of FRR from Nordic and/or European platforms, as the case may be. Further specifications shall be included in the New SOA.

7.8 Other elements

Over time it might be appropriate to include further elements and products in the balancing concept, e.g. such as:

- (a) Inertia (SO GL art. 39 (3)); and
- (b) Replacement reserves (RR) (SO GL art. 160 – 162).

7.9 Approvals

All Parties shall work loyally and diligently to obtain approvals from national regulators for all matters where such approval is necessary for the timely and efficient implementation of this Agreement.

8. IT

This art. 8 determines the general business model that apply for IT development projects. However, for certain projects where e.g. not all Balancing Parties participate, or where it is more appropriate that Fifty finances the project itself, a different business model may be agreed upon. Some IT solutions might also be made available on an embedded basis, as e.g. indicated in art. 5.3.

8.1 General

The software solutions implementing and supporting the new balancing concept and future developments within the area of balancing shall be developed by Fifty. Fifty shall be the contractual counterparty for third party contracts with vendors, on behalf of the Balancing Principals. In the event of doubt as to whether a functionality is within or outside the area of balancing, the issue shall be decided by the Steering Group, applying the provisions of art. 5.

Unless specifically approved by the Balancing Principals, all Balancing Parties shall participate in all common IT solutions.

Fifty shall upon request assist a Balancing Party with local implementation projects relating to software developed and/or procured by Fifty relating to balancing.

8.2 IT solutions

It is anticipated that the following IT services should be established (the list is non-exhaustive; the contents, sequence and timings can be adjusted over time) in the initial stage, to be developed by Fifty:

- (a) aFRR capacity market, as described in art. 6.6 above;
- (b) Local ACE calculation;
- (c) Common aFRR energy activation market supporting MACE;

- (d) Common mFRR capacity and energy activation market supporting MACE control;
- (e) Common FCR market;
- (f) Other common IT services to support MACE control; and
- (g) Replacement of balancing functions in NOIS.

8.3 Intellectual property rights (IPR) and rights to software

With respect to software and software components developed by Fifty relating to balancing, the IPR shall belong to Fifty.

With respect to third party deliveries, Fifty shall receive and hold:

- (a) intellectual property rights for developed software that is not part of the third party supplier standard software library or components to which the third party supplier has obtained intellectual property rights, and
- (b) a perpetual right to use software for which it is not granted intellectual property rights (such as standard software).

With respect to applications running centrally, which the users (i.e. both the Balancing Principals and the Balancing Participants, as the case may be) access through an interface, they shall have users' rights.

The users of applications which run locally, shall have a non-exclusive, non-transferable user license with respect to such applications.

All users' rights and user licenses shall be conditional upon all applicable fees etc. having been paid by the Balancing Party in question.

The rights of a Balancing Participants with respect to IT in the event that its participation is terminated, are addressed in art. 8.4.

8.4 IT cost sharing and allocation key

With effect from each date the first IT sub-system developed hereunder becomes operational, a part of the investment cost incurred by Fifty shall be allocated to the Balancing Participants on the basis of the percentage mean annual power consumption in their countries constitutes of mean annual power consumption in the four Nordic countries. However, for solutions that do not include DK1, it is the consumption in DK2 only that is relevant for Denmark.

The allocation key shall be calculated for fixed 5 year periods, the first period consisting of 2012-2016. After each 5 year period, the allocation key shall be modified so as to reflect annual mean consumption in the expired 5 year period.

8.5 IT development and cost sharing

The part of the investment cost for an IT sub-system that is allocated to the Balancing Participants based on the allocation key shall be charged as an up-front payment, falling due on the date such sub-system becomes operational. Alternatively, the Balancing Parties may agree, if it is found to be more appropriate, that the investment cost shall form the basis for an annual charge which shall be financially fair, inter alia applying an appropriate depreciation rate.

Any involvement by Svk/SN or Fifty, as the case may be, in local implementation projects, shall be charged based costs (hourly rates plus to the extent not covered by the hourly rates, a reasonable administrative surcharge) plus a margin of 6%.

8.6 IT operation and maintenance, and cost sharing

All costs relating to operation and maintenance of common Nordic IT systems implementing or supporting the new balancing concept, shall be shared using the same allocation key as in art. 8.4. Annual cost is assumed to be in the 15-20% range of the total initial investment cost during the first five years.

8.7 IT - "software as a service" or on an embedded basis

As most IT services presumably will be made on a "software as a service" or embedded in a wider service, i.e. the operation of a market, the payments under art. 7.5 and 7.6 might be merged, into a single annual fee:

- (a) The investment/development cost shall be converted into an annual fee, payment starting on the date of a system becoming operational. The Balancing Participants shall pay their share of such fee, as determined by the allocation key in art. 8.4.
- (b) The cost of ICT operations and maintenance for the first five years of operation is determined to be the equivalent of an annual 15%-20% of the initial investment cost. The Balancing Participants shall pay their share of such fee, as determined by the allocation key in art. 8.4.
- (c) Additional investment cost of new common market services/functionality/sub-systems after initial go-live will be calculated and shared according to the principles above.

