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# ENTSO-E GENERATION AND LOAD TRANSPARENCY PROCESS IMPLEMENTATION GUIDE

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APPROVED DOCUMENT

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**This document is maintained by the ENTSO-E CIM WG. Comments or remarks are to be provided at [cim@entsoe.eu](mailto:cim@entsoe.eu)**

## Revision History

Version	Release	Date	Comments
1	0	2013-06-24	First version
2	0	2013-09-12	Version taking into account the comments issued during the Public Consultation.
3	0	2014-01-24	Version taking into account comments in addition to correcting some typing errors. Alignment of the models and attribute names with the CIM model following integrity check. Correction to the use of Business Type A04 Approved by Market Committee on 2014-02-04.
4	0	2015-01-08	This version takes into account the EMFIP corrigendum version 5. The following changes have been made: <ul style="list-style-type: none"> <li>Generation and load document: Indicate in the generation and load document load dependency table for articles 14(c), 16(a) and 16(b and c) that the inBiddingZone.Domain should be used in the case of positive production and clarification for 16 (a).</li> </ul>
4	1	2016-04-28	Maintenance request EMFIP30:  The attributes based on ESMP_ActivePower or ESMP_Voltage has the following constraints:  <i>The maximum length of this information is 17 numeric characters.</i>  <i>The number of decimal places identifying the fractional part of the quantity is limited to one (1) only.</i>
4	2	2016-09-02	Maintenance request EMFIP33:  In the dependency table §3.3.11.1, article 14.1.d the two codes A40=Intraday process and A18=Intraday total are added to attribute process.processType.
5	0	2024-04-25	Maintenance request SDP01:  Monthly resolution may be used when submitting actual total load (TR art. 6.1.a) and net generation and consumption of pumps (TR art. 16.1.b&c) for statistical purposes.  Realigned document with new editorial standards: Added missing table of schema versions and removed chapters describing schemas and their attributes.  Approved by ICTC.

## Reference Documents

1. Commission Regulation No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council. (note: all articles mentioned in the current document come from this regulation).
2. Central Information Transparency Platform - Business Requirements Specification.
3. The ENTSO-E Harmonised Role Model.
4. A Common Identification System for the Energy Industry, The Energy Identification Coding Scheme – EIC.
5. The ENTSO-E Code List.
6. IEC 62325-301, Framework for energy market communications Common information model (CIM) Extensions for markets.
7. IEC 62325-351, Framework for energy market communications CIM European market model exchange profile.
8. IEC 62325-450, Profile and context modelling rules.
9. IEC 62361 part 100, Naming and design rules for CIM profiles to XML schema mapping.
10. The introduction of different time series possibilities (CurveType) within ENTSO-E electronic documents.
11. ENTSO-E XML namespace reference document version 2 release 0. This reference shall ensure to have compliant electronic document instance files; and in particular to apply the following recommendations:
  - **In order to enable flexibility, it is recommended that the schema location instruction (and xsi definition) in the schema compliant instance should not be used.**

# 1 INTRODUCTION

This implementation guide is one of the implementation guides drafted by ENTSO-E to enable the establishment of a common level of fundamental data transparency as per the Regulation on transparency and provision of information in European electricity markets.

This implementation guide focuses on defining the information to be exchanged for the publication of the Generation and Load data as defined in the EMFIP Business Requirements Specification.

