Nordic Balancing model

Question: Does it exist some updated forecast regarding the need for ancillary services (short, medium and long term)?

Answer: This past Spring Svenska kraftnät presented a forecast for how demand for balancing services may evolve in the coming three years. The forecast is available here. Demand for FRR and for FCR-D is expected to increase. Svenska kraftnät may publish more outlooks later this year.

Question: The implementation of a common Nordic imbalance price is not specified in Svenska kraftnät's roadmap. When will this be implemented?

Answer: The calculation of the imbalance price will be revised when the Nordic TSOs join the MARI-platform. According to the NBM roadmap, this will happen in 2026.

Question: How does Svenska kraftnät work together with the other Nordic TSOs? Can you say something about the different forums you will have? Good to work cross-border.

Answer: Svenska kraftnät and the other Nordic TSOs work together in common projects and different expert groups, see Nordic Balancing Model (NBM). Also many methodologies required under European legislation must be developed at the Nordic (or European) level.

Question: Are intraday auctions included in the updated roadmap? Is it still three auctions per day that will be implemented or has the plan changed?

Answer: As per the current roadmap, intraday auctions will start during Q2 2024. Three daily auctions will complement continuous trading. Worth noting is that the market time unit (MTU) will still be 60 minutes. The transition to 15 minutes will be in Q1 2025.

Question: Regarding the European market. How many markets exist? Will the pricing stay Nordic or transition to a European? Have the prices in Europe been as volatile as in the Nordic?

Answer: There are different markets for trading in different timeframes, forward, day-ahead, intraday and balancing. For day-ahead trading, the Euphemia market coupling algorithm already links power exchanges across Europe. This means that day-ahead prices are not "Nordic". Closer to delivery participants adjust their physical positions in intraday markets. Intraday trading is also coupled across Europe. Balancing market are different in that they reflects the actions taken by TSOs to balance the system. The procurement of balancing capacity is likely to remain regional, but the activation of balancing energy will be done at European level. The MARI-platform for mFRR activation and the PICASSO-platform for

aFRR activation are already operational. The Nordic TSOs will be joining these platforms in 2026. At present liquidity on MARI and PICASSO is low but will improve as more TSOs join the platforms.

Question: When can we expect a Nordic FCR-market?

Answer: Svenska kraftnät and Energinet have set up a common market for the procurement of FCR balancing capacity. A pre-requisite for a common Nordic market are harmonised technical requirements. These common technical requirements have already been approved by the regulatory authorities and are currently being implemented. Another step towards Nordic integration is upcoming the move of FCR-procurement to a common Nordic platform IT-platform (Fifty Nordic MMS) during 2024. Fingrid and Statnett, however, are currently not planning to join the common procurement despite a pre-study from 2022 showing that the common Nordic procurement of FCR balancing capacity would be beneficial to all.

National mFRR capacity market

Question: Can you explain the reasoning behind the volumes of mFRR balancing capacity that will be procured for each hour?

Answer: Svenska kraftnät will be procuring smaller volumes in the early days of the mFRR capacity market. The procured volumes will vary over the hours of the day to reflect different needs for balancing actions. Svenska kraftnät will update these volumes as needed, and expects the procured volumes to increase over time.

Question: How will the mFRR need change over time?

Answer: Approximately 1000 MW are expected to be procured by the turn of year 2024/2025. The amount of mFRR needed will be determined by the need to cover the reference incident (single largest incident) of the control area. However, not all of this amount will be procured in the capacity market, as Svenska kraftnät has the option to activate voluntary (non-contracted) mFRR balancing energy bids closer to delivery.

Question: The minimum capacity market bid is 1MW but the minimum energy market bid is 5MW. How does this work?

Answer: The minimum bid size for mFRR-balancing energy will be reduced to 1 MW in Q1 2025 when mFRR EAM. The automated activation process is a requirement to handle smaller bids. Until then, the minimum bid size will remain at 5 MW for mFRR energy bids except for participants in the 1MW-pilot that are allowed to bid smaller quantities.

Question: Will mFRR balancing capacity be procured for purposes other than balancing?