9. TERM AND TERMINATION – APPLICATION OF THIS AGREEMENT

9.1 The Agreement

This Agreement shall be in force from the time of signature of all Parties hereto. By signing this Agreement by all Parties, the Agreement in Principle between SvK, SN and EN of 13 October 2017 shall lapse without further notice or action.

The Operational Agreements, when they become effective over time, will contain more detailed provisions than this Agreement. Such provisions shall prevail over the provisions of this Agreement.

If a Party terminates his participation in the LFC Block Agreement or the New SOA, it shall from the same time his termination of the LFC Block Agreement has become effective, no longer be a party to this Agreement.

9.2 The Operational Agreements

The LFC Block Agreement and the New SOA shall be effective for a minimum period of 5 years from the time it has become operational.

After the expiry of the minimum period, a two-stage termination process shall apply, similar to the mechanism of art. 21 of the Current SOA. However, while the two notice periods shall remain 6 months for termination by a Balancing Participant, they shall be 12 months for termination by the Balancing Principals.

The other Operational Agreements, shall expire at the same time as the LFC Block Agreement, or as otherwise specifically specified in them.

9.3 Termination for cause

In the event of a Party becoming insolvent, permanently losing its status as a TSO or committing material breach of contract, which is not remedied in reasonable time after due notice has been given, the other Parties shall be entitled to terminate the first Party's participation in this Agreement. This principle shall also be reflected in the Operational Agreements.

9.4 Rights with respect to IT

A Balancing Party whose participation is terminated shall be granted a non-exclusive right to use software developed by Fifty relating to Nordic balancing, for use in its own organization, and to further extend or change such software, provided that it has paid its share of the relevant costs, as determined in accordance with art. 8.4, so that full cost recovery has been made.

The Balancing Party in question shall be able to reproduce the complete IT system for its own use by acquiring licenses for the suppliers' standard software, at his own cost.

The Balancing Party in question does not have the right to sell or license the developed software to a third party.

The procurement processes arranged by Fifty with software suppliers etc. shall provide for these rights.

10. AMENDMENTS

This Agreement, and/or the Operational Agreements, as the case may be, shall be amended from time to time as is necessary to comply with new EU/EEA regulations including network codes and guidelines, other regulatory developments, new knowledge and insights, changes in the Nordic power system, new markets and market practices etc. In all such amendments all main principles herein shall be retained to the extent they are not in conflict with such new legislation. The amendments shall be negotiated and agreed timely and efficiently.

All amendments to the Agreement shall be made in writing, signed by all Parties.

The Parties anticipate that the annexes to the New SOA will need to be updated frequently. The main body of the New SOA should stipulate an appropriate and effective process for developing and implementing such changes. The same principle shall apply to the LFC Block Agreement.

11. MISCELLANEOUS

11.1 Kraftnät Åland

KÅ has been certified as TSO for the Åland archipelago. It is connected with an AC line to the Swedish regional grid, and by a DC cable to the Finnish regional grid. KÅ has no tasks or functions with respect to balancing at the Nordic level, it being understood that these matters are currently handled by Svk.

For these reasons KÅ shall only have those rights and obligations hereunder (including in the implementation efforts under art. 5) that expressly include it, e.g. by the use of the term "Parties".

11.2 Liability

The Parties will only be liable to one another for damage resulting from gross negligence or willfulness.

None of the Parties will be able to hold any of the other Parties liable for lost revenues, consequential losses or other indirect losses, unless such damage has been caused by gross negligence or malice aforethought.

The provisions above shall also be included in the Operational Agreements.

12. LAW AND JURISDICTION

This Agreement shall be governed by Swedish law.

Should a dispute arise, the Parties shall initially attempt to resolve their conflict through negotiation. If this does not succeed, the dispute shall be conclusively be settled by arbitration in accordance with the Rules of the Arbitration Institute of the Stockholm Chamber of Commerce. The arbitration procedure shall take place in Stockholm.

The provisions above shall also be included in the Operational Agreements.

This Agreement has been executed in five originals, one for each Party.