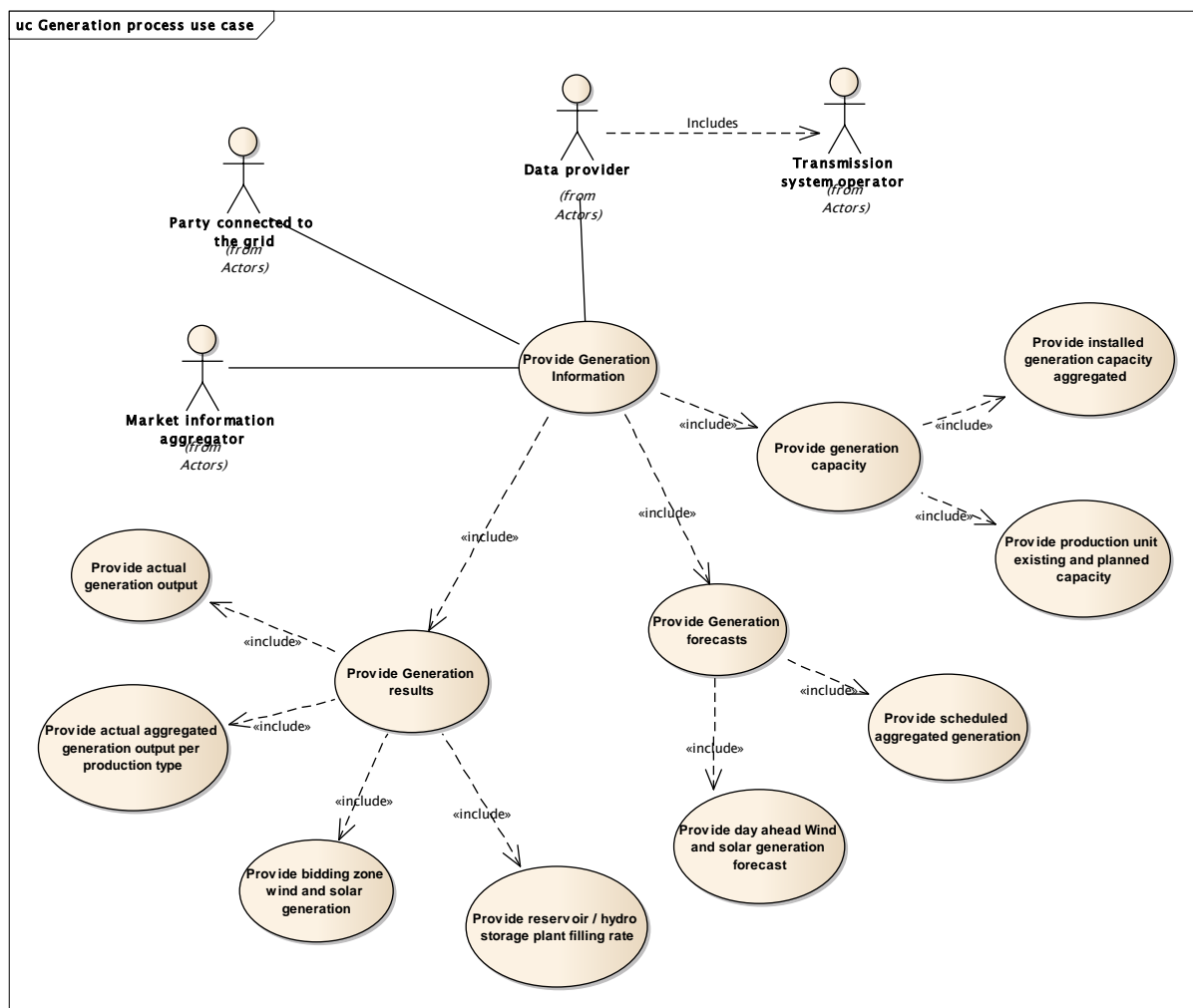
Its purpose is to facilitate the provision of Generation and Load (GL) information to a central information platform. This platform should enable the establishment of a coherent and consistent view of the European wholesale electricity market by all the market participants as well as to interested European consumers.

The implementation guide is one of the building blocks for using UML (Unified Modelling Language) based techniques in defining processes and documents for interchange between actors in the electrical industry in Europe.

This guide provides a standard for enabling a uniform layout for the transmission of Generation and Load data between the European electricity market participants and the Transparency platform via the Data Provider (who may be the Transmission System Operator). The information model within the guide shall ensure that a common interface can be provided between different software solutions.

## 2 THE GENERATION AND LOAD PROCESS OVERVIEW

### 2.1 BREAKDOWN OF THE GENERATION PROCESS



**FIGURE 1: INFORMATION EXCHANGE FOR THE PROVISION OF GENERATION INFORMATION**

The provision of generation information concerns 8 different categories of information as defined in the regulation:

