Unofficial translation

Fingrid Oyj

Terms and conditions for providers of Fast Frequency Reserves (FFR)

Valid from 4 May 2020

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1 Introduction

This document specifies Fingrid Oyj's (hereinafter Fingrid) terms and conditions for the suppliers of reserve services (hereinafter Balancing Service Provider) for the control of low-inertia conditions in the electricity system.

The Fast Frequency Reserve (FFR) is a reserve that ensures that the loss of an individual electricity production unit or HVDC link will not cause the frequency to fall below 49.0 Hz. The reserve is procured when the amount of inertia so requires.

The terms and conditions for the procurement and maintenance of the Fast Frequency Reserve shall apply when the Balancing Service Provider participates in the FFR Market.

Fingrid has the right to publish the names of the Balancing Service Providers that participate in the FFR Market.

2 Definitions

The following definitions are used in this document:

Capacity Fee refers to the compensation paid by Fingrid to a Balancing Service Provider for maintaining the reserve.

Day-Ahead Market refers to an electricity market place that trades in electricity sold and purchased for the next day.

Fast Frequency Reserve (FFR) is a reserve used for controlling low inertia conditions.

FFR Market refers to a reserve market maintained and used by Fingrid for the procurement of the Fast Frequency Reserve for the next day in the CET time zone and timed after the Day-Ahead Market.

FFR Market Agreement refers to an agreement between Fingrid and a Balancing Service Provider on the provision of a Fast Frequency Reserve (FFR) to the *FFR Market*.

Frequency Containment Reserve (FCR) refers to a reserve that is available for the containment of frequency during an imbalance between electricity production and consumption.

Frequency Containment Reserve for Disturbances (FCR-D) is a frequency containment reserve that aims to contain the frequency to at least 49.5 Hz if the frequency falls below the normal frequency range of 49.9 - 50.1 Hz.

Hourly Market refers to a reserve market maintained and used by Fingrid for the procurement of the Frequency Containment Reserves for the next day in the CET time zone and timed after the Day-Ahead Market.

Hourly Market Agreement refers to an agreement between Fingrid and a Balancing Service Provider on the provision of Frequency Containment Reserves (FCR) to the Hourly Market.

Reserve Plan refers to an hourly plan submitted by the Balancing Service Provider according to the Yearly Market Agreement concerning the reserve volumes in the hours of the next day in the CET time zone.

Reserve Unit refers to a unit that fulfils the requirements concerning the provision of the reserve. A Reserve Unit can consist of one or more Reserve Resources.

Reserve Resource refers to an individual resource capable of control; a power plant, consumption facility or energy storage facility.

Yearly Market refers to a market maintained by Fingrid, from which Fingrid procures some Frequency Containment Reserves and in which the procurement volume and procurement price are determined for the next calendar year.

Yearly Market Agreement refers to a one-year agreement between Fingrid and a Balancing Service Provider on the provision of Frequency Containment Reserves (FCR).

3 Procurement of reserves

The need to procure a Fast Frequency Reserve depends on the inertia of the electricity system and the magnitude of the reference incident as defined in the Guideline on System Operation, COMMISSION REGULATION (EU) 2017/1485 (hereinafter SOGL), so it is procured for only some of the hours and the volume to be procured may vary. The need for procurement is based on inertia forecasts and takes place mostly at times when the inertia is lowest.

Fingrid procures the reserve by daily procurement from the FFR Market referred to in section 7. The volume to be procured varies from hour to hour and the procurement obligation is divided between the Nordic TSOs.

4 Requirements for a Balancing Service Provider

A party that has access to Reserve Unit(s) that fulfil(s) the requirements laid down in section 5 can become a Balancing Service Provider.

The Balancing Service Provider must make a FRR Market Agreement with Fingrid before participating in the maintenance of the reserves.

A Balancing Service Provider does not need to be the owner or an open provider or a balance responsible party of a Reserve Resource. A Balancing Service Provider must have the consent of the owner of the Reserve Resource for the use of the reserve pursuant to the FFR Market Agreement. Upon Fingrid's separate request, the Balancing Service Provider shall deliver the consent of the owner of the Reserve Resource to Fingrid.