Affärsvetket svenska kraftnät

Name:
Position:
Date:

Statnett SF

Name:
Position:
Date:

Energinet

Name:
Position:
Date:

Fingrid Oyj

Name:
Position:
Date:

Kraftnät Åland AB

Name:
Position:
Date:

The Nordic Balancing Concept (NBC) implementation roadmap

	Degree of implementation			
Phase	Step 1	Step 2	Step 3	Step 4
	2017	-	-2020	-~2022
Main deliverables/concepts/features	Preparation for MACE Implementation	Implementation of first generation MACE	Full Nordic implementation of MACE	European integration (NBC fully realized)
	<ul style="list-style-type: none"> Develop NSOA, reflecting NBC <ul style="list-style-type: none"> Including design mFRR capacity arrangements Detail balancing process mapping of target model Design aFRR markets and implement aFRR capacity market Nordic participation in ENTSOE development (incl. mFRR platforms) 	<ul style="list-style-type: none"> Develop and implement aFRR activation market <ul style="list-style-type: none"> First version of MACE control Design mFRR capacity and - activation markets Implement mFRR capacity arrangements Implement all required settlement solutions 	<ul style="list-style-type: none"> Implement full mFRR capacity and activation markets <ul style="list-style-type: none"> Full Nordic MACE control Prepare for integration with European platforms 	<ul style="list-style-type: none"> Connect Nordic platforms and markets to European counterparts
IT system implications	<ul style="list-style-type: none"> Develop IT architecture for NBC Responsibility for balancing functions in NOIS ACE calculation First version Nordic MMS (aFRR cap.) mFRR SE / NO local improvements (Electronic ordering and decision sup.) Better real time measurement and communication 	<ul style="list-style-type: none"> Second version Nordic MMS <ul style="list-style-type: none"> MACE enabled aFRR EAM mFRR MOL, imbalance prognosis Begin IT preparation for rotational work dispatch for balancing principals MACE enabled settlement solutions Phase out balancing functions in NOIS First version data analytics 	<ul style="list-style-type: none"> MACE enabled Nordic MMS <ul style="list-style-type: none"> Nordic mFRR CM Nordic mFRR EAM Full version data analytics Implementation of IT solutions for rotational work dispatch for balancing principals 	<ul style="list-style-type: none"> Integration of Nordic enabled MMS with European platforms for mFRR AOF and aFRR AOF
Organizational implications for Nordic TSOs	<ul style="list-style-type: none"> Prepare control rooms and personnel for the Nordic Balancing Concept / Begin control room alignment Review and implementation of new Nordic workgroup structure Ensure sufficient resources and competences for future needs 	<ul style="list-style-type: none"> Begin organizational preparation for rotational work dispatch for balancing principals Balancing Parties begins requesting aFRR activations Prepare and adjust for new TSO roles and responsibilities for all Balancing Parties 	<ul style="list-style-type: none"> Implement rotational work dispatch for balancing principals Balancing Parties begins requesting mFRR activations 	<ul style="list-style-type: none"> Continue with feedback loop between development and operation to ensure continuous improvement

1. The Initial aFRR Agreement

- 1.1 There are no changes to the market design in appendix 2 of the Initial aFRR Agreement. However, during implementation it might be appropriate to make some adjustments, e.g, due to implementation of the balancing concept in this Agreement, including MACE. In such event, all Balancing Parties shall be informed.
- 1.2 The scope for the aFRR capacity market solution remains unchanged, as defined in the mutually agreed tender documentation "Appendix 2 Annex 1 Requirement specification". However, during contract negotiations and /or in implementation it might be appropriate to make some adjustments. In such event, all Balancing Parties shall be informed.
- 1.3 SN or Svk, as the case shall be, shall be the Market Operator, without any review or rotation arrangements, other than as agreed between the Balancing Principals.
- 1.4 The cost sharing arrangements in § 5.1.6 of the main body of the Initial aFRR Agreement and item 2e of appendix 2 thereof, shall still apply for the specified period of three years from launch of the aFRR capacity market. However, they shall be reviewed, as provided for in the main body of the Initial aFRR Agreement, and then brought in line with this Agreement.
- 1.5 With respect to the language on page 7 under the heading "General":
- (a) It is agreed that EN and FG shall not participate in the procurement, which will be handled by Fifty on behalf of the Balancing Principals;
 - (b) It is acknowledged that a Nordic market for aFRR balancing services will be established, but it is not confirmed that EN and FG will participate as previously assumed. *[text depends on confirmation of participation]*
- 1.6 With respect to §6 of the main body of the Initial aFRR Agreement on changes to the Initial aFRR Agreement, the following shall apply:
- (a) The signing of this Agreement shall constitute an amendment of the Initial aFRR Agreement in all instances where the contents of the Initial aFRR Agreement are not compatible.
 - (b) All revision documents shall be prepared and determined by the Balancing Principals.
- 1.7 With respect to §9 of the main body of the Initial aFRR Agreement on entry into force of the Initial aFRR Agreement, the following shall apply:
- (a) The requirement for entry into force that all appendices and revision documents outstanding under the Initial aFRR Agreement have been finalized and approved by RGN, shall not apply. Instead, this shall be determined by the Balancing Principals, in compliance with the provisions of this Agreement.
 - (b) Regulatory approval in Norway is still required, with respect to Denmark and Finland ...*[text depends on confirmation of participation and national law]*
- 1.8 With respect to §11 of the main body of the Initial aFRR Agreement on termination of the Initial aFRR Agreement, the following shall apply:
- (a) The signing of this Agreement shall not be held to be a termination or repudiation of the Initial aFRR Agreement, only a modification thereof.
- 1.9 All Balancing Parties are responsible for own local integration activities towards the common solution.