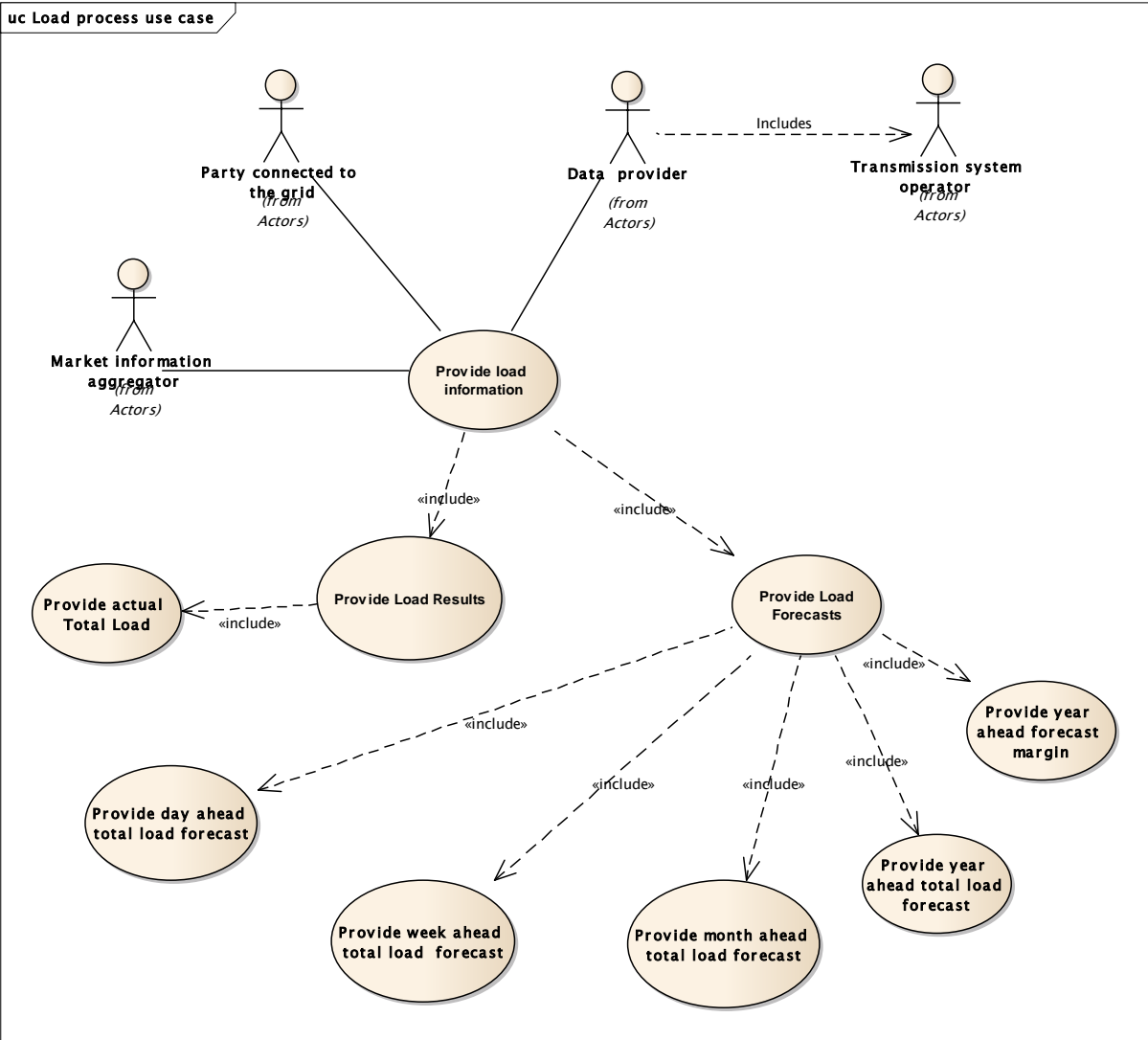
1. Installed generation capacity aggregated: The sum of installed generation capacity (MW) for existing production units per production type (article 14 [a]<sup>1</sup>).
2. Existing and planned production unit capacity: The installed generation capacity (MW) for each installed and planned production unit (article 14 [b]).

<sup>1</sup> All articles mentioned in this chapter can be found in [Reference 1]

- 107 3. Scheduled aggregated generation (MW): An estimate of the total scheduled  
108 generation per bidding zone, per each market time unit for the following day (article  
109 14 [c]).
- 110 4. Day ahead wind and solar generation forecast (MW): The forecast of the wind and  
111 solar power generation (MW) per bidding zone, per each market time unit of the  
112 following day (article 14 [d]).
- 113 5. Actual generation output (MW). The generation output detailed per generation unit  
114 (article 16 [a]).
- 115 6. Aggregated actual generation output per production type: The aggregated generation  
116 output (MW) per production type and per market time unit (article 16 [b]).
- 117 7. Bidding zone wind and solar generation: The estimated wind and solar power  
118 generation (MW) in each bidding zone per market time unit (article 16 [c]).
- 119 8. Reservoir / hydro storage plant filling rate: The weekly filling rate of all water reservoir  
120 and hydro storage plants (MWh) per bidding zone including the figure for the same  
121 week of the previous year (article 16 [d]).



