Implementation Guide

Settlement Basis for mFRR and mFRR-D Capacity Markets to BSP

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Revision History

Version	Date	Changed by	Comments
1.0	2025-09-18	Erling Singstad Paulsen	First published version of the guide
1.1	2025-10-07	Erling Singstad Paulsen	• Updated formulas for committed amount, deviation amount and deviation factor in Table 2 and in the example in Section 2.3 Example Data, to consider that bids in the capacity markets are submitted per hour • Updated Section 2.2 Manual Overrides and the example in Section 2.3 Example Data to emphasize that there are separate time series for overridden commitments and overridden deviations • Removed unused attribute *energy_Measurement_Unit.name* from Table 2

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1. Introduction

This implementation guide describes the interface between the BSP and TSO for reporting the settlement basis for the mFRR and mFRR-D capacity markets to BSP.

2. Message overview

The settlement basis for the mFRR and mFRR-D capacity markets will be sent from TSO to BSP every hour, covering the period from the start of the previous hour until the end of the following calendar day. Each message will be based on the available data at the time of the message production. Separate messages will be sent for each market, see Table 1. If a BSP does not have any submitted bids in the capacity market during the period covered, it will not receive any message. The messages will be distributed to BSP via ECP. Implementation guide for ECP can be requested from TSO.

Message name	Market	Frequency
Settlement Basis for mFRR Capacity Market to BSP	mFRR	Hourly
Settlement Basis for mFRR-D Capacity Market to BSP	mFRR-D	Hourly

Table 1 – Message details

The messages will be an implementation of *ReserveAllocationResult_MarketDocument* v6.5 and will include the following time series per resource object:

- Commitments in the mFRR or mFRR-D capacity market
- Correction due to deviation of volume between bids in the activation market and commitments in the capacity market according to current terms and conditions

Each time series will have a resolution of PT15M and will include the following data points:

- Volume of the commitment or deviation (MW)
- The unit price for the commitment or deviation (EUR)
- The committed amount or deviation amount for the commitment or deviation (EUR)

A deviation (MW) and deviation amount (EUR) can be both negative and positive to account for voluntary bids for each individual resource object.

2.1 BSP Data Aggregation

Data aggregated at the BSP level for a bidding zone and direction is not part of the message but can be calculated by BSP from the time series as described in this section. See also Section 2.3 Example Data.

The total deviation (MW) at the BSP level for a given MTU, bidding zone and direction is always less than or equal to zero and is given by:

$$Total\ Deviation\ [MW] = min(D_{\Sigma}, 0)\,,$$
$$D_{\Sigma} = \sum_{i=1}^{n} Deviation(i)$$

Where D_{Σ} is calculated as the sum of all deviations over all n time series for a given bidding zone and direction at a particular MTU.

Similarly, the overall settlement amount at the BSP level for a given MTU, bidding zone and direction is always less than or equal to the overall committed amount CA_{Σ} and is given by:

$$Settlement\ Amount\ [EUR] = min(CA_{\Sigma} + DA_{\Sigma}, CA_{\Sigma}),$$
$$CA_{\Sigma} = \sum_{i=1}^{n} Committed\ Amount(i)$$
$$DA_{\Sigma} = \sum_{i=1}^{n} Deviation\ Amount(i),$$

Where CA_{Σ} and DA_{Σ} are calculated as the sum of all committed amounts and deviation amounts over all n time series for a given bidding zone and direction at a particular MTU. See *financial_Price.amount* in Table 2 for definitions of committed amount and deviation amount.

See 2.3 Example Data for a detailed example.

2.2 Manual Overrides

If the deviation (MW), deviation amount (EUR) or committed amount (EUR) has been manually overridden by the TSO at the BSP level for a given MTU, bidding zone and direction, additional time series without the attribute *registeredResource.mRID* will be added to the message. Separate time series will be used for overridden commitments and overridden deviations, specified by reason codes. The overridden and/or aggregated values the BSP level for a given bidding zone and direction will be reported in these time series. The corresponding time series for commitments and/or deviations for the resource objects in the same bidding zone and direction will contain points with zero values at overridden MTUs, as illustrated by Figure 1. Reason code Z67 will be added to points at overridden MTUs for time series with the same reason code, bidding zone and direction as the new override time series.

