



European Network of  
Transmission System Operators  
for Electricity

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# FSKAR TRANSPARENCY REPORTING

## IMPLEMENTATION GUIDE

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2020-11-04

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APPROVED DOCUMENT  
VERSION 2.0



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22 absolute requirement of the specification.
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24 absolute prohibition of the specification.
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26 reasons in particular circumstances to ignore a particular item, but the full implications must  
27 be understood and carefully weighed before choosing a different course.
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29 exist valid reasons in particular circumstances when the particular behaviour is acceptable  
30 or even useful, but the full implications should be understood and the case carefully weighed  
31 before implementing any behaviour described with this label.
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- 33

## 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		<p>Some adjustments are performed in order to align the IG with the Accounting and Financial Settlement IG.</p> <p>Imbalance settlement responsible role is replaced for Coordination Centre Operator.</p> <p>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. Dependency tables were updated.</p> <p>Approved by MC.</p>

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## 64 1 Objective and Scope

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

70 The main objectives of the implementation guide are as follows

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

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

81

## 82 2 References

### 83 2.1 Normative references

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

- 88 • [IEC 62325-351:2016, Framework for energy market communications – Part 351: CIM](#)  
89 [European market model exchange profile.](#)
- 90 • [IEC 62325-450:2013, Framework for energy market communications – Part 450: Profile](#)  
91 [and context modelling rules.](#)
- 92 • [IEC 62325-451-1:2017, Framework for energy market communications – Part 451-1:](#)  
93 [Acknowledgement business process and contextual model for CIM European market.](#)

94

### 95 2.2 Other references

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

105 **3 Terms and definitions**

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

110 **Aggregated Netted External Schedules (ANES):** A schedule representing the netted  
111 aggregation of all external TSO schedules and external commercial trade schedules between  
112 two scheduling areas or between a scheduling area and a group of other scheduling areas.<sup>1</sup>

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

115 **External commercial trade schedule:** It means a schedule representing the commercial  
116 exchange of electricity between market participants in different scheduling areas.<sup>1</sup>

117 **External TSO schedule:** It means a schedule representing the exchange of electricity between  
118 TSOs in different scheduling areas.<sup>1</sup>

119 **Frequency Containment Process (FCP):** Means a process that aims at stabilising the system  
120 frequency by compensating imbalances by means of appropriate reserves.<sup>1</sup>

121 **Frequency Containment Process Energy (FCPE or E<sub>FCP</sub>):** The energy resulting from the  
122 frequency containment process. It is equal to the product of the notified k-factor with the  
123 average frequency deviation for each TSO-TSO settlement period and each LFC area.  
124

125 
$$E_{FCP} = -k * \Delta f * \frac{1}{4} h$$

126  
127 **Frequency deviation (Delta f):** The difference between the actual and the nominal frequency  
128 of the synchronous area which can be negative or positive <sup>1</sup>.

129 **Intended Energy Exchange (E<sub>ie</sub>):** This means the intended cross-border energy exchanges  
130 according to EBGL Art. 50. This includes the ANES, the cross-border exchanges over virtual  
131 tie-lines, the cross-border energy exchanged as a result of the frequency containment process  
132 and the cross-border energy exchanged as a result of the ramping periods.

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

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

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

142 **Ramping Period Energy (E<sub>RP</sub>):** Energy exchanged as a result of ramping between different  
143 ANES values (ANES<sub>n-1</sub> and ANES<sub>n</sub>, where n and n-1 refer to adjacent TSO-TSO settlement  
144 periods). The RP energy is the difference between a step change and a ramped change, where  
145 the ramp is linear starting 5 minutes before the change and ending 5 minutes after the change.  
146

147 
$$E_{RP} = \frac{(ANES_{n-1} - ANES_n)/2}{2} * \frac{5}{60} h + \frac{(ANES_{n+1} - ANES_n)/2}{2} * \frac{5}{60} h$$

---

<sup>1</sup> SO GL Network Code

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

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

155  
156  
157 **System Operator Accounting data Matching (SOAM):** Calculated accounting data on  
158 interconnection.