## 2.2 BREAKDOWN OF THE LOAD PROCESS



**FIGURE 2: INFORMATION EXCHANGE FOR THE PROVISION OF LOAD INFORMATION**

The provision of load information concerns 6 different categories of information as defined in the regulation:

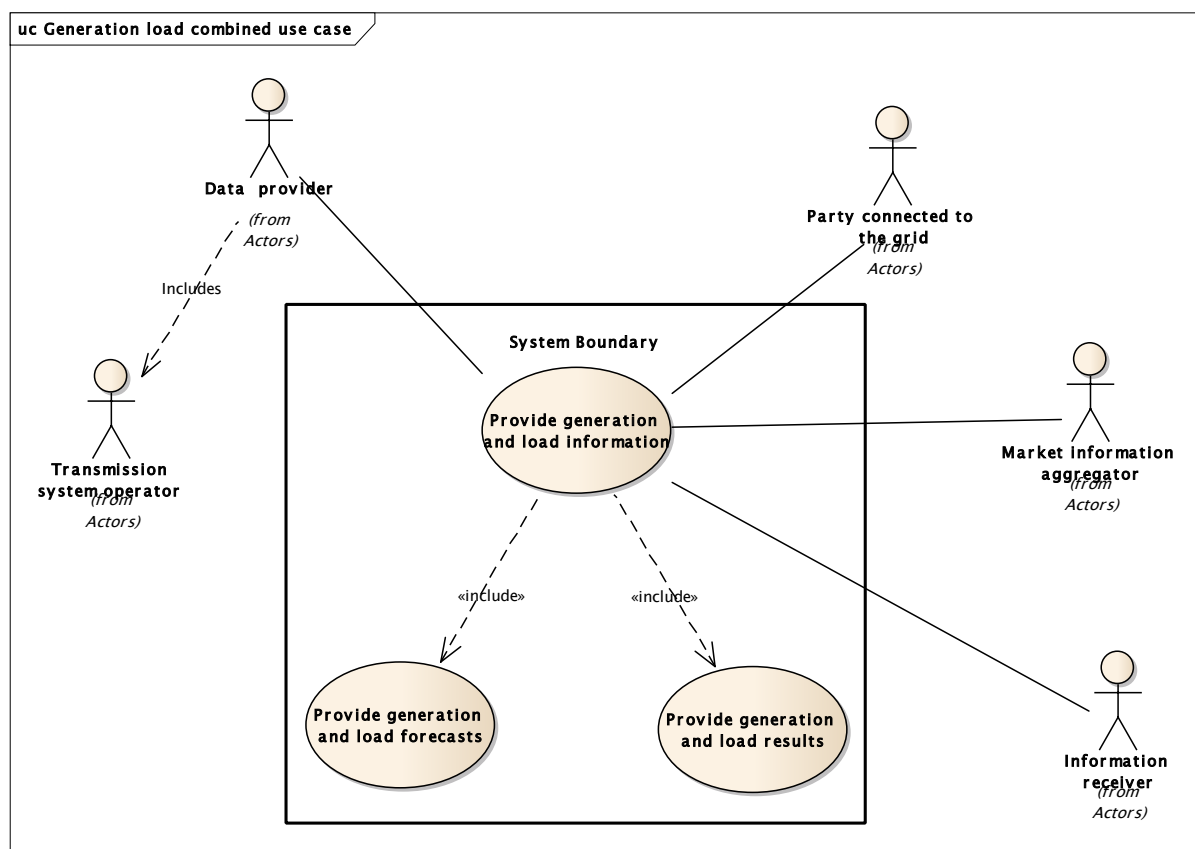
1. Total load: The total load per market time unit (article 6 [a]<sup>2</sup>).
2. Day ahead forecast: The day ahead forecast of the total load per market time unit (article 6 [b]).

<sup>2</sup> All articles mentioned in this chapter can be found in [Reference 1]

3. Week ahead forecast: A week-ahead forecast of the total load for every day of the following week which shall include a maximum and a minimum load value (article 6 [c]).
4. Month ahead forecast: A month ahead forecast of the total load for every week of the following month which shall include, for a given week, a maximum and a minimum load value (article 6 [d]).
5. Year ahead forecast: A year-ahead forecast of the total load for every week of the following year, which shall for a given week include a maximum and a minimum load value (article 6 [e]).
6. Year ahead forecast margin: The information is to be given per bidding zone evaluated at local market time unit (article 8).

## 2.3 MERGE OF GENERATION AND LOAD PROCESSES

The previous detailed processes for Generation and Load can be merged in the single use case as outlined in Figure 3 due to their very strong similarities in information requirements.