If manual overrides are registered after the period for the scheduled message is passed, the message will be manually resent for a full day to the BSP concerned.

2.3 Example Data

Figure 1 shows four examples for a particular BSP, bidding zone and direction. Seven time series across three resource objects are used to illustrate different scenarios and settlement outcomes. The time series denoted **To be calculated by BSP** are not part of the message but can be calculated based on the formulas given in Section 2.1 BSP Data Aggregation.

BSP1									
Bidding Zone & Direction	**Time Series**		**Attribute**	**Unit**	**Example**				
	Resource Object	**Reason Code**			1	2	3	4	5
NO1 UP	N/A	ZA7 Deviation	price.amount	EUR	1	1	1	1	1
			quantity	MW		**Z67** -40			
			financial_Price.amount	EUR		-20			
	RO1	Z31 Commitment	price.amount	EUR	1	1	1	1	1
			quantity	MW	20	20	20	0	0
			financial_Price.amount	EUR	5	5	5	0	0
		ZA7 Deviation	price.amount		1	1	1	1	1
			quantity	MW	0	**Z67** 0	-20	20	20
			financial_Price.amount	EUR	0	0	-10	10	5
	RO2	Z31 Commitment	price.amount	EUR	1	1	1	1	1
			quantity	MW	20	20	20	0	0
			financial_Price.amount	EUR	5	5	5	0	0
		ZA7 Deviation	price.amount		1	1	1	1	1
			quantity	MW	0	**Z67** 0	-20	0	0
			financial_Price.amount	EUR	0	0	-10	0	0
	RO3	Z31 Commitment	price.amount	EUR	1	1	1	1	1
			quantity	MW	0	0	0	40	40
			financial_Price.amount	EUR	0	0	0	10	10
		ZA7 Deviation	price.amount		1	1	1	1	1
			quantity	MW	0	**Z67** 0	50	-40	-40
			financial_Price.amount	EUR	0	0	25	-20	-10
	To be calculated by BSP		ΣCommitment	MW	40	40	40	40	40
			ΣCommitted Amount	EUR	10	10	10	10	10
			ΣDeviation	MW	0	-40	10	-20	-20
			Deviation Factor		2	2	2	2	1
			ΣDeviation Amount	EUR	0	-20	5	-10	-5
			Total Deviation	MW	0	-40	0	-20	-20
			Settlement Amount	EUR	10	-10	10	0	5

Figure 1 - Detailed example with calculations

Example 1: The BSP has commitments on RO1 and RO2 which are fully met in the activation market. This results in a Total Deviation (MW) of 0 and a Settlement Amount (EUR) equal to the Committed Amount (EUR).

Example 2: The BSP has the same commitments as in Example 1, but the Deviation (MW) has been manually overridden at the BSP level. This results in an additional time series being added to the message with bidding zone NO1, direction UP and reason code ZA7, but without *registeredResource.mRID*. Reason code Z67 is applied at this point across all the deviation time series for the same bidding zone and direction.

Example 3: The BSP has the same commitments as in Example 1 but has used voluntary bids on RO3 to meet and exceed the commitment. This results in a Total Deviation (MW) of 0 and a Settlement Amont (EUR) equal to the Committed Amount (MW).

Example 4: The BSP has a commitment on RO3 and a voluntary bid on RO1 that partially meets the commitment. This results in a negative Total Deviation (MW) and Settlement Amount (EUR) of 0.

Example 5: The same as in Example 4, but the TSO has changed the Deviation Factor from 2 to 1, resulting in a positive Settlement Amount (EUR).

3. Document attributes and dependencies

Both messages listed in Table 1 will implement *ReserveAllocationResult_MarketDocument* v6.5 as detailed in Table 2. The attribute *process.processType* will be used to distinguish between the messages.