159  
160 **System Operator Measurement Alignment (SOMA):** Metered measurement data on  
161 interconnection.

162  
163 **System Operator Validated Accounting (SOVA):** Bilaterally validated calculated accounting  
164 data on interconnection.

165  
166 **System Operator Validated Measurements (SOVM):** Bilaterally validated metered  
167 measurement data on interconnection.

168  
169 **Unintended Exchange (UE or  $E_{ue}$ ):** This means the unintended cross-border exchange of  
170 energy according to EBGL Art. 51. It is equal to the difference between the metered exchanges  
171 on physical tie-lines as reflected in the accounting data and the sum of the ANES, the VTL  
172 exchanges, the FCP energy and the RP energy. The unintended exchange is calculated as  
173 shown below.

174 
$$E_{ue} = E_{ex} - E_{sch} - E_{VTL} - E_{FCP} - E_{RP}$$

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

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

182

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

183

184 **4 The FSKAR Transparency Reporting Business Process**

185 **4.1 Overview**

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

190  
191 Article 50.3 of this regulation indicates that TSOs shall develop a proposal for common  
192 settlement rules for the intended exchanges of energy as a result of the frequency containment  
193 process and ramping periods. Article 51(1) states a similar requirement for the unintended  
194 exchanges of energy.

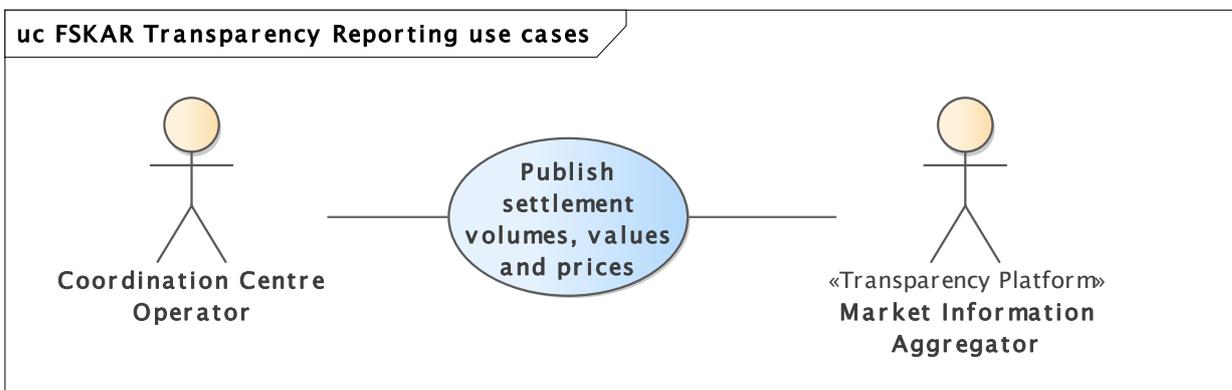
195  
196 A detailed data definition document for exchange of settlement data between TSOs foreseen  
197 by EB GL articles 50.3 and 51 (1) was produced. Following this, a Business requirement  
198 specification (BRS) containing the different categories of information was also produced. The  
199 categories of information submitted are listed below:

- 200 • Settlement of volumes and values for:
  - 201 ○ Frequency containment energy
  - 202 ○ Ramping period energy
  - 203 ○ Unintended energy
- 204 • Settlement prices

205  
206  
207 **4.2 Use Cases**

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

209



210

211 **Figure 1 - Use Cases**

212

213  
214 Table 1 gives a list of actors involved in the FSKAR Transparency reporting.

215  
216 **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.

217  
218  
219 Table 2 gives a list of use cases for the FSKAR Transparency reporting.

220  
221 **Table 2 - FSKAR Transparency reporting use cases**

Use case label	Roles involved	Action descriptions and assertions
<b>Publish settlement volumes, monetary values and prices</b> for the following energy exchange categories: <ul style="list-style-type: none"> <li>• Frequency Containment</li> <li>• Ramping period</li> <li>• Un-intended energy</li> </ul>	<ul style="list-style-type: none"> <li>• CCO</li> <li>• MIA</li> </ul>	CCO sends to the MIA, the exchanges of energy volumes, monetary values and settlement prices for energy exchanged. MIA acknowledges the received information.

