

## DIN EN IEC 62325-451-6



ICS 27.010; 33.200

Ersatz für  
DIN EN 62325-451-6:2017-05  
Siehe Anwendungsbeginn

**Kommunikation im Energiemarkt –  
Teil 451-6: Veröffentlichung von Marktinformationen, kontextbezogene  
Modelle und Einbindungsmodelle für den europäischen Markt  
(IEC 62325-451-6:2018);  
Englische Fassung EN IEC 62325-451-6:2018**

Framework for energy market communications –  
Part 451-6: Publication of information on market, contextual and assembly models for  
European-style markets  
(IEC 62325-451-6:2018);  
English version EN IEC 62325-451-6:2018

Cadre pour les communications pour le marché de l'énergie –  
Partie 451-6: Publication d'informations de marché, modèles contextuels et modèles  
d'assemblage pour les marchés de style européen  
(IEC 62325-451-6:2018);  
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## **Anwendungsbeginn**

Anwendungsbeginn für die von CENELEC am 2018-06-12 angenommene Europäische Norm als DIN-Norm ist 2019-11-01.

Für DIN EN 62325-451-6:2017-05 besteht eine Übergangsfrist bis 2021-06-12.

## **Nationales Vorwort**

*Vorausgegangener Norm-Entwurf: E DIN EN 62325-451-6:2018-04.*

Für dieses Dokument ist das nationale Arbeitsgremium K 952 „Netzleittechnik“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE ([www.dke.de](http://www.dke.de)) zuständig.

Die enthaltene IEC-Publikation wurde vom TC 57 „Power systems management and associated information exchange“ erarbeitet.

Das IEC-Komitee hat entschieden, dass der Inhalt dieses Dokuments bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu diesem Dokument angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees das Dokument

- bestätigt,
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- durch eine Folgeausgabe ersetzt oder
- geändert.

Für den Fall einer undatierten Verweisung im normativen Text (Verweisung auf ein Dokument ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils aktuellste Ausgabe des in Bezug genommenen Dokuments.

Für den Fall einer datierten Verweisung im normativen Text bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Dokuments.

Der Zusammenhang der zitierten Dokumente mit den entsprechenden deutschen Dokumenten ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Das Präsidium des DIN hat mit Präsidialbeschluss 1/2004 festgelegt, dass DIN-Normen, deren Inhalt sich auf internationale Arbeitsergebnisse der Informationsverarbeitung gründet, unter bestimmten Bedingungen allein in englischer Sprache veröffentlicht werden dürfen. Diese Bedingungen sind für die vorliegende Norm erfüllt.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN IEC 62325-451-6 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt, und Abschnitt 3, der die Begriffe und Abkürzungen festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA der vorliegenden Norm hinzugefügt. Für die meisten der verwendeten Begriffe existieren keine gebräuchlichen deutschen Benennungen, da sich die deutschen Anwender in der Regel ebenfalls der englischen Benennungen bedienen. Diese Norm steht nicht in unmittelbarem Zusammenhang mit Rechtsvorschriften und ist nicht als Sicherheitsnorm anzusehen.

Das Original-Dokument enthält Bilder in Farbe, die in der Papierversion in einer Graustufen-Darstellung wiedergegeben werden. Elektronische Versionen dieses Dokuments enthalten die Bilder in der originalen Farbdarstellung.

## Änderungen

Gegenüber DIN EN 62325-451-6:2017-05 wurden folgende Änderungen vorgenommen:

- a) Hinzufügen des neuen Dokumentes kontextbezogenen und Einbindungsmodelle zur Informations-Veröffentlichung über die Teilnehmer der Übertragungskapazitätszuweisung;
- b) Aktualisierung von TransmissionNetwork\_MarketDocument, um Information über inbegriffene Übertragungszuweisung an Grenzen von Drittländern zu veröffentlichen;
- c) Aktualisierung von Unavailability\_MarketDocument, um Informationen über Ausfälle, die Bezug zu Verbraucher-Einheiten haben, zu veröffentlichen;
- d) Aktualisierung von Balancing\_MarketDocument-Modell, um Informationen für Ressourcen-Einheiten, die entweder verbrauchen oder erzeugen können, zu veröffentlichen.

## Frühere Ausgaben

DIN EN 62325-451-6: 2017-05

## Nationaler Anhang NA (informativ)

### Auszugsweise Übersetzung

Reihenfolge und Inhalt der folgenden Abschnitte sind identisch mit denen in den jeweiligen Abschnitten der Englischen Fassung.

