European Network of
Transmission System Operators
for Electricity

# FSKAR TRANSPARENCY REPORTING

# IMPLEMENTATION GUIDE

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APPROVED DOCUMENT
VERSION 2.1

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The force of the following words is modified by the requirement level of the document in which they are used.

- SHALL: This word, or the terms “REQUIRED” or “MUST”, means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase, or the phrase “MUST NOT”, means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase “NOT RECOMMENDED”, means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- MAY: This word, or the adjective “OPTIONAL”, means that an item is truly optional.

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# Revision History

| Version | Release | Date | Paragraph | Comments |
|---|---|---|---|---|
| 0 | 1 | 2019-07-18 | | First draft |
| 1 | 0 | 2019-09-10 | | Approved by MC. |
| 2 | 0 | 2020-11-04 | | Some adjustments are performed in order to align the IG with the Accounting and Financial Settlement IG.<br>Imbalance settlement responsible role is replaced for Coordination Centre Operator.<br>FSKAR group decided to create a new ESMP data format to submit all the data together. Therefore, Balancing and EnergyAccount documents are replaced by FinancialSettlementReport document. Dependecy tables were updated.<br><br>Approved by MC. |
| 2 | 1 | 2022-09-21 | | In Financial Settlement Report dependency table, for MSR. Product was changed from Active power (8716867000016) to active energy (8716867000030).<br><br>Approved by SOC. |
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# 1 Objective and Scope

This implementation guide serves as a basis for enabling the sharing of data between TSOs and ENTSO-E for transparency purposes. The business motivation for this is contained in EB GL articles 50.3 and 51 (1). These articles together with the business requirement specification document address the data exchanges for Financial Settlement of KΔf, ACE and ramping period (FSKAR).

The main objectives of the implementation guide are as follows

- To facilitate the harmonisation of the underlying data exchange process for FSKAR.
- To ensure a standard for enabling uniform layout for the transmission of FSKAR data between the European electricity market participants and the Transparency platform
- By using the information model, ensure that a common interface can be provided between different software solutions.
- To serve as one of the building blocks for using Unified Modelling Language (UML) based techniques in defining processes and documents for interchange between actors in the electrical industry in Europe.

Specifically, it covers settlement volumes, values and prices as a result of the processes foreseen in FSKAR.

# 2 References

## 2.1 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- IEC 62325-351:2016, Framework for energy market communications – Part 351: CIM European market model exchange profile.
- IEC 62325-450:2013, Framework for energy market communications – Part 450: Profile and context modelling rules.
- IEC 62325-451-1:2017, Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market.

## 2.2 Other references

- Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EB GL).
- Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (SO GL)
- The Harmonised Electricity Market Role Model
- Detailed Data Descriptions for the purpose of the FSKAR Transparency Reporting
- Business Requirements Specification for FSKAR Transparency Reporting
- All TSOs' proposal for the determination of LFC blocks for the Synchronous Area Continental Europe

# 3 Terms and definitions

**Accounting data ($Eex$)**: The value $Eex$ is the exchanged energy between two LFC areas/blocks as reflected in the accounting data. The accounting data also includes the exchanges per virtual tie-lines (VTL). This VTL exchanges may include but are not limited to aFRR exchanges and imbalance netting.

**Aggregated Netted External Schedules (ANES):** A schedule representing the netted aggregation of all external TSO schedules and external commercial trade schedules between two scheduling areas or between a scheduling area and a group of other scheduling areas.[1]

**Day-Ahead Market Prices (DAMP):** Day-Ahead Market Prices for each LFC block or area provided by each corresponding LFC Operator in €.

**External commercial trade schedule:** It means a schedule representing the commercial exchange of electricity between market participants in different scheduling areas.[1]

**External TSO schedule**: It means a schedule representing the exchange of electricity between TSOs in different scheduling areas. [1]

**Frequency Containment Process (FCP)**: Means a process that aims at stabilising the system frequency by compensating imbalances by means of appropriate reserves.[1]

**Frequency Containment Process Energy (FCPE or $E_{FCP}$):** The energy resulting from the frequency containment process. It is equal to the product of the notified k-factor with the average frequency deviation for each TSO-TSO settlement period and each LFC area.

$$E_{FCP} = -k * \Delta f * \frac{1}{4} h$$

**Frequency deviation (Delta f):** The difference between the actual and the nominal frequency of the synchronous area which can be negative or positive [1].

**Intended Energy Exchange ($E_{ie}$):** This means the intended cross-border energy exchanges according to EBGL Art. 50. This includes the ANES, the cross-border exchanges over virtual tie-lines, the cross-border energy exchanged as a result of the frequency containment process and the cross-border energy exchanged as a result of the ramping periods.