An individual Reserve Resource may only be offered by a single Balancing Service Provider to the Fast Frequency Reserve market.

Fingrid has the right to sell the reserves sold to Fingrid by Balancing Service Providers further to other transmission system operators.

5 Requirements for a Reserve Unit

The Balancing Service Provider must demonstrate that the Reserve Unit reported as reserve is in compliance with the required control capacity by means of prequalification tests laid down in the document, *The technical requirements and the prequalification process of Fast Frequency Reserve (FFR),* published by Fingrid.

The Reserve Unit shall be located within Fingrid's system responsibility area[1].

The volume of reserve produced by the Reserve Unit and lost as a result of a single fault shall not exceed 50 MW.

6 Aggregation of Reserve Resources

The Balancing Service Provider may combine Reserve Resources from the production balance and consumption balance and contribute to the maintaining of the Fast Frequency Reserve by also using Reserve Resources included in the balances of different balance responsible parties.

7 FFR Market Rules

Participation in the FFR Market requires compliance with the requirements for Balancing Service Providers laid down in section 4.

A Balancing Service Provider participating in the FFR Market may submit a combination bid to the FFR Market and to the FCR-D market, if the Balancing Service Provider has an FCR Hourly or Yearly Market Agreement.

7.1 Bidding rules

The maximum capacity of a single bid for Fast Frequency Reserve is 10 MW.

The minimum capacity of a single bid for Fast Frequency Reserve is 1 MW.

The bids shall be submitted at an accuracy of 0.1 MW. A Balancing Service Provider can submit several bids.

It must be specified whether the bid is an FFR bid or a combination bid.

The FFR bid must contain the following information:

[1] Finland excluding the autonomous region of Åland.

- FFR bid or a combination bid
- type (production, consumption or aggregated)
- capacity (MW)
- price of availability (€/MW,h)
- hour (EET time zone).

The combination bid must include the following information in addition to the information above:

- For the combination bid: FFR + FCR-D Hourly Market or FFR + FCR-D Reserve Plan
- For the combination bid: FCR-D control method (linear, piecewise linear or a relay-connected reserve activating in a single step)
- FFR and FCR-D prices of availability (€/MW,h) separately

The hourly bids shall be submitted for the hours of a day in the CET time zone. Bids can be submitted for the hours of the next day until 18:00 (EET). The bids shall be submitted in Fingrid's electronic reserve trading system (Vaksi web) in accordance with Fingrid's separate guideline, *Fingrid's reserve trading and information exchange*. Fingrid publishes the valid guideline on its website.

7.2 Processing of bids

Fingrid arranges the bids by price and gives priority to the cheapest bid (€/MW) for each delivery period. A required number of bids will be used in price order. Bids with the same price are used in the order of receiving the bids. Each bid is handled separately and used as a whole. Fingrid confirms the transactions for the next day by 22:00 (EET).

7.2.1 Combination Bids

For combination bids (FFR + FCR-D Hourly Market or FFR + FCR-D Reserve Plan), FFR is traded first.

If the combination bid, FFR + FCR-D Hourly Market, is used on the FFR market, the bid will not be transferred to the FCR-D Hourly Market. If the bid is not used on the FFR market, the bid will be transferred to the FCR-D Hourly Market.

If the combination bid, FFR + FCR-D Reserve Plan, is used on the FFR market, Fingrid will update the Balancing Service Provider's reserve plan by removing the share of the capacity used on the FFR Market from the plan.

8 Reporting and monitoring of reserve maintenance

The Balancing Service Provider and Fingrid provide information for each other in accordance with the *Fingrid Guidelines on Reserve Trading and Information Exchange*.

8.1 Real-time data

Fingrid uses real-time data to monitor the maintenance and activation of the reserves. A Balancing Service Provider shall deliver, at its own expense, the following Reserve Unit specific real-time data to Fingrid:

- the volume of Fast Frequency Reserve maintained (MW).