#### 1 Anwendungsbereich

Dieser Teil der IEC 62325 legt ein UML-Paket für den Geschäftsprozess der Marktinformationspublikation und die damit verbundenen Dokument-kontextbezogenen Modelle, Einbindungsmodelle (en: assembly models) und XML-Schemata für den Einsatz in Strommärkten nach europäischer Art fest.

Dieser Teil der IEC 62325 basiert auf dem Markt-kontextbezogenen Modell nach europäischer Art (IEC 62325-351). Der Geschäftsprozess, der von diesem Teil der IEC 62325 abgedeckt wird, ist in Abschnitt 5 beschrieben.

Die relevanten aggregierten Kernkomponenten (en: aggregate core components; ACCs), die in IEC 62325-351 definiert sind, wurden kontextualisiert in die aggregierten Geschäfts-Informationseinheiten (en: business information entities; ABIEs), um die Anforderungen des Geschäftsprozesses der Veröffentlichung in Märkten nach europäischer Art zu erfüllen.

#### 3 Begriffe

Für die Anwendung dieses Dokuments gelten die Begriffe nach IEC 61970-2 und die folgenden Begriffe.

ISO und IEC stellen terminologische Datenbanken für die Verwendung in der Normung unter den folgenden Adressen bereit:

- IEC Electropedia: verfügbar unter <http://www.electropedia.org/>
- ISO Online Browsing Platform: verfügbar unter <http://www.iso.org/obp>

##### 3.1

##### **aggregierte Geschäfts-Informationseinheit**

##### **ABIE**

(en: aggregate business information entity)

Wiederverwendung einer aggregierten Kernkomponente (ACC) in einem festgelegten Geschäftsbereich

Anmerkung 1 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

##### 3.2

##### **aggregierte Kernkomponente**

##### **ACC**

(en: aggregate core component)

Anhäufung zusammengehöriger Geschäftsinformationsteile, die unabhängig von einem bestimmten Geschäftskontext zusammen eine gesonderte Bedeutung für das Geschäft haben

Anmerkung 1 zum Begriff: Ausgedrückt durch Modellierungsbegriffe, ist dies die Darstellung einer Objektklasse, unabhängig von einem bestimmten Geschäftskontext.

Anmerkung 2 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

[QUELLE: ISO/TS 15000-5:2005, Abschnitt 9, modifiziert – der zweite Satz wurde in Anmerkung 1 zum Begriff überführt]

**3.3****Anwendungsprogramm-Schnittstelle****API**

(en: application program interface)

Menge von öffentlichen Funktionen, welche von einer ausführbaren Anwendungskomponente für die Verwendung durch andere ausführbare Anwendungskomponenten bereitgestellt wird

Anmerkung 1 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

**3.4****Einbindungsmodell**

(en: assembly model)

Modell, welches Informationen in einem Geschäftskontext für das Einbinden in elektronische Dokumente für den Datenaustausch aufbereitet

**3.5****basierend auf****IsBasedOn**

(en: based on; IsBasedOn)

Verwendung eines Artefakts, welches entsprechend den Anforderungen eines spezifischen Geschäftskontexts eingeschränkt ist

[QUELLE: IEC 62325-450:2013, 3.4]

**3.6****Geschäftskontext**

(en: business context)

formale Beschreibung einer speziellen Geschäftssituation, die aus den Werten einer Gruppe von Kontextkategorien bestimmt wurde und es ermöglicht, unterschiedliche Geschäftssituationen eindeutig voneinander zu trennen

[QUELLE: UN/CEFACT, Unified Context Methodology Technical Specification]

**3.7****Profil des Europäischen Marktes****ESMP**

(en: European style market profile)

Gegenstand von IEC 62325-351, beschreibt die Gruppe von Klassen und Zusammenhängen, die zur Erzeugung aller Teile IEC 62325-451-x verwendet werden

Anmerkung 1 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

**3.8****Informationsmodell**

(en: information model)

Darstellung von Konzeptionen, Beziehungen, Beschränkungen, Regeln und Operationen zur Festlegung von Datensemantiken für eine ausgewählte Diskursdomäne

Anmerkung 1 zum Begriff: Es kann gemeinsam anwendbare, feste und geordnete Informationsstrukturanforderungen an den Domänenkontext bereitstellen.