**K-factor**: K-factor represents the assumed reaction of an LFC area/block to a frequency deviation. Defined in the SOGL as a value expressed in megawatts per hertz ('MW/Hz'), which is as close as practical to, or greater than the sum of the auto-control of generation, self-regulation of load and of the contribution of frequency containment reserve relative to the maximum steady-state frequency deviation.[1]

**LFC Operator**: Responsible for the load frequency control for its LFC Area or LFC Block.

**Ramping period**: It is a period of time defined by a fixed starting point and a length of time during which the input and/or output of active power will be increased or decreased. 1 For CE, the ramping period is set at 10 minutes

**Ramping Period Energy ($E_{RP}$):** Energy exchanged as a result of ramping between different ANES values ($ANES_{n-1}$ and $ANES_n$, where n and n-1 refer to adjacent TSO-TSO settlement periods). The RP energy is the difference between a step change and a ramped change, where the ramp is linear starting 5 minutes before the change and ending 5 minutes after the change.

$$E_{RP} = \frac{(ANES_{n-1} - ANES_n)/2}{2} * \frac{5}{60} h + \frac{(ANES_{n+1} - ANES_n)/2}{2} * \frac{5}{60} h$$

[1] SO GL Network Code

**Scheduled energy exchanges ($Esch$):** It refers to the energy corresponding to the sum of the ANES for each LFC area/block, as obtained by the co-ordination centres from the Verification Platform.

**TSO-TSO Settlement period**: The TSO-TSO-Settlement period is a parameter of the process representing the time resolution on which the accounting data and energy exchanges are determined. According to the currently approved version of the FSKAR methodologies, the TSO-TSO settlement period shall be equal to 15 minutes.

**System Operator Accounting data Matching (SOAM):** Calculated accounting data on interconnection.

**System Operator Measurement Alignment (SOMA):** Metered measurement data on interconnection.

**System Operator Validated Accounting (SOVA):** Bilaterally validated calculated accounting data on interconnection.

**System Operator Validated Measurements (SOVM):** Bilaterally validated metered measurement data on interconnection.

**Unintended Exchange (UE or $E_{ue}$):** This means the unintended cross-border exchange of energy according to EBGL Art. 51. It is equal to the difference between the metered exchanges on physical tie-lines as reflected in the accounting data and the sum of the ANES, the VTL exchanges, the FCP energy and the RP energy. The unintended exchange is calculated as shown below.

$$E_{ue} = E_{ex} - E_{sch} - E_{VTL} - E_{FCP} - E_{RP}$$

**Virtual Tie-Line (VTL)**: The energy exchanged through virtual tie lines can be manual frequency restoration reserves, automatic frequency restoration reserves or imbalance netting. Moreover, there might be other processes that use virtual tie-lines for the exchange of energy. Virtual tie-line exchanges are recorded in the accounting data.

**Working Day:** The Working Day is the calendar day except Saturdays, Sundays and 4 holidays: Christmas day (25th of December), New Year's Day (1st of January), Easter Monday and Ascension Day.

182 $$E_{ue} = E_{ex} - E_{sch} - E_{VTL} - E_{FCP} - E_{RP}$$

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# 4 The FSKAR Transparency Reporting Business Process

## 4.1 Overview

The EU Commission regulation 2017/2195 of 23rd November 2017 (EB GL) establishes a guideline on electricity balancing. It sets out technical, operational and market rules for the electricity balancing markets. It covers the procurement, activation and financial settlements as a result of balancing activities in the market.

Article 50.3 of this regulation indicates that TSOs shall develop a proposal for common settlement rules for the intended exchanges of energy as a result of the frequency containment process and ramping periods. Article 51(1) states a similar requirement for the unintended exchanges of energy.

A detailed data definition document for exchange of settlement data between TSOs foreseen by EB GL articles 50.3 and 51 (1) was produced. Following this, a Business requirement specification (BRS) containing the different categories of information was also produced. The categories of information submitted are listed below:

- Settlement of volumes and values for:
  - Frequency containment energy
  - Ramping period energy
  - Unintended energy
- Settlement prices

## 4.2 Use Cases

The use case diagram below identifies the actors and their interactions.