222

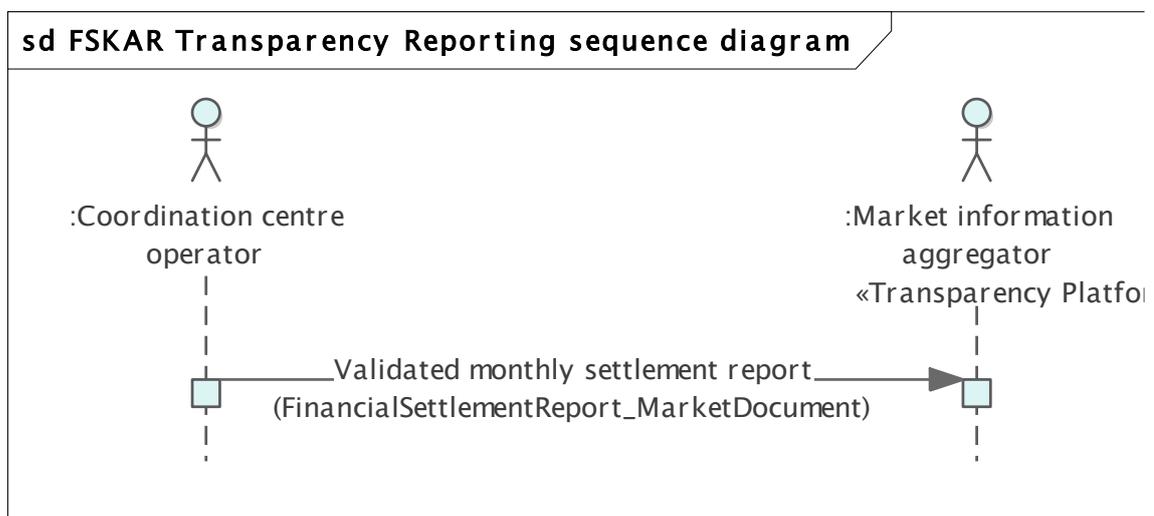
223 **4.3 Document exchange processes**

224 **4.3.1 Overview**

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

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

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



235  
236  
237  
238  
239

**Figure 2 - Sequence diagram for FSKAR**

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

240 **5 General rules for document exchange**

241 **5.1 Overview**

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

- 245 • FinancialSettlementReport\_MarketDocument v1.0
- 246 • Acknowledgement\_MarketDocument v8.1 based on IEC 62325-451-1:2017 Ed. 2

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

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

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

- 256 • FSR: FinancialSettlementReport\_MarketDocument
- 257 • ACK: Acknowledgement\_MarketDocument

258 **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. Fully rejected due to errors in the FSR.

260  
261

262 **5.2 FinancialSettlementReport\_MarketDocument**

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

266 **5.2.1 FinancialSettlementReport\_MarketDocument General Overview**

267 Following table shows a description of the different attributes in  
268 FinancialSettlementReport\_MarketDocument v1.0 to be used in this business process and the  
269 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. Monthly Period
	domain.mRID	EIC code of the Synchronous Area. Coding Scheme: A01
	docstatus	A13: Withdrawn Only used in case a document has been submitted by mistake
Timeseries	mRID	Used
	businessType	C34: Frequency Containment Process Energy C36: Ramping Period Energy A21: Unintended Energy C35: FCPE price C37: RPE price C33: UE price
	product	8716867000016: Active power
	curveType	A01: Sequential Fixed Block 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: Not used (Synchronous area code already in header)  For the rest: EIC code of the importer LFC area/block or Synchronous area.  Coding Scheme: A01
	out_Domain	For FCPE price, RPE price and UE price: Not used (Synchronous area code already in header)  For the rest: EIC code of the exporter LFC area/block or Synchronous Area.  Coding Scheme: A01
connectingLine_RegisteredResource	Not used	
Series_Period	timeInterval	Used
	resolution	PT15M

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

270

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.