[QUELLE: IEC 62325-450:2013, 3.6]

### 3.9

#### **Marktmanagementsystem**

##### **MMS**

(en: market management system)

Computersystem, das eine Softwareplattform für die grundlegenden Supportdienstleistungen und eine Reihe von Anwendungen mit der Funktionalität beinhaltet, die für das effiziente Management des Elektrizitätsmarktes notwendig ist

Anmerkung 1 zum Begriff: Diese Softwaresysteme in einem Elektrizitätsmarkt dürfen Unterstützung für Kapazitätsvergabe, Energiezeitplanung, Hilfs- oder andere Dienste, Echtzeit-Abläufe und Abrechnungen einschließen.

Anmerkung 2 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

### 3.10

#### **Geschäfts-Informationseinheiten-Nachrichten**

##### **MBIE**

(en: message business information entity)

Zusammenfassung einer Gruppe von ABIEs, die eine definierte Menge von Einbindungsvorschriften berücksichtigt

Anmerkung 1 zum Begriff: Diese Anmerkung gilt nur für die französische Sprachfassung.

### 3.11

#### **Profil**

(en: profile)

grundlegender Rahmen für alle Informationen, welche erforderlich sind, um einer spezifischen Umgebung zu genügen

[QUELLE: IEC 62325-450:2013, 3.7]

English Version

**Framework for energy market communications -  
Part 451-6: Publication of information on market, contextual and  
assembly models for European-style markets  
(IEC 62325-451-6:2018)**

Cadre pour les communications pour le marché de l'énergie  
- Partie 451-6: Publication d'informations de marché,  
modèles contextuels et modèles d'assemblage pour les  
marchés de style européen  
(IEC 62325-451-6:2018)

Kommunikation im Energiemarkt -  
Teil 451-6: Veröffentlichung von Marktinformationen,  
kontextbezogene Modelle und Einbindungsmodelle für den  
europäischen Markt  
(IEC 62325-451-6:2018)

This European Standard was approved by CENELEC on 2018-06-12. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## **European foreword**

The text of document 57/1955/FDIS, future edition 2 of IEC 62325-451-6, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62325-451-6:2018.

The following dates are fixed:

- latest date by which the document has to be (dop) 2019-03-12  
implemented at national level by  
publication of an identical national  
standard or by endorsement
- latest date by which the national (dow) 2021-06-12  
standards conflicting with the  
document have to be withdrawn

This document supersedes EN 62325-451-6:2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

## **Endorsement notice**

The text of the International Standard IEC 62325-451-6:2018 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

|               |      |                             |
|---------------|------|-----------------------------|
| IEC 61968-11  | NOTE | Harmonized as EN 61968-11.  |
| IEC 61970-301 | NOTE | Harmonized as EN 61970-301. |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

| <u>Publication</u> | <u>Year</u> | <u>Title</u>                                                                                                                                                                        | <u>EN/HD</u>     | <u>Year</u> |
|--------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|
| IEC/TS 61970-2     | -           | Energy management system application program interface (EMS-API) - Part 2: Glossary                                                                                                 | CLC/TS 61970-2   | -           |
| IEC 62325-301      | -           | Framework for energy market communications - Part 301: Common information model (CIM) extensions for markets                                                                        | EN IEC 62325-301 | -           |
| IEC 62325-351      | 2016        | Framework for energy market communications - Part 351: CIM European market model exchange profile                                                                                   | EN 62325-351     | 2016        |
| IEC 62325-450      | 2013        | Framework for energy market communications - Part 450: Profile and context modelling rules                                                                                          | EN 62325-450     | 2013        |
| IEC 62325-451-1    | -           | Framework for energy market communications - Part 451-1: Acknowledgement business process and contextual model for CIM European market                                              | EN 62325-451-1   | -           |
| IEC 62325-451-3    | -           | Framework for energy market communications - Part 451-3: Transmission capacity allocation business process (explicit or implicit auction) and contextual models for European market | EN 62325-451-3   | -           |
| IEC 62325-451-5    | -           | Framework for energy market communications - Part 451-5: Problem statement and status request business processes, contextual and assembly models for European market                | EN 62325-451-5   | -           |
| IEC 62361-100      | -           | Power systems management and associated information exchange - Interoperability in the long term - Part 100: CIM profiles to XML schema mapping                                     | EN 62361-100     | -           |

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## INTRODUCTION

This document is part of the IEC 62325 series for deregulated energy market data exchanges based on the European-style market profile. This part of IEC 62325 defines the document contextual models, the message assembly models as well as the XML schemas to be used for the market information publication process, also called the transparency process.