ReserveAllocationResult_MarketDocument		**iec62325-451-7-reserveallocationresult – version 6.5**
mRID	M	Unique identification of the document
revisionNumber	M	Version of the document
type	M	**A38** – Reserve allocation result document
process.processType	M	**A30** – Tertiary reserve process **Z16** – mFRR-D
sender_MarketParticipant.mRID	M	Identification of the party sending the document Statnett: **10X1001A1001A38Y** **A01** – EIC coding scheme
sender_MarketParticipant.marketRole.type	M	**A04** – System Operator
receiver_MarketParticipant.mRID	M	Identification of the party receiving the document **A10** – GS1 coding scheme
receiver_MarketParticipant.marketRole.type	M	**A46** – Balancing Service Provider
createdDateTime	M	Date and time of document creation (in ISO 8601 UTC format) YYYY-MM-DDTHH:MM:SSZ
reserveBid_Period.timeInterval	M	The period covered by the document (in ISO 8601 UTC format) Start: YYYY-MM-DDTHH:MMZ End: YYYY-MM-DDTHH:MMZ

domain.mRID	M	EIC identification of the Control Area Norway: **10YNO-0--------C** **A01** – EIC coding scheme
TimeSeries – one or more instances		
mRID	M	Unique identification of the time series
businessType	M	**A10** – Tertiary control
acquiring_Domain.mRID	M	The EIC identification of the Nordic Market Area: **10Y1001A1001A91G** **A01** – EIC coding scheme
connecting_Domain.mRID	M	The EIC identification of the bidding zone where the resource is located **A01** – EIC coding scheme
quantity_Measurement_Unit.name	M	**MAW** - megawatt
currency_Unit.name	M	**EUR** - euro
registeredResource.mRID	O	The unique identification of a resource. Will be omitted if the time series contains manually overridden data
flowDirection.direction	M	**A01** – Up **A01** – Down
curveType	M	**A03** – Variable sized block
Series_Period – One or more instances per TimeSeries		
timeInterval	M	The period covered by the time series (in ISO 8601 UTC format) Start: YYYY-MM-DDTHH:MMZ End: YYYY-MM-DDTHH:MMZ
resolution	M	**PT15M**
Point – One or more instances per Series_Period		
position	M	Position within the time interval. Sequential value beginning with 1
quantity	M	Quantity of commitment or deviation
price.amount	M	The unit price for the commitment or deviation
financial_Price.amount	M	The committed amount or deviation amount for the commitment or deviation. **Committed amount:** $\frac{quantity \times price.amount}{4}$ **Deviation amount:** $\frac{quantity \times price.amount \times deviation\ factor}{4}$

		Deviation factor – 0, 1, 2 or 25 Can be deduced from deviation amount as follows: $4 \times \frac{financial_Price.amount}{quantity \times price.amount}$ Note: This is only valid if the deviation or deviation amount are not manually overridden.
Reason – Exactly one instance per TimeSeries		
code	M	Commitments: **Z31** – mFRR, Balancing Power **Z74** – Disturbance reserve Deviations: **ZA7** – Correction, deviation between CM and EAM
Reason – Zero or one instance per Point		
code	M	**Z67** - Override

Table 2 – Document attributes

The followed reason codes are used in the messages:

Reason code	NMEG Name	NMEG Description
Z31	mFRR, Balancing Power	Frequency Restoration Reserve - Manual activated reserves (mFRR), Balancing Power
Z74	Disturbance reserve	A reserve to be used if disturbance occur. If the bids on the balancing power market are not sufficient to remedy the disturbance, the TSO can activate the disturbance reserve and brings the system into balance.
Z67	Override	The information in question is overridden or a result of an override of data
ZA7	Correction, deviation between CM and EAM	Correction due to deviation of volume between bids in the activation market and commitments in the capacity market according to current terms and conditions

Table 3 – Reason codes