Answer: mFRR balancing capacity will be procured to reflect balancing needs per bidding zone. The needs of a bidding zone can partly be covered by bids from another bidding zones, so a more specific geographic location of the bid is not

required. Svenska kraftnät has the option to request more specific locational information – needed to resolve system constraints - but the option will not be exercised in the near future.

Please note that mFRR-balancing energy bids do include more precise locational information as bidding is per “reglerobjekt”. mFRR balancing energy bids are currently used for purposes other than balancing, and this will continue in the future.

Question: What is the demand for mFRR in each bidding zone?

Answer: In the longer term, the procured volumes will reflect the mFRR need will in each bidding zone and for each hour. Daily dynamic dimensioning will be combined with a forecast for voluntary (non-contracted) mFRR balancing energy bids. The mFRR need is likely to vary considerably on a daily basis, and it will likely be larger in southern Sweden.

Question: Will the capacity market volume be connected to the reference incident in each price area (largest error in each price area)?

Answer: The mFRR need of a bidding zone will indirectly reflect the reference incident of the bidding zone. However, dimensioning takes into account that balancing capacity can be used in more than one bidding zone and that bidding zones do not have to be self-sufficient. Dimensioning does not consider the case in which the reference incident occurs in all bidding zones at the same time.

Question: Does Svenska kraftnät have any views on prices in SE4. How price sensitive are you?

Answer: the maximum bid price for mFRR balancing energy is currently to 10 000 euro/MWh in all bidding zones. Svenska kraftnät believes increased liquidity as the mFRR balancing capacity market matures will lead to lower and less volatile prices. The mFRR needs of a bidding zone can be covered by bids from other bidding zones. If enough transmission capacity is available to accommodate all trades, the price will be the same in both bidding zones. But if transmission capacity needs to be allocated price differences will arise, as they also do in other markets.

Question: What is the difference between a national and Nordic capacity market? Will transmission capacity be reserved already with the national capacity market?

Answer: The exchange of mFRR balancing capacity between bidding zones within Sweden requires transmission capacity. Transmission capacity between Swedish bidding zones will be reserved if it is socioeconomically beneficial.

Question: How is mFRR financed?

Answer: Costs for mFRR-balancing energy are borne by balance responsible parties. Costs are included in the imbalance price. Costs for mFRR-balancing capacity will be included in the transmission tariff (40%) and in the balancing responsible party fee (60%).

Question: Is the level of the balancing responsible party fee different in the different bidding zones?

Answer: The approved structure of the balancing responsible party fee doen no consider bidding zones. It takes into account the size of a balance responsible party´s portfolio and its imbalances. For more information please refer to eSett Oy's handbook.

Development of FCR

Question: What is the forecast for FCR and FFR demand? What are Svenska kraftnät's thoughts incidents larger than N-1 incidents that have occurred in the past?

Answer: The amount of FCR balancing capacity to be procured to cover the need of the Nordic synchronous area is determined following the dimensioning rules for FCR approved by the relevant national regulatory authorities. FCR-D is dimensioned to be at least equal to the imbalance caused by the reference incident. The reference incident is calculated from the N-1 error, the largest change in power expected in case of a disturbance. Historically, errors larger than the reference incident have occurred, but the dimensioning rules take into account how often these larger incidents occur and whether it is reasonable to procure reserves for extreme events. For more information please refer to the approved methodology for the dimensioning rules for FCR. There are no plans to update this methodology.

A long-term forecast of FFR demand is under development.

Question: Will it be different prices for static and dynamic FCR-D?

Answer: Static and dynamic FCR-D resources will bid into the same market where all successful bidders are awarded the price of the most expensive bid accepted (pay-as-clear or marginal pricing). However, incentives to provide the higher quality product dynamic FCR-D are in place given that there are restrictions on the share of the procured volume that can come from static FCR-D. The volumes of dynamic FCR-D are not limited.

Question: Why does Svenska kraftnät not publish data on specific bids and marginal prices? Is Svenska kraftnät planning to publish historical prices for the most expensive accepted FCR bid before the transition to marginal pricing?

Answer: The Energy Markets Inspectorate has approved a request from Svenska kraftnät to withhold the publication of information on offered prices and volumes of balancing capacity or balancing energy bids. This is justified by a lack of competition and market abuse concerns. Svenska kraftnät reports such withholdings at least once a year to the Energy Markets Inspectorate. At present, there are no plans to publish historical data but Svenska kraftnät will be looking into this in the near future.

