Application for the provision of Fast Frequency Reserve (FFR) and reporting of test results

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| Summary |
| Date (yyyy-mm-dd) |  |
| Name of unit/group*Please note that the name should be chosen independently from BSP name, capacities and other constraints that might change over time.* |  |
| Bidding area | [ ]  SE1 [ ]  SE2 [ ]  SE3 [ ]  SE4 |
| Background to the application | [ ]  New application [ ]  Periodic reassessment[ ]  Substantial change | Describe any substantial change |  |
| Company details |
|  | Applicant company  | Subcontractor (if applicable) |
| Company name |  |  |
| Corporate ID number |  |  |
| Ediel ID |  | N/A |
| Address |  |  |
| Contact person name |  |  |
| Contact person tel. |  |  |
| Contact person e-mail |  |  |
| Information on reserve |
| Specify the type of reserve | ☐ Unit[[1]](#footnote-1) ☐ Group[[2]](#footnote-2)  |
| Type of installation | ☐ Production ☐ Consumption ☐ Energy storage |
| Specify the type of energy reserve | ☐ Unlimited energy reserve ☐ Limited energy reserve (LER) |
| Activation time at corresponding activation level (frequency) | [ ]  0,7 seconds at 49,5 Hz [ ]  1,0 seconds at 49,6 Hz [ ]  1,3 seconds at 49,7 Hz |
| Endurance time  | [ ]  Long, at least 30 seconds [ ]  Short, at least 5 seconds |
| Test method | [ ]  Test method 1 [ ]  Test method 2 |
| Test sequence | ☐ Step response test ☐ Ramp response test |
| Measure accuracy for active power[[3]](#footnote-3) | [ ]  Category 1 [ ]  Category 2 [ ]  Category 3 |
| Will type qualification be used? Note that additions are possible to the upcoming contract period.  | [ ]  Yes [ ]  No |
| If the unit or group is covered by the RfG: are the requirements for power generation modules according to RfG 13.1.a.i and 13.1.b fulfilled? |  |
| If the unit or group is covered by the RfG: are the requirements for power generation modules according to RfG 13.1.a.i and 13.1.b fulfilled? | [ ]  Yes [ ]  No [ ]  Not applicable |
| Capacities applied for |
|  | Requested maximum capacity (MW) | Requested minimum capacity (MW) |
| FFR |  |  |
| Indicate whether FFR is already prequalified by the applying company.  | [ ]  Yes [ ]  No  |

