Application for the provision of Automatic Frequency Restoration Reserve (aFRR) and reporting of test results

|  |
| --- |
| 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 (BSP/potential BSP) | 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) |
| Voltage level for grid connection  | [ ]  Low voltage grid (400/230 V) [ ]  Medium voltage grid (10–50 kV)[ ]  High voltage grid (70-130 kV) |
| Transmission grid/Network area([www.natomraden.se](http://www.natomraden.se)) | [ ]  Connected to the transmission grid [ ]  Network area:  |
| 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 |
|  | Applied for | Requested maximum capacity (MW) | Requested minimum capacity (MW) |
| aFRR upregulation | [ ]  |  |  |
| aFRR downregulation | [ ]  |  |  |
| Indicate if the BSP is new provider of aFRR (do not have any units or groups that deliver aFRR)[[3]](#footnote-3) | [ ]  Yes [ ]  No  |
|  |

|  |
| --- |
| 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. |
|  |

|  |
| --- |
| 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] |  |  |  |
| Regional grid |  |  |  |
| Local grid (if occurring)  |  |  |  |
| Provide a description of the unit/group, including information on the production type, consumption type or energy storage type.  |
|  |
| Specify any technical information that may be significant when assessing the application. The following are examples of such information. The corresponding technical information 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 [MVA] |  |
| Please provide any other technical information relevant to the application. |
|  |
| 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). |
|  |
| Activation of aFRR |
| Are there any delays in activation? If **Yes**, what are these caused by?  | [ ]  Yes [ ]  No |
|  |
| Describe how activation and recovery of the resource occurs.  |
|  |
| Limitations in energy reservoir | Are there limitations of the energy reservoir? | [ ]  Yes [ ]  No |
| Describe and give reasons for limitations of the energy reservoir for the unit or group providing aFRR (e.g. duration, recovery time, and any SOC limits).  |
|  |
| Describe the consideration of limitations in the energy reserve that will be taken into account in terms of how often aFRR bids can be submitted. |
|  |
| Explain how endurance is calculated.  |
|  |
| Explain how available capacity is calculated. |
|  |
| Control system  |
| 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.
 |
|  |
| Describe method to ensure that intended amount of aFRR is activated. |
|  |
| If aFRR is activated with a fixed ramp rate, explain the ramp rate for activation and deactivation. |
|  |
| 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 |  |
| 3.5. Calculation of capacity and forecasted bid capacity (this section only applies to variable resources) | Does the output from the unit or group vary depending on ambient conditions or other external factors? If **No** go to 3.7. | [ ]  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?
 |
|  |
| 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.
 |
|  |
| Registration 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 |  |

|  |
| --- |
| 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 for testing. |  |
| Specify settings and control parameters applied during the tests in Table 3: |
| Table 3.  | Active power  |
| aFRR up  | $P\_{0}$ [MW][[7]](#footnote-7) |  |
| $P\_{up}$ [MW][[8]](#footnote-8) |  |
| $P\_{max}$ [MW][[9]](#footnote-9) |  |
| $P\_{min}$ [MW][[10]](#footnote-10) |  |
| Expected capacity aFRR up [MW] |  |
|  |
| aFRR down  | $P\_{0}$ [MW] |  |
| $P\_{down}$ [MW] |  |
| $P\_{max}$ [MW] |  |
| $P\_{min}$ [MW] |  |
| Expected capacity aFRR up [MW] |  |
| 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 3 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 result |
| Table 5. Results of the capacity test for aFRR down regulation. The step numbering follows the definition in the test program. If the application concerns a maximum capacity aFRR < 10 MW, the sequence is adapted, see Appendix 1 in the test program. |
| Table 5 | Step  | $∆T\_{max}$ [mm:ss][[11]](#footnote-11) | $∆P\_{max}$ [MW][[12]](#footnote-12) | $∆T\_{min}$ [mm:ss][[13]](#footnote-13) | $∆P\_{min}$ [MW][[14]](#footnote-14) |
| aFRR up | 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
| 8 |  |  |  |  |
| 9 |  |  |  |  |
| 10 |  |  |  |  |
| 11 |  |  |  |  |
| 12 |  |  |  |  |
|  |
| aFRR down | 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
| 8 |  |  |  |  |
| 9 |  |  |  |  |
| 10 |  |  |  |  |
| 11 |  |  |  |  |
| 12 |  |  |  |  |

|  |
| --- |
| Real time telemetry setup |
| Describe how real time values are communicated to Svenska kraftnät. |
|  |
| 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 6. Signals for reporting real time measurements |
| **Signal** | **ID** |
| Date and time  |  |
| Status indicating if aFRR upwards is on or off and indicating if aFRR regulation is allowed  |  |
| Status indicating if aFRR downwards is on or off and indicating if aFRR regulation is allowed |  |
| Instantaneous measured active power per unit/group [MW] |  |
| Received aFRR setpoint per power area [MW] |  |
| Received aFRR setpoint per unit/group [MW] |  |
| Reference power per unit/group [MW] |  |
| Maximum power per unit/group[MW] |  |
| Minimum power per unit/group [MW] |  |
| Maintained capacity aFRR up regulation per unit/group [MW] |  |
| Maintained capacity aFRR down regulation per unit/group [MW] |  |
| Maintained capacity aFRR up regulation per electricity area [MW] |  |
| Maintained capacity aFRR down regulation per electricity area [MW] |  |
| Remaining endurance aFRR up regulation (minutes) |  |
| Remaining endurance aFRR down regulation (minutes) |  |
| Instantaneous delivered aFRR up regulation [MW] |  |
| Instantaneous delivered aFRR down regulation [MW] |  |

## References

|  |  |  |  |
| --- | --- | --- | --- |
|   |

|  |  |
| --- | --- |
| [1]  | *Tekniska villkor för förkvalificering och leverans av aFRR,* 2023-12-20.  |

 [2] *Rapportering av data aFRR 2.0,* 2024-01-08. |

## Appendix

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

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. In order to be able to deliver reserves as a BSP, you also need to be responsible for the balance in the delivery point (input and/or withdrawal point) that is intended to be used to deliver the reserve, and thus have a valid Agreement on balance responsibility for electricity. [↑](#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. Set point active power before activation of aFRR up regulation. [↑](#footnote-ref-7)
8. Set point active power before activation of aFRR down regulation. [↑](#footnote-ref-8)
9. Highest possible power at the time the test is performed. [↑](#footnote-ref-9)
10. Lowest possible power at the time the test is performed. [↑](#footnote-ref-10)
11. Time for each step in the activation sequence for aFRR at maximum test. [↑](#footnote-ref-11)
12. Active power for each step in the activation sequence for aFRR at maximum test. [↑](#footnote-ref-12)
13. Time for each step in the activation sequence for aFRR at maximum test. [↑](#footnote-ref-13)
14. Active power for each step in the activation sequence for aFRR at minimum test. [↑](#footnote-ref-14)