The principal objective of the IEC 62325 series is to produce standards which facilitate the integration of market application software developed independently by different vendors into a market management system, between market management systems and market participant systems. This is accomplished by defining message exchanges to allow these applications or systems access to public data and exchange information independent of how such information is represented internally.

The common information model (CIM), i.e. IEC 62325-301, IEC 61970-301 and IEC 61968-11, specifies the basis for the semantics for message exchange.

This European style market profile is based on different parts of the CIM IEC standards and specifies the content of the messages exchanged.

This document provides, for the European-style market profile, the publication (or transparency) information exchanges to submit either to a data aggregator or to an electronic publication platform the necessary information to be published about the electricity market. These market processes are based on the European regulations (No. 1227/2011 and No. 543/2013), and on the concepts of third party access and zonal markets. This part of IEC 62325 was originally based upon the work of the European Network of Transmission System Operators (ENTSO-E) Working Group EDI.

## FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

### Part 451-6: Publication of information on market, contextual and assembly models for European-style markets

#### 1 Scope

This part of IEC 62325 specifies a UML package for the market information publication business process and its associated document contextual models, assembly models and XML schemas for use within the European-style electricity markets.

This part of IEC 62325 is based on the European-style market contextual model (IEC 62325-351). The business process covered by this part of IEC 62325 is described in Clause 5.

The relevant aggregate core components (ACCs) defined in IEC 62325-351 have been contextualised into aggregated business information entities (ABIEs) to satisfy the requirements of the European-style market publication business process.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TS 61970-2, *Energy management system application program interface (EMS-API) – Part 2: Glossary*

IEC 62325-301, *Framework for energy market communications – Part 301: Common information model (CIM) extensions for markets*

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, *Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market*

IEC 62325-451-3, *Framework for energy market communications – Part 451-3: Transmission capacity allocation business process (explicit or implicit auction) and contextual models for European market*

IEC 62325-451-5, *Framework for energy market communications – Part 451-5: Problem statement and status request business processes, contextual and assembly models for European market*

IEC 62361-100, *Power systems management and associated information exchange – Interoperability in the long term – Part 100: CIM profiles to XML schema mapping*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 61970-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE General glossary definitions can be found in IEC 60050, *International Electrotechnical Vocabulary*.

#### 3.1 aggregate business information entity ABIE

re-use of an aggregate core component (ACC) in a specified business

Note 1 to entry: This note applies to the French language only.

#### 3.2 aggregate core component ACC

collection of related pieces of business information that together convey a distinct business meaning, independent of any specific business context

Note 1 to entry: Expressed in modelling terms, this is the representation of an object class, independent of any specific business context.

Note 2 to entry: This note applies to the French language only.

[SOURCE: ISO TS 15000-5:2005, Clause 9, modified – The second sentence has been transformed into Note 1 to entry.]

#### 3.3 application program interface API

set of public functions provided by an executable application component for use by other executable application components

Note 1 to entry: This note applies to the French language only.

#### 3.4 assembly model

model that prepares information in a business context for assembly into electronic documents for data interchange

#### 3.5 based on IsBasedOn

use of an artefact that has been restricted according to the requirements of a specific business context

[SOURCE: IEC 62325-450:2013, 3.4]

#### 3.6 business context

formal description of a specific business circumstance as identified by the values of a set of context categories, allowing different business circumstances to be uniquely distinguished

[SOURCE: UN/CEFACT, Unified Context Methodology Technical Specification]

### 3.7

#### **European style market profile**

##### **ESMP**

object of IEC 62325-351, describing the set of classes and associations used to generate all the parts of IEC 62325-451-x

Note 1 to entry: This note applies to the French language only.

### 3.8

#### **information model**

representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse

Note 1 to entry: It can provide shareable, stable, and organized structure of information requirements for the domain context.

[SOURCE: IEC 62325-450:2013, 3.6]

### 3.9

#### **market management system**

##### **MMS**

computer system comprised of a software platform providing basic support services and a set of applications providing the functionality needed for the effective management of the electricity market

Note 1 to entry: These software systems in an electricity market may include support for capacity allocation, scheduling energy, ancillary or other services, real-time operations and settlements.

Note 2 to entry: This note applies to the French language only.