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| Information about confidentiality |
| All information submitted to a government agency is treated in accordance with the principle of public access to official documents. This means that anyone can request a copy of the information submitted to Svenska kraftnät, unless it is classified. It is likely that information in this application will be requested. Any applicant company that is of the opinion that information it has provided in the prequalification application fulfils the conditions for commercial confidentiality (Chapter 31, Section 16 of the Public Access to Information and Secrecy Act (2009:400) on business and operating relationships) must clearly provide a request for confidentiality. Such a request must specify the information covered by the request for confidentiality and the harm that would be caused to the requesting company if the information were to be disclosed. Svk always performs a confidentiality assessment in connection with a request for information, but cannot guarantee that a request for confidentiality will not lead to disclosure of the document. A confidentiality decision may also be subject to judicial review. The applicant company does not have the right to review the confidentiality flags prior to each disclosure. Also note that the application evaluation will partially be done according to common Nordic requirements and that Svenska kraftnät may therefore need to discuss interpretations of rules and development of new requirements with their Nordic counterparts. The same confidentiality assessment will apply in the Nordic collaboration. |
| The applicant company requests that parts of the application be subject to confidentiality: | [ ]  Yes [ ]  No |
| Specify the information and data deemed sensitive that the applicant company wishes to be subject to confidentiality. Refer clearly to specific paragraphs, bullet points, etc., in application documents and appendices. |
|  |
| Give reasons for and describe the harm that may result from the disclosure of the information specified above. |
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| Description of the unit/group  |
| Indicate the resource(s) included in the unit or group in Table 1. If more than 3 separate units are included, please attach a separate unit list containing the information requested below. |
| Table 1. | Unit 1 | Unit 2  | Unit 3 |
| Name |  |  |  |
| Unit owner |  |  |  |
| Facility-ID[[4]](#footnote-4) |  |  |  |
| Balance responsible party (BRP) at the delivery point |  |  |  |
| Rated power[[5]](#footnote-5) [MW] |  |  |  |
| Provide a description of the unit/group, including information on the production type, consumption type or energy storage type.  |
|  |
| Specify any technical data that may be significant when assessing the application. The following are examples of such information. The corresponding technical data must be provided for types of resources other than those listed below. |
| Turbine rated power [MW] |  |
| Turbine inertia constant H [MWs/MVA] |  |
| Hydro power plant: hydraulic head [m] |  |
| Converter connected unit: Converter type (DFIG, full power converter etc.) |  |
| Nominal wind speed of the wind turbine [m/s] |  |
| Maximum, Pmax, and minimum, Pmin, possible power output [MW] |  |
| Upper and lower limits for energy storage (state of charge) [MWh] |  |
| Nominal apparent power [MWA] |  |
| Please provide any other technical data relevant to the application. |
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| Aggregation |
| If the application is for a group or an aggregated unit (consisting of several smaller units behind different or the same grid connection point), describe the aggregation system (note that changing the aggregation of units within a group must be approved by Svenska kraftnät). |
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| Activation and deactivation of FFR |
| Are there any delays in activation or deactivation? If **Yes**, what are these caused by?  | [ ]  Yes [ ]  No |
|  |
| Describe how the activation, deactivation and recovery of the resource occurs. |
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| Limitations in energy reservoir | Are there limitations of the energy reservoir? | [ ]  Yes [ ]  No |
| Describe any limitations in the energy reserve of the unit or group providing the FFR (e.g. duration and recovery time). Include strategy for recovery.For batteries, a strategy must also be included for how the batteries should be kept at the right temperature in order to be able to deliver during the scheduled hours. |
|  |
| Describe the consideration of limitations in the energy reserve that will be taken into account for how often FFR bids can be submitted. |
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| Describe how the endurance has been calculated. |
|  |
| Describe how available capacity is calculated. Also describe strategy for bidding. |
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| Control system  |
| Describe how the FFR setpoint is calculated from measured frequency. Include, for example, computational algorithms and signal processing. |
|  |
| Provide a technical description and block diagram of the governor/relay structure, including controller parameter settings. Include power measurement and frequency measurement in the block diagram and explain the designations introduced. * If more ancillary services are provided from the reserve, include a general description of how the other ancillary services are controlled.
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| Does the unit or group have the capacity to provide several ancillary services simultaneously (e.g. FCR, FFR, FRR, FSM, LFSM)? If **Yes**: describe how the combined delivery is managed on the basis of the questions below. | [ ]  Yes [ ]  No |
| Describe how the transfer, if any, between control parameters for the different ancillary services takes place, and whether there is any delay in the transition between control parameters |  |
| Describe the ability to switch individual deliveries on and off |  |
| Describe the method of ensuring that capacity is available for all procured ancillary services |  |
| Calculation of power baseline and forecast bidding capacity (this section only applies to variable resources) | Does the power from the unit or group vary depending on ambient conditions or other external factors? If **No**, go to 3.6. | [ ]  Yes [ ]  No |
| Describe what causes the power variations and how they vary over time[[6]](#footnote-6). |
|  |
| Describe how the power variations of the unit or group are managed during bidding to ensure sufficient capacity. This description must include a clear explanation of why bidding took place during certain hours and not others, which can be substantiated in the data submitted.* What forecasts are used?
* How accurate are the forecasts?
* What margin is used?
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|  |
| Describe how the power fluctuations of the unit or group are managed during operation:* Describe in detail how the power baseline is calculated.
* Whether there are periods when the power baseline is more or less accurate, etc. How is this handled?
* Indicate whether any method is used to improve the power baseline and how it is implemented.
* Describe whether any power baseline reduction factor is used and how it is calculated.
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| Registration and calculation of measurements  |
| Describe how power and frequency are measured and if there are factors that affect the measurements. Report the entire measurement chain including time delays and any limitations on the recording of measurement values.  |
|  |
| Enter values for recording and measurement of data according to Table 2, and also attach supporting documentation. Calibration logs and data sheets are examples of such documentation. |
| Table 2. | Accuracy | Resolution | Sampling time logged data  | Sampling time data recording |
| Instantaneous active power | % | MW | s | s |
| Measured frequency | mHz | mHz | s | s |
| Describe the time source on which measurement time stamps are based.  |
|  |
| Specify which reference source is used for synchronization and how the synchronization is performed. |
|  |
| Specify the time zone used for time stamping when measurements are logged | [ ]  UTC [ ]  CET/CEST  | Specify any other time zone |  |