**FIGURE 3: INFORMATION EXCHANGE FOR THE PROVISION OF GENERATION AND LOAD INFORMATION**

149 Consequently the information exchanged for these two processes can be wrapped into a  
150 single generic information exchange structure. It is sufficient to differentiate between the  
151 “Load” or the “Generation” information in the electronic document through the use of a type  
152 that indicates whether it is related to “Generation” or “Load”.

### 3 GENERATION AND LOAD PROCESSING SEQUENCE

#### 3.1 GENERIC PROCESSING SEQUENCE

The generation and load process basically follows the periodicity that is required for the delivery of the information to the Transparency platform. Information has to be provided by the parties connected to the grid to the Data Provider (who may be a Transmission System Operator). The Data Provider assembles the information together and transmits it to the Market Information Aggregator for implementation on the Transparency Platform.

The “global” generic process sequence is outlined in Figure 4.

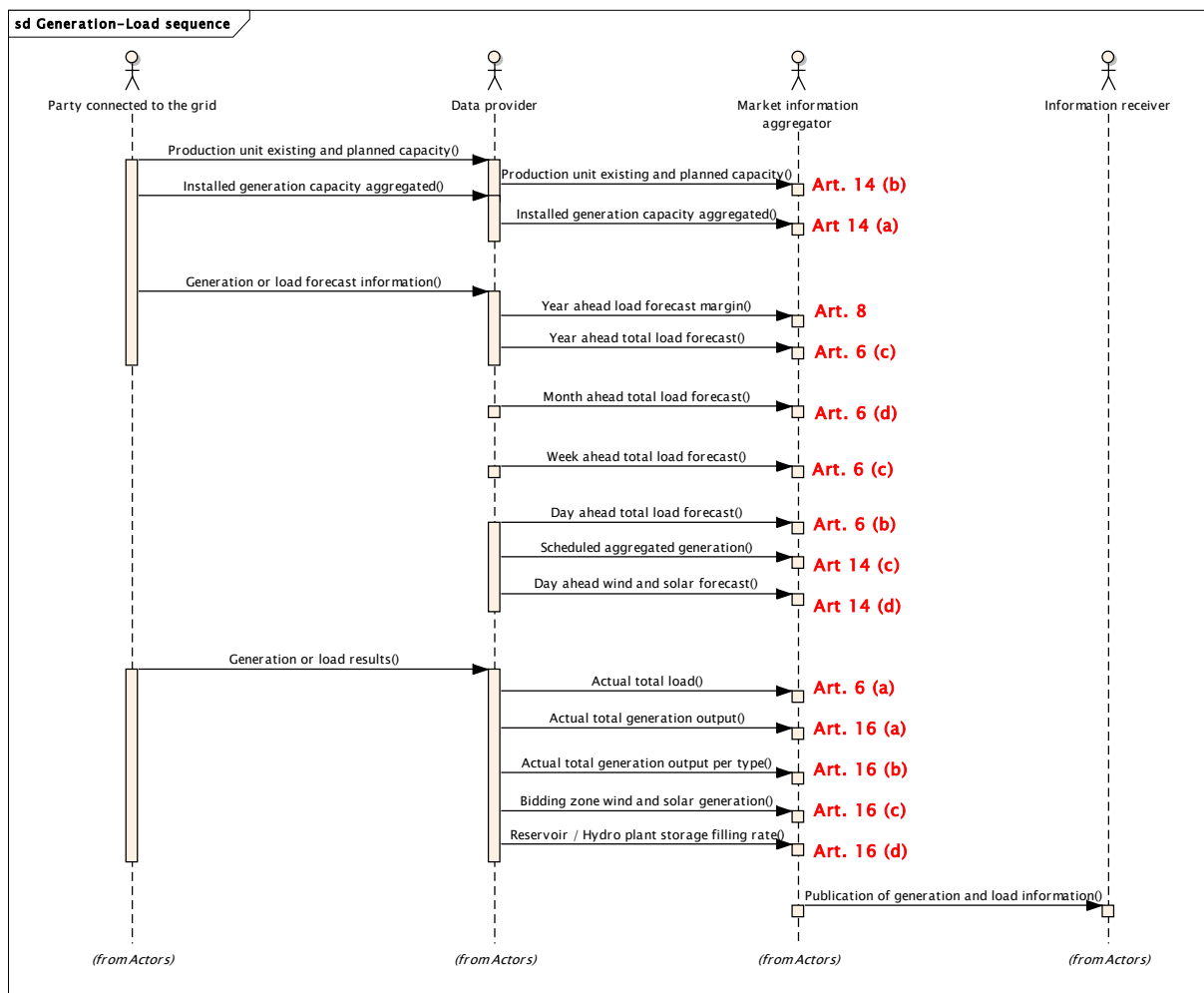


FIGURE 4: GENERIC GENERATION / LOAD PROCESS SEQUENCE<sup>3</sup>

<sup>3</sup> All articles mentioned in this diagram can be found in [Reference 1]

The provision of generation or load forecast information requires the information to be exchanged between the Party Connected to the Grid and the Data Provider.