Question: How will the repurchase of FCR after gate closure of the second auction work when marginal pricing is intrduced?

Answer: Pricing of repurchases that happen after gate closure of the second auction will not change with the introduction of marginal pricing. Today, the repurchase price is given by the highest of the marginal price of the first and second auctions or the price for any special trade needed to replace the missing volume, if the repurchase occurs after the second auction has been completed (during D-0).

Question: Can bids on FCR-D down- and up be linked?

Answer: No, and there are no plans to implement this in the future.

Question: How will Svenska kraftnät distinguish between FCR prequalified with new and old requirements and between dynamic and static?

Answer: In the future, bids for FCR-D will have to contain information on product type "static" or "dynamic". This feature will be implemented in the Fifty Nordic MMS platform. When accepting a bid, Svenska kraftnät does not take into account under which prequalification regime the resources that are included in a bid have been approved. All resources will eventually be prequalified under the recently approved technical requirements.

Question: Will FCR-N be traded separately (for up and down) as FCR-D in the future?

Answer: Current Nordic technical requirements for FCR include a symmetrical FCR-N product (symmetrical = equal amounts of up- and downregulation). For more information on future plans please refer to Svenska kraftnät's approved derogation from procuring FCR-N upward balancing capacity and downward balancing capacity separately.

Question: Is the FCR market planning to transition to a Nordic market?

Answer: Svenska kraftnät sees advantages in a Nordic common procurement of balancing capacity. A common Nordic pre-study on the subject has been carried out but at present Fingrid and Energinet have no plans to join the Danish-Swedish capacity market for FCR.

BSP/BRP

Question: Apart from "elleverantörsproblemet" (rebound effect) described in the material, what challenges can you see?

Answer: The two main challenges Svenska kraftnät is working to resolve are presented on slide "Indirekta gränssnitt – BSP/BRP". The first challenge is how to make the BRP aware close to real time that an independent BSP is delivering balancing services from resources in the BRP's portfolio. The other challenge is how to verify the BSP's delivery for the purposes of imbalance adjustment of the BRP and settlement of the BSP.

Question: The continuous monitoring of the actual delivery (from all units/groups) will be a large task. How will this be handled?

Answer: The details have not been specified yet. Monitoring and verification will be discussed with market participants in the coming weeks.

Question: Is the BSP harmonised in the Nordic and is there Nordic IT-support to handle this?

Answer: The Nordic TSOs as well as the Nordic regulatory authorities have either made different interpretations of the requirements of European regulation or have decided to implement the requirements at a different pace. So there will be no Nordic harmonisation in the near future. There are no common Nordic IT-systems to implement the independent BSP role and national IT-systems vary greatly. For instance, Sweden does not have an electricity market data hub.

Question: Who is responsible to report which BRP is responsible for a specific resource? How is the flow of information handled if an error is discovered?

Answer: The details are under development. Concerning who will report to Svenska kraftnät which BRP is responsible for a certain resource it will likely be the BSP during the prequalification of the resource. The requirement to disclose correct information to Svenska kraftnät will likely have to part of the agreement between the BSP and the owner of the resource. How errors will be handled is under investigation.

Question: Will it be possible for one stakeholder to be both BRP and BSP.

Answer: Yes, but all the necessary agreements for the two separate roles BSP and BRP will need to be signed.

Question: How often is the settlement calculated?

Answer: Daily.

Question: Are Svenska kraftnät still working on a prequalification responsible party?

Answer: No. According to current EU-regulation the BSP is responsible for the prequalification process and for complying with all technical requirements set out during prequalification. Unless European regulation changes, Svenska kraftnät will not consider a “prequalification responsible party” different from a BSP.

Question: When will the new agreement for BSP/BRP be published?

Answer: Svenska kraftnät expects to start consulting the proposals for the future BSP- and BRP-agreements mid-December before the holidays. The final agreements will be published one month before the agreements will enter into force at the latest.

Question: Will the work with the electricity market data hub be resumed in the future?