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| Test result reporting  |
| Specify the date of the tests |  | Specify the time of the tests |  |
| Specify the location for the tests |  |
| Describe the general operating conditions at the time of the tests, and include a brief description of how the operating conditions can be expected to have affected the test results. |
|  |
| Information on staff involved in testing:  |
| Name | Function | Organisation |
|  |  |  |
|  |  |  |
|  |  |  |
| Test method  |
| Describe the test method |
|  |
| Has Svenska kraftnät approved any exceptions related to the implementation of the tests?* If Yes, describe the exception.
 | [ ]  Yes [ ]  No |
|  |
| Specify the time zone of the logged data during the test.  |  |
| Indicate the settings and control parameters applied during the tests in Table 3: |
| Table 3. | Maximum test [MW] | Middle test [MW] | Minimum test[MW] |
| $P\_{max}$ [[7]](#footnote-7) |  |  |  |
| $P\_{min}$ [[8]](#footnote-8) |  |  |  |
| Set point active power[[9]](#footnote-9) |  |  |  |
| Expected capacity FFR |  |  |  |
| Has special equipment been used for the tests? If **Yes**: describe the equipment.  | [ ]  Yes [ ]  No |
|  |
| Enter information for the measuring instruments used during the tests in Table 4. Cells containing the same values as those in Table 2 can be marked with a line (-). |
| Table 4. | Accuracy | Resolution | Sampling time |
| Instantaneous active power | % | MW | s |
| Available capacity | N/A | MW | s |
| Measured frequency | mHz | mHz | s |
| Applied frequency signal | mHz | mHz | s |
| Test results |
| Enter the calculated setpoint, activation time, endurance, recovery time and power difference in Table 5. Unused fields can be omitted. |
| Table 5. | Test | Set point [MW] | Activation time [ms] | Endurance [min:ss] | Time until FFR is available again [min:ss] | ΔP after activation [MW] |
| * Maximum test
 | 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| Middle test  | 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| * Minimum test
 | 1 |  |  |  |  |  |
| 2 |  |  |  |  |  |
| Summary of results in table 6.  |
| Table 6 | Maximum test[[10]](#footnote-10) [MW] | Middle test[[11]](#footnote-11) [MW] | Minimum test[[12]](#footnote-12)[MW] |
| FFR capacity[[13]](#footnote-13)  |  |  |  |

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| Real time telemetry setup |
| Describe how real time measured values ​​are delivered to Svenska kraftnät.For the 2025 procurement, no real time communication with Svenska kraftnät is required. Until otherwise notified, the supplier must instead continuously log measurement values ​​and subsequently submit these values ​​to Svenska kraftnät for verification in accordance with the separate instruction "Real time reporting of measurement values ​​for units and groups that supply FFR". |
|  |
| Indicate whether any of the signals have a slower underlying refresh rate than the real-time reporting. |
|  |
| Specify how often the capacity calculation is updated. |
|  |
| Specify the point number (ID) used in the real time measurement reporting setup in Table 6, if applicable.Table 7. Signals for reporting real time measurements |
| **Signal** | **ID** |
| Date and time preferably UTC, otherwise please indicate what is used |  |
| Activated FFR capacity (0 or 1, where 1 indicates activated FFR) |  |
| Status indicating if FCR-D down is on or off |  |
| Measured active power [MW] |  |
| Reference power [MW] |  |
| Maximum power[MW] |  |
| Minimum power [MW] |  |
| Available capacity FFR [MW] |  |
| Regulating strength FCR-N [MW/Hz]  |  |
| Remaining endurance FFR (minutes)11  |  |
| Measured grid frequency [Hz] |  |
| Measured state of charge [%] |  |

## References

[1] Technical Requirements for Fast Frequency Reserve Provision in the Nordic Synchronous Area – External document.

## Appendix

*Additional information that may be relevant to the application, such as equations, control systems or descriptions of the reserve, can be included below.*

*Report calculation of capacity for FFR using the formula below:*

𝐶FFR= 𝑚𝑖𝑛(𝑎𝑏𝑠(𝑃(𝑡)−𝑃(0))) [MW]

1. See the definition of a unit providing reserves indicated in Article 3 of Regulation (EU) 2017/1485. [↑](#footnote-ref-1)
2. See the definition of a group providing reserves indicated in Article 3 of Regulation (EU) 2017/1485. [↑](#footnote-ref-2)
3. Categories for measurement accuracy is stated in the test program. [↑](#footnote-ref-3)
4. Information on facility-ID is found on each electricity grid invoice and is used to identify the facility. [↑](#footnote-ref-4)
5. Highest power potential [↑](#footnote-ref-5)
6. This includes all variable resources. [↑](#footnote-ref-6)
7. Maximal possible power at the time for the test. [↑](#footnote-ref-7)
8. Minimal possible power at the time for the test. [↑](#footnote-ref-8)
9. Set point means active power when no delivery of FFR has happened. [↑](#footnote-ref-9)
10. Refers to maximum achieved capacity from a unit or group providing FFR. [↑](#footnote-ref-10)
11. Refers to tests for capabilities in the middle of the capability range from a unit or group providing FFR (if prequalification tests refer to a range). Test in the middle of the capacity range is required if maximum FFR capacity exceeds 10 MW. [↑](#footnote-ref-11)
12. Refers to minimum achieved capacity from a unit or group providing FFR. [↑](#footnote-ref-12)
13. Equation for calculating capacity can be found at the bottom of the application form for FFR. [↑](#footnote-ref-13)