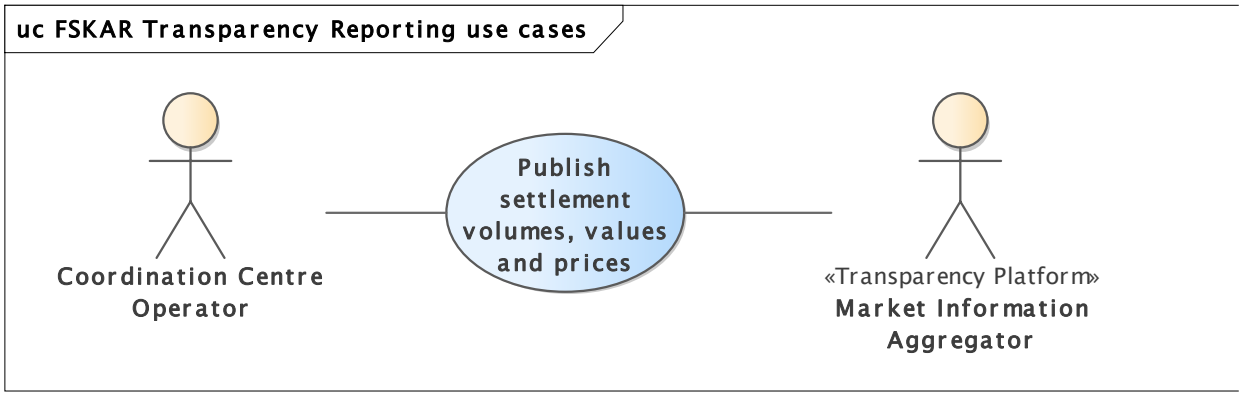


**Figure 1 - Use Cases**

Table 1 gives a list of actors involved in the FSKAR Transparency reporting.

**Table 1 - Actor labels and descriptions**

| Role Label | Role Description |
|---|---|
| Coordination Centre Operator (CCO) | The coordination centre operator calculates settlement volumes, values and prices by the SA, LFC area, LFC block or LFC areas for submission to MIA. |
| Market information aggregator (MIA) | MIA is the role that receives, validates and acknowledges all submitted information to TP. This role will be played by TP. |

Table 2 gives a list of use cases for the FSKAR Transparency reporting.

**Table 2 - FSKAR Transparency reporting use cases**

| Use case label | Roles involved | Action descriptions and assertions |
|---|---|---|
| **Publish settlement volumes, monetary values and prices** for the following energy exchange categories:<br>• Frequency Containment<br>• Ramping period<br>• Un-intended energy | • CCO<br>• MIA | CCO sends to the MIA, the exchanges of energy volumes, monetary values and settlement prices for energy exchanged.<br>MIA acknowledges the received information. |

## 4.3 Document exchange processes

### 4.3.1 Overview

The use cases are supported by the following document exchanges between the CCO and the MIA(TP)

- **Publish settlement volumes, values** and prices data use case is supported by the **FinancialSettlementReport_MarketDocument**. The volumes, values and prices published are for the exchange of energy as a result of frequency containment process, ramping period and un-intended energy. These are reported monthly per LFC area and may alternatively be reported by LFC block or LFC areas. The prices are for frequency containment, ramping period and unintended energy exchanges for a given Synchronous area. These are reported monthly per synchronous area.

Next figures show a sequence diagram of the document exchange processes.