Answer: The development of an electricity market data hub is a political decision. Svenska kraftnät has made clear to the Swedish government that a data hub would be of great benefit for the efficient functioning of electricity markets. The other Nordic countries all have functioning data hubs. For more information please refer to (in Swedish): Elmarknadshubben | Svenska kraftnät (Svenska kraftnät.se).

Question: How will it work when a resource has different BSPs (for instance, a BSP handles the solar PV and another one the battery)?

Answer: The details of such an arrangement will likely be decided during prequalification and rely on data provided by the BSPs.

Question: How will a BRP get access to the information regarding the imbalance adjustment?

Answer: Svenska kraftnät will carry out the BRP's imbalance adjustment based on the data (delivered MWh per BRP) provided by the BSP. BSPs will be required to store data for 90 days, and this data will be used to resolve conflicts. Svenska kraftnät expects the owners of the resources to play an important role in this, as the resource owner will have agreements with both the BSP and the BRP.

Question: How do Svenska kraftnät view the fact that this worsen the conditions for take and pay agreements?

Answer: Take and pay means that the supplier will be paid only for the actual supplied energy. Svenska kraftnät sees positively that incentives to provide flexibility reach those that can provide flexibility.

Development of the mFRR energy activation market

Question:How many large BSPs will participate in Svenska kraftnät's accessnätspilot?

Answer: Svenska kraftnät is in contact with 2-3 BSPs but aims for at least 5-6 in the future. All BSPs be will be offered to join the pilot, however but pilot will focus on larger BSPs. Svenska kraftnät is analyzing how to proceed.

Question: In the future, can a BSP bid into the market but the activation signal goes to another market participant?

Answer: No. This is not possible today and is not part of the scope of the upcoming mFRR EAM.

Question: When Svenska kraftnät joins MARI, how will the activation of mFRR over HVDC-cables work?

Answer: HVDC-cables will ramp up according to the ramping requirements of the mFRR standard product. This means that mFRR providers will have to follow the ramping requirements of the mFRR standard product, otherwise imbalances will arise.

Conclusion and final questions

Question: It is 5 years since the EU-regulation about system operation (SO) took effect on September 14. How have the prequalification work played out?

Answer: Providers of balancing services (FCR, aFRR and mFRR) active with multiple resources when the SO-regulation entered into force were given an action plan describing the steps to be taken to prequalify a minimum number of resources before a given deadline. Svenska kraftnät also saw the need to develop a simplified prequalification process available to some resources in order to ease bottlenecks and spread complete prequalifications over a longer period of time, as complete prequalifications take time. Overall this has worked out well.

Question: Will the BSP/BRP deadline of May 17, 2024 be upheld?

Answer: The May 17th deadline has been set by the Energy Markets Inspectorate and cannot be changed by Svenska kraftnät. Svenska kraftnät will start the qualification of BSPs and prequalification of resources according to the new rules without undue delay. More information will be published on Svenska kraftnät's website as soon as it is available.

Question: A prerequisite to supply aFRR today is a fiber connection to Svenska kraftnät. Is a simplified solution still under way?

Answer: Simplifications will not be possible until aFRR is activated based on the Area Control Error (ACE) in the respective bidding zone instead of using the system frequency as today. ACE-based balancing will be implemented before Svenska kraftnät joins PICASSO in 2026.

Question: How large is the largest possible FCR-resource that can be prequalified?

Answer: The maximum volume of FRC-N and FCR-D is restricted to 70MW in both up- and down regulation (in every connection point). If FCR-N and FCR-D are supplied at the same time, the combined delivery cannot exceed 100MW for up- or downregulation.

Question: How can Europe harmonise balancing markets when the needs and conditions look very different in different countries?

Answer: The main purpose of allowing trade of balancing energy across borders is to contribute to a common social benefit while enabling a continued reliable balancing in all of Europe. All buyers on the European balancing platforms (TSOs) must contribute with an amount of balancing energy equal to their historic

demand. In other words, it is not possible to join the platforms and completely rely on the resources of other countries.

Question: Where will market information be published in the future? Does plans of a Nordic solution exist (beyond NUCS)?

Answer: A pilot study for a new publishing platform for Sweden is under way, but market information will continue to be published to Mimer and NUCS in the near future. Price and volume data for the Swedish mFRR capacity market will be initially published to NUCS. Publishing to Mimer may start at a later stage.