The information is provided respecting the periodicity constraints for various forecast information. However local market rules may make use of other means to provide this information.

The Data Provider provides the following information to the Market Information Aggregator once it has been received from the Party Connected to the Grid:

- Wind and solar forecasts
- Generation capacity forecasts
- Load / generation forecasts
- Reservoir/ hydro storage plant filling rate.

In addition the Data Provider provides the following additional information to the Market Information aggregator:

- Generation unit output
- Production type output
- Actual total load.

As the information is received the Market Information Aggregator publishes it so that it is available for the market. Information Receivers may then look up or download the available information.

Following the reception of a generation and load market document, the acknowledgement business process as per IEC 62325-451-1 shall be applied. In particular, the Data Provider shall receive an acknowledgement stating whether the document has been accepted or rejected and the reasons for the rejection.

## 3.2 APPLICABLE ESMP DOCUMENTS

This implementation guide assumes the use of the following EDI documents and contextual and assembly models (also referred to as XSD or schema versions):

**Table 1 – Applicable ESMP documents**

ESMP document	version
Generation Load market document	urn:iec62325.351:tc57wg16:451-6:generationloadaddocument:3:2

191 All schemas are available for download from the ENTSO-E website.

## 3.3 RULES GOVERNING THE GENERATION AND LOAD MARKET DOCUMENT

### 3.3.1 THE RETRANSMISSION OF HISTORICAL INFORMATION

Information for a given period in time (e.g. a day) may, depending of the nature of the information, be sent via several distinct transmissions (e.g. a document for each hour of the day). For example a separate electronic document could be sent every hour containing a quantity for the hour in question. Such documents will each have a distinct identification and version. The version could change in this case to correct the hour's quantity.

It may be necessary to retransmit at the end of the period the complete set of historical information. This is carried out through the creation of a new document covering the complete period (e.g. all the hours in the day) that includes all the quantities that have been previously sent with any corrections that are necessary.

Every document version has a creation date and time that could be effectively used as the document timestamp since a new version of a document cancels and replaces the previous version of the document.

### 3.3.2 MISSING INFORMATION

If for a given period there is missing information then the use of gaps as defined in [10] (*"The introduction of different time series possibilities (CurveType) within ENTSO-E electronic documents"*) shall be applied. A gap is identified through the use of two periods, where the end of the first period does not coincide with the period of the second. The difference between the two periods represents a gap where data is missing.

### 3.3.3 RULES GOVERNING THE TIME\_PERIOD.TIMEINTERVAL ATTRIBUTE

A week always starts on a Monday and ends on a Sunday. A week is assigned to a month if the Monday of the week in question is included in the month that the data is intended to cover.

### 3.3.4 RULES GOVERNING THE TIME\_SERIES CLASS

A time series shall exist for each type of information content as defined in the dependency table.

If the information contained in a previously transmit time series is to be cancelled then a new version of the original document shall be sent with the time series in question completed with the information from the previous transmission in addition to the attribute cancelled being put to A01 = "Yes", i.e. the time series data has been withdrawn. All the Periods below the time series shall be removed.

An electronic document under certain circumstances may contain no time series. This signifies that in a download condition none of the requested information was available.

In a submission scenario it may be used to meet a submission deadline although no information is available.

### 3.3.5 RULES GOVERNING THE INBIDDINGZONE\_DOMAIN.MRID ATTRIBUTE

This identifies the bidding zone where energy is going for which the generation information is being provided.

In the case of generation this indicates generation output.

### 3.3.6 RULES GOVERNING THE OUTBIDDINGZONE\_DOMAIN.MRID ATTRIBUTE

This identifies the bidding zone where energy is going out from for which the load or generation information is being provided.

In the case of generation this indicates the load used by the generation unit.

### 3.3.7 RULES GOVERNING THE SERIES\_PERIOD CLASS

There may be more than one series\_period class for a time series. The interval of the series\_period must fall within the time interval declared in the document header.

The total number and positions of points within the series period must correspond to the curve type and the series period's resolution and time interval.

If there are no values available within a given period, then the period class shall stop where the date time has no value and a new period class shall be created with the date and time corresponding to the date and time where data exists. Hence, a given document instance may have Time Intervals in the Series Period class that do not cover the complete Period Time Interval.