The above data shall describe the current actual volume of the Fast Frequency Reserve maintained. A potential activation of a Fast Frequency Reserve must not reduce the volume of the Fast Frequency Reserve maintained.

The volume of the Fast Frequency Reserve maintained can be calculated for the Reserve Units and energy storage facilities with the following equation:

$$C_{\mathrm{FFR-Gen},} = \min\left(P_{\max} - P_{\text{set value}} - C_{\mathrm{FCR}},\ C_{\text{prequalified}}\right) \quad (1)$$

$C_{\mathrm{FFR-Gen}}$ is the maintained volume of Fast Frequency Reserve

$P_{\max}$ is the current maximum active power of the Reserve Unit

$P_{\text{set value}}$ is the set value of active power of the Reserve Unit

C_{FCR} is the maintained FCR-N and/or FCR-D capacity

$C_{\text{prequalified}}$ is the accepted volume of the Fast Frequency Reserve based on the prequalification test

For a Reserve Unit based on electricity consumption, the volume of the Fast Frequency Reserve can be calculated with the equation

$$C_{\mathrm{FFR-Load},} = \min\left(P_{\text{load}} - C_{\mathrm{FCR}},\ C_{\text{prequalified}}\right) \quad (2)$$

$C_{\mathrm{FFR-Load}}$ is the maintained volume of Fast Frequency Reserve

P_{load} is the power of the Reserve Unit, excluding any activated FCR or FFR power.

The resolution of the measured values used in the calculation of the maintained volume of the Fast Frequency Reserve shall be at least 0.01 MW. The required measurement accuracy of active power with relation to the rated power of the Reserve Unit depends on the measurement system of the Reserve Unit and the rated power according to Table 8.1.

Table 8.1 The accuracy requirement of measurement of active power

Category	Description	Max. inaccuracy
1	no current and voltage transformer	± 5 %
2	current transformer, no voltage transformer	± 2 %
3	rated power < 2 MW, current and voltage transformer	± 2 %
4	rated power 2–10 MW, current and voltage transformer	± 1 %
5	rated power > 10 MW, current and voltage transformer	± 0,5 %

The volume of the maintained Fast Frequency Reserve is zero, if the reserve generating functionality is switched off.

The Balancing Service Provider shall provide Fingrid a description of the implementation of the calculation of the maintained Fast Frequency Reserve. If a Balancing Service Provider has a more precise calculation method, it may be used upon Fingrid's approval.

The real-time exchange of information is subject to Fingrid's application guideline *Real-time exchange of information*.

The update interval for real-time data exchange must not exceed 60 seconds.

8.2 History data

The Balancing Service Provider shall store the following information on a Unit basis:

- The volume of Fast Frequency Reserve maintained (MW)
- Instantaneous active power (MW)
- Network Frequency (Hz)
- Controller setting
- Controlled operating mode, a numeric or alphabetical ID that indicates which control parameters are in use

In addition, it is recommended to store the following information:

- Controller output
- An indicator of any restrictions to the activation of the Fast Frequency Reserve (1 or 0)

The sampling frequency for history data must be at least 10 Hz. The resolution of active power shall be at least 0.01 MW and the required measurement accuracy is determined by the rated power and the measurement system according to table 8.1. The frequency resolution shall be at least 10 mHz and the accuracy shall be 10 mHz or better.

The Balancing Service Provider shall store the history data for at least 14 days. The data must be time-stamped and synchronised to UTC time.

Upon Fingrid's request, the Balancing Service Provider must submit the history data of Reserve Units that participated in the control, so that Fingrid can verify that the Reserve Unit has activated pursuant to the Agreement. The data shall be delivered within five days in accordance with Fingrid's guideline, *Fingrid's reserve trading and information exchange*.

8.3 Technical descriptions

The Balancing Service Provider shall submit, upon Fingrid's request, descriptions of the technical properties of the Reserve Units and the implementation of the activation of the reserve. In so far as the delivery of the data would entail excessive costs for the Balancing Service Provider, the parties shall negotiate on what type of data is considered sufficient for delivery.