2. Replacement of not completed appendixes of the Initial aFRR Agreement

2.1 **The aFRR activation market (appendix 3):** The aFRR activation market shall be prepared and determined by the Balancing Principals, in compliance with the provisions of this Agreement, both with respect to market design and implementation.

2.2 **Implementation agreement (appendix 4):** No such agreement shall be entered into.

The implementation project, including necessary procurement processes and ICT implementation, for establishing the aFRR capacity market shall be carried out by Fifty (with Statnett as the purchaser until Fifty has been incorporated) in close cooperation with the balancing organization to be established by the Balancing Principals, in order to assure high quality delivery of the new common aFRR capacity market. All initial funding of the implementation project shall be assumed by the Balancing Principals.

The implementation of the aFRR capacity market shall be governed by the ordinary provisions of this Agreement, unless otherwise determined in this attachment.

Governance : The existing aFRR steering group is discontinued.

IT implementation is the responsibility of the Fifty steering group.

With respect to decision-making, the governance provisions of the Agreement shall generally apply. As set out in art. 4.5 sixth para item (c), an "IT balancing forum" shall be established, which will also cover aFRR.

Any changes in market design etc. can be addressed by a sub-group with members with relevant experience and appropriate positions in their respective organizations in accordance with this Agreement.

2.3 **Hosting agreement (appendix 4):** Will not be covered as a separate agreement, the functions are to be included in the aFRR capacity market "embedded service".

2.4 **Market operator agreement (appendix 4):** The aFRR capacity market shall be made available by, the Balancing Principal holding the market operator role, to the Balancing Parties as an "embedded market service". The embedded market service includes common ICT solutions, including ICT operations, common support and common maintenance, as well as necessary market operator functions. The market operator role shall switch between the Balancing Principals, as determined by them, without any specific time restrictions.

2.5 **Financial agreement** (not contemplated in appendix 4, but discussed between the Balancing Parties): The matters that were to be addressed there, shall be governed by the ordinary provisions of this Agreement, and as provided below:

Cost sharing – cost of embedded market service: The fee to be paid by the Balance Participants to the market operator for making the aFRR capacity market available to them shall be agreed between the Balancing Principals and the Balancing Participants, and shall include the following cost elements:

- (a) The investment cost which is determined to be X – the Balancing Principals being accountable for any cost deviations - shall be converted into an annual fee. The Balancing Participants shall pay their share of such fee, as determined by the allocation key in art. 6.4.
- (b) In respect to the cost of ICT operation and maintenance the Balancing Participants shall be charged their respective share, and for the two first

- years of operation the equivalent of an annual 12-15 % of the initial investment cost.
- (c) Any additional development cost of new common market services/functionality after initial go-live will be calculated and shared accordingly to the principles above.
- 2.5 ***Technical product specification for delivery of aFRR and settings for frequency controller (appendix 5):*** Appendix 5 shall be prepared and determined by the Balancing Principals.
- 2.6 ***Implementation schedule (appendix 6):*** The implementation schedule for the aFRR capacity market shall be in accordance with Attachment 1 hereto. No appendix 6 will be prepared.

LIST OF ABBREVIATIONS AND DEFINED TERMS

Abbreviation	Explanation
aFRR	Automatic Frequency Restoration Reserves
ATC	Available Transfer Capacity
BRP	Balancing Responsible Party
BSP	Balancing Service Provider
FCR	Frequency Containment Reserve
LFC	Load Frequency Control
mFRR	Manual Frequency Restoration Reserves
NOIS	Nordic Operational Information System
RR	Replacement Reserve

Term	Reference
ACE	Art. 4.1
Agreement	Page 4
Balancing Participant	Page 3
Balancing Party	Page 3
Balancing Principal	Page 3
Current SOA	Art. 1
EB GL	Art. 1
EN	Page 3
FG	Page 3
Fifty	Art. 3 (h)
Initial aFFR Agreement	Art. 7.6
KA	Page 3
LFC Block Agreement	Art. 7.3
MACE	Art. 4.1
New SOA	Art. 7.3
Operational Agreements	Art. 7.4
Party	Page 3
Scandinavian LFC Block	Art. 1
SN	Page 3
SO GL	Art. 1
Svk	Page 3
Synchronous Area	Art. 1
TSO	Art. 1