If a time series is suppressed then the period information is not provided.

### 3.3.8 RULES GOVERNING THE NOMINALP ATTRIBUTE

This represents the installed generation capacity for the production unit being described. This value shall always be provided in MAW. All quantities are non-signed values.

### 3.3.9 DOCUMENT INSTANCE IMPLEMENTATION

The XML documents described in this implementation guide are to be used for the upload of information to the transparency platform; they may also be used for the download of information to market participants in order to enable automatic processing of the information within their systems.



Consequently attributes that describe basic configuration information (such as name, voltage level, etc.) have been included in the XML documents as optional attributes that may be used only in the case where information is downloaded from the platform. This information shall not be used in the case where information is uploaded to the platform.

### 3.3.10 CODING SCHEME

A01 = EIC coding scheme is the single supported coding scheme.

### 3.3.11 DOCUMENT ATTRIBUTE DEPENDENCIES

#### 3.3.11.1 GENERATION DEPENDENCY TABLE<sup>4</sup>

Article involved Attribute		Art. 14(a) Installed production capacity aggregated per production type	Art. 14(b) Production unit existing and planned capacity	Art. 14(c) Day-ahead aggregated generation	Art. 14(d) Day-ahead generation forecast for wind and solar
	type	A68: installed generation per type	A71: generation forecast	A71: generation forecast	A69: wind and solar forecast
	process.processType	A33: year ahead	A33: year ahead	A01: day-ahead	A01: day-ahead A40: Intraday process A18: Intraday total
	sender_MarketParticipant.marketRole.type	A20 = Party Connected to the Grid A39 = Data Provider A04 = System Operator or TSO A32 = Market Information Aggregator			
	receiver_MarketParticipant.marketRole.type	A39 = Data Provider A32 = Market Information Aggregator A04 = System Operator or TSO A33 = Information Receiver			
TimeSeries	businessType	A37: installed generation	A37: installed generation	A01: production	A93: wind generation A94: solar generation
	objectAggregation	A08: resource type	A06: resource object	A01: area	A08: resource type
	inBiddingZone_Domain.mRID	Used	Used	Used (production positive)	Used
	outBiddingZone_Domain.mRID	Not used	Not used	Used (production negative)	Not used
	registeredResource.mRID	Not used	Used	Not used	Not used
	registeredResource.name	Not used	Used only for download transmissions. Not used for upload transmissions	Not used	Not used
	quantity_Measure_Unit.name	MAW	MAW	MAW	MAW
MktPSRType	psrType	Used	Used, if nominal for production unit is provided in download context	Not used	Used
	voltage_PowerSystemResources.highVoltageLimit	Not used	Used only for download transmissions. Not used for upload transmissions	Not used	Not used
PowerSystem Resources	mRID	Not used	Not used	Not used	Not used
	name	Not used	Not used	Not used	Not used
	nominalP	Not used	Used only for download transmission for production unit nominal Not used for upload	Not used	Not used
Period	resolution	P1Y	P1Y	PT60M PT30M PT15M	PT60M PT30M PT15M

<sup>4</sup> All articles mentioned in this table can be found in [Reference 1]

Article involved Attribute		Art. 14(a) Installed production capacity aggregated per production type	Art. 14(b) Production unit existing and planned capacity	Art. 14(c) Day-ahead aggregated generation	Art. 14(d) Day-ahead generation forecast for wind and solar
Point	secondaryQuantity	Not used	Not used	Not used	Not used

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Article involved Attribute		Art. 16(a) Actual generation per unit	Art. 16(b and c) Aggregated generation per type	Art. 16(d) Reservoir, hydro storage filing rate
	type	A73: actual generation	A75: actual generation per type A74: wind and solar generation	A72: reservoir filing generation
	process.processType	A16: realised	A16: realised	A16: realised
	sender_MarketParticipant.marketRole.type	A20 = Party Connected to the Grid A39 = Data Provider A04 = System Operator or TSO A32 = Market Information Aggregator		
	receiver_MarketParticipant.marketRole.type	A39 = Data Provider A32 = Market Information Aggregator A04 = System Operator or TSO A33 = Information Receiver		
TimeSeries	businessType	A01: production	A01: production A93: wind generation A94: solar generation	A01: production
	objectAggregation	A06: resource object	A08: resource type	A01: area
	inBiddingZone_Domain.mRID	Used (production positive)	Used (production positive)	Used
	outBiddingZone_Domain.mRID	Used (production negative)	Used (production negative)	Not used
	registeredResource.mRID	Not used	Not used	Not used
	registeredResource.name	Not used	Not used	Not used
	quantity_Measure_Unit.name	MAW	MAW	MWH
	curveType	A01 = Sequential fixed size block A03 = Variable sized block		
MktP SRT	psrType	Used	Used	Not used
	voltage_PowerSystemResources.highVoltageLimit	Not used	Not used	Not used
PowerSystem Resources	mRID	Used	Not used	Not used
	name	Used only for download transmissions. Not used for upload transmissions.	Not used	Not used
	nominalP	Not used	Not used	Not used
Period	resolution	PT60M PT30M PT15M	P1M <sup>1)</sup> PT60M PT30M PT15M	P7D
Point	secondaryQuantity	Not used	Not used	Not used