8.4 Fingrid's reporting to the Balancing Service Provider

Fingrid shall report the following hourly data to the Balancing Service Provider in accordance with the Fingrid guideline, *Fingrid's reserve trading and information exchange*:

- actual transactions and prices for the next day in accordance with the CET time zone on the FFR Market.

8.5 Balancing Service Provider's reporting to balance responsible party

If a Balancing Service Provider is not the balance responsible party of the Reserve Resource, the Balancing Service Provider shall inform the balance responsible party of the Reserve Resource of the control use of the Reserve Resource no later than when an FFR Market Agreement has been concluded.

9 Fees

Fingrid shall pay a Capacity Fee to the Balancing Service Provider for the Balancing Service Provider's contribution to the maintaining of the Fast Frequency Reserve.

The Balancing Service Provider shall send the invoice for the maintenance of the previous month's reserves to Fingrid on the 10th of each month or the first working day following that date. The due date of the invoice is 14 days from the invoice date, which is the date the invoice was sent.

9.1 Capacity Fee in the FFR Market

The compensation to be paid to the Balancing Service Provider is determined separately for each hour on the basis of the most expensive bid ordered (margin price principle).

Fingrid shall pay the Balancing Service Provider a compensation on the basis of the volumes verified by means of measurements; however, no more that for a transaction

agreed within the FFR Market. The starting point for billing is the real-time data on the maintained volume of the Fast Frequency Reserve (MW), supplied by the Balancing Service Provider pursuant to section 8.1. The Balancing Service Provider shall create an invoicing review using minute averages, which are used to calculate the Capacity Fee for each hour. The invoicing calculation based on real-time information is described in more detail in the instruction, *Fingrid reserve trade and information exchange*.

If the reserve capacity verified by means of measurements is below the transaction carried out in the FFR Market, Fingrid shall pay the Balancing Service Provider a compensation on the basis of the capacity verified by means of measurements. For capacity not delivered, the Balancing Service Provider shall pay Fingrid 100 per cent of the price of the hour in question on the FFR Market.

10 Breach of terms

10.1 Undelivered reserve capacity

For capacity not delivered, the Balancing Service Provider shall pay Fingrid a compensation in accordance with chapter 9.1.

10.2 Verification of control properties of reserves, and the Balancing Service Provider's reimbursement obligation

Fingrid has a right to verify the control properties of a Reserve Unit. If monitoring carried out by Fingrid indicates that a Balancing Service Provider has not maintained the agreed control properties, the Balancing Service Provider shall provide within 30 days an account requested by Fingrid concerning the shortcomings in the maintaining of reserves.

If the account requires a verification of the control capability by means of measurements carried out on Fingrid's demand and the measurements indicate that the Reserve Unit fulfils the valid requirements, Fingrid shall be responsible for the costs of the measurements. Otherwise, the Balancing Service Provider shall be responsible for the costs.

If the Balancing Service Provider fails to provide the account requested by Fingrid by the deadline, the Balancing Service Provider shall reimburse the fees based on these terms and conditions for the period of the account.

If a verification, other test in accordance with this document or monitoring by Fingrid indicates that the reserve maintained by the Balancing Service Provider has been smaller than what has been agreed or if the control capability of the Reserve Unit differs from the terms and conditions of this document, the Balancing Service Provider shall reimburse the fees paid by Fingrid in so far as they have been based on a reserve volume which was higher than in reality.

10.3 Temporary exclusion of a Balancing Service Provider from the reserve market

Fingrid has a right to temporarily exclude a Balancing Service Provider from the FFR Market, if the Balancing Service Provider:

- fails to deliver reserves without giving an acceptable reason despite Fingrid's written notice,
- has knowingly changed the control settings so that the control properties are changed significantly,
- has failed to give the account referred to under section 10.2,
- does not deliver the history data referred to in section 8.2 and requested by Fingrid,
- or has otherwise violated the terms and conditions of this document despite Fingrid's written notice.

The duration of the temporary exclusion is from one to three months depending on the nature of the violation.

10.4 Cancelling the Agreement

If the violation of the Agreement is a material one, Fingrid has a right to cancel the FFR Market Agreement in accordance with the terms and conditions of the agreement.