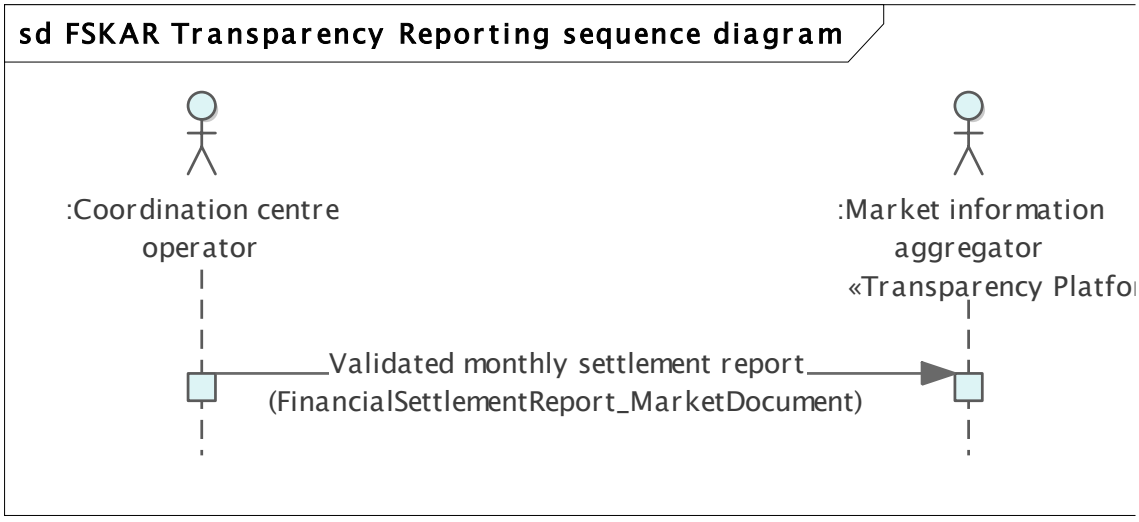


**Figure 2 - Sequence diagram for FSKAR**

All documents sent by CCO will always get an Acknowledgement message response from MIA (TP).

# 5 General rules for document exchange

## 5.1 Overview

The document exchange processes of FSKAR Transparency Reporting described in the previous chapter require sending and receiving various ESMP documents. The information to be exchanged is based on the following documents:

- FinancialSettlementReport_MarketDocument v1.0
- Acknowledgement_MarketDocument v8.1 based on IEC 62325-451-1:2017 Ed. 2

These ESMP based documents shall be used to carry out the communication tasks

- **Submit** - The document contains data to be processed by the receiver.
- **Reply** - It is the acknowledgement sent by the receiver to the sender when receiving a submitted document.

Next table gives an overview, which ESMP documents shall be used to carry out the communication tasks of document exchange processes (DEP). The following abbreviations apply

- FSR: FinancialSettlementReport_MarketDocument
- ACK: Acknowledgement_MarketDocument

**Table 3 - Document Exchange**

| Number | Use case | Publish document | Reply document | Reply conditions |
|---|---|---|---|---|
| 1 | Publish settlement volumes, values and prices | FSR | ACK | FSR fully accepted.<br><br>Fully rejected due to errors in the FSR. |

## 5.2 FinancialSettlementReport_MarketDocument

Following table below shows a description of the different attributes and XSD requirements to be used in the **Publish settlement volumes, monetary values and pries** use case and the XSD requirements for each one of them.

### 5.2.1 FinancialSettlementReport_MarketDocument General Overview

Following table shows a description of the different attributes in FinancialSettlementReport_MarketDocument v1.0 to be used in this business process and the XSD requirements for each one of them.

| Class | Attribute | Monthly Settlement Report (MSR) |
|---|---|---|
| Financial Settlement Report_ Market Document | mRID | Used |
| | revisionNumber | Used |
| | type | B44: Financial settlement document |
| | process.processType | A57: FSKAR settlement |
| | sender.mRID | Used |
| | sender.roleType | A16: Coordination Centre Operator |
| | receiver.mRID | Used |
| | receiver.roleType | A32: Market Information Aggregator |
| | createdDateTime | Used |
| | period.timeInterval | Used.<br>Monthly Period |
| | domain.mRID | EIC code of the Synchronous Area.<br>Coding Scheme: A01 |
| | docstatus | A13: Withdrawn<br>Only used in case a document has been submitted by mistake |
| Timeseries | mRID | Used |
| | businessType | C34: Frequency Containment Process Energy<br>C36: Ramping Period Energy<br>A21: Unintended Energy<br>C35: FCPE price<br>C37: RPE price<br>C33: UE price |
| | product | 8716867000030: Active energy |
| | curveType | A01: Sequential Fixed Block<br>A03: Variable Fixed Block |
| | Measurement _Unit.name | MWH: megawatt hours |
| | Currency _Unit.name | EUR: EURO |
| | in_Domain | For FCPE price, RPE price and UE price:<br>Not used (Synchronous area code already in header)<br>For the rest:<br>EIC code of the importer LFC area/block or Synchronous area.<br>Coding Scheme: A01 |
| | out_Domain | For FCPE price, RPE price and UE price:<br>Not used (Synchronous area code already in header)<br>For the rest:<br>EIC code of the exporter LFC area/block or Synchronous Area.<br>Coding Scheme: A01 |
| | connectingLine_ RegisteredResource | Not used |
| Series_Period | timeInterval | Used |
| | resolution | PT15M |

| | | |
|---|---|---|
| Point | position | Used |
| | quantity | Used<br><br>Volume or price depending on the chosen businessType code |
| | monetaryValue_Quantity .quantity | Used only with businessType codes C34, C36 and A21<br><br>Monetary value |

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271 Note: Volumes and monetary values of energy are always netted. If for a given 15-minute time
272 interval and In and Out domain couple there are non-zero values, then only a zero can be
273 provided for the opposite In and Out domain couple and the same 15-minute time interval.