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Note<sup>1)</sup>: Submission in monthly resolution is optional and intended for statistical purposes only, to complement the mandatory submission in MTU resolution. When submitting in monthly resolution, an average value per month in MW shall be provided. Transparency platform will convert submitted data to GWh and publish as such.

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### 3.3.11.2 LOAD DEPENDENCY TABLE<sup>5</sup>

Article involved Attribute		Art. 6(a) Actual total load	Art. 6(b) Day-ahead total load forecast	Art. 6(c) Week-ahead total load forecast
	type	A65: total load	A65: total load	A65: total load
	process.processType	A16: realised	A01: day-ahead	A31: week-ahead
	sender_MarketParticipant.marketRole.type	A20 = Party Connected to the Grid A39 = Data Provider A04 = System Operator or TSO A32 = Market Information Aggregator		
	receiver_MarketParticipant.marketRole.type	A39 = Data Provider A32 = Market Information Aggregator A04 = System Operator or TSO A33 = Information Receiver		
TimeSeries	businessType	A04: consumption	A04: consumption	A04: consumption A60: minimum possible A61: maximum possible
	objectAggregation	A01: area	A01: area	A01: area
	inBiddingZone_Domain.mRID	Not used	Not used	Not used
	outBiddingZone_Domain.mRID	Used	Used	Used
	registeredResource.mRID	Not used	Not used	Not used
	registeredResource.name	Not used	Not used	Not used
	quantity_Measure_Unit.name	MAW	MAW	MAW
	curveType	A01 = Sequential fixed size block A03 = Variable sized block		
	psrType	Not used	Not used	Not used
Period	resolution	P1M <sup>1)</sup> PT60M PT30M PT15M	PT60M PT30M PT15M	P1D PT60M PT30M PT15M

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<sup>5</sup> All articles mentioned in this table can be found in [Reference 1]

Note: if the businessType corresponds to A04 then A60 and A61 shall not be used. If A04 is not used then A60 and A61 shall be used

Note<sup>1)</sup>: Submission in monthly resolution is optional and intended for statistical purposes only, to complement the mandatory submission in MTU resolution. When submitting in monthly resolution, an average value per month in MW shall be provided. Transparency platform will convert submitted data to GWh and publish as such.

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Article involved Attribute		Art. 6(d) Month-ahead total load forecast	Art. 6(e) Year-ahead total load forecast	Art. 8 Year-ahead forecast margin
	type	A65: total load	A65: total load	A70: load forecast margin
	process.processType	A32: month-ahead	A33: year-ahead	A33: year-ahead
	sender_MarketParticipant.marketRole.type	A20 = Party Connected to the Grid A39 = Data Provider A04 = System Operator or TSO A32 = Market Information Aggregator		
	receiver_MarketParticipant.marketRole.type	A39 = Data Provider A32 = Market Information Aggregator A04 = System Operator or TSO A33 = Information Receiver		
TimeSeries	businessType	A04: consumption A60: minimum possible (note: this must be by week) A61: maximum possible (note: this must be by week)	A04: consumption A60: minimum possible (note: this must be by week) A61: maximum possible (note: this must be by week)	A91: positive forecast margin (if installed capacity > load forecast) A92: negative forecast (if load forecast > installed capacity)
	objectAggregation	A01: area	A01: area	A01: area
	inBiddingZone_Domain.mRID	Not used	Not used	Not used
	outBiddingZone_Domain.mRID	Used	Used	Used
	registeredResource.mRID	Not used	Not used	Not used
	registeredResource.name	Not used	Not used	Not used
	quantity_Measure_Unit.name	MAW	MAW	MAW
	curveType	A01 = Sequential fixed size block A03 = Variable sized block		
MktPSR Type	psrType	Not used	Not used	Not used
Period	resolution	P7D PT60M PT30M PT15M	P7D PT60M PT30M PT15M	P1Y

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