### 3.10

#### **message business information entity**

##### **MBIE**

aggregation of a set of ABIEs that respects a define set of assembly rules

Note 1 to entry: This note applies to the French language only.

### 3.11

#### **profile**

basic outline of all the information that is required to satisfy a specific environment

[SOURCE: IEC 62325-450:2013, 3.7]

## **4 Document contextual model and message assembly model basic concepts**

### **4.1 Overview**

IEC 62325-450 defines a set of CIM profiles that follows a layered modelling framework as outlined in Figure 1 going from the common information model (CIM), to different regional contextual models and their subsequent contextualized documents for information exchange; the final step being the message specifications for information interchange.

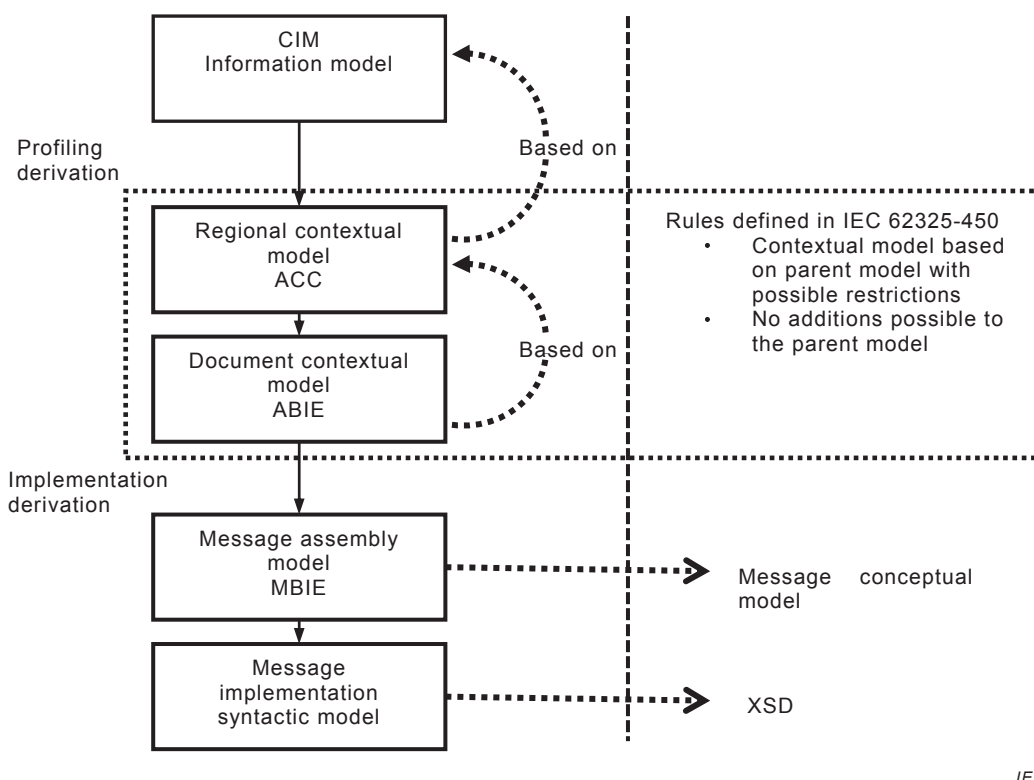


**Figure 1 – IEC 62325-450 modelling framework**

The regional contextual models are the basic components that are necessary to build electronic documents for information interchange. The European style market contextual model (IEC 62325-351) is, as an example, a regional contextual model based on IEC 62325-301. The components are also termed "aggregate core components" (ACCs).

A document contextual model is based upon a specific business requirements specification and is constructed from the contextualisation of the ACCs that can be found in the European-style market contextual model. The contextualised ACCs at this stage are termed "aggregate business information entities" (ABIEs). These ABIEs are the constructs that are assembled together into a specific electronic document to satisfy the information requirements outlined in the business requirements specification. The transformation from an ACC to an ABIE shall respect the rules defined in IEC 62325-450.

Once a document contextual model has been built that satisfactorily meets the business requirements, a message assembly model can be automatically generated from it. The automatic generation respects the rules defined in IEC 62361-100.

XML schema may then be automatically generated from the message assembly model. If necessary, specific mapping can take place at this stage to transform the CIM class and attribute names into more market resilient names.

## 4.2 European style market package structure (ESMP)

The main package structure of the European-style market profile is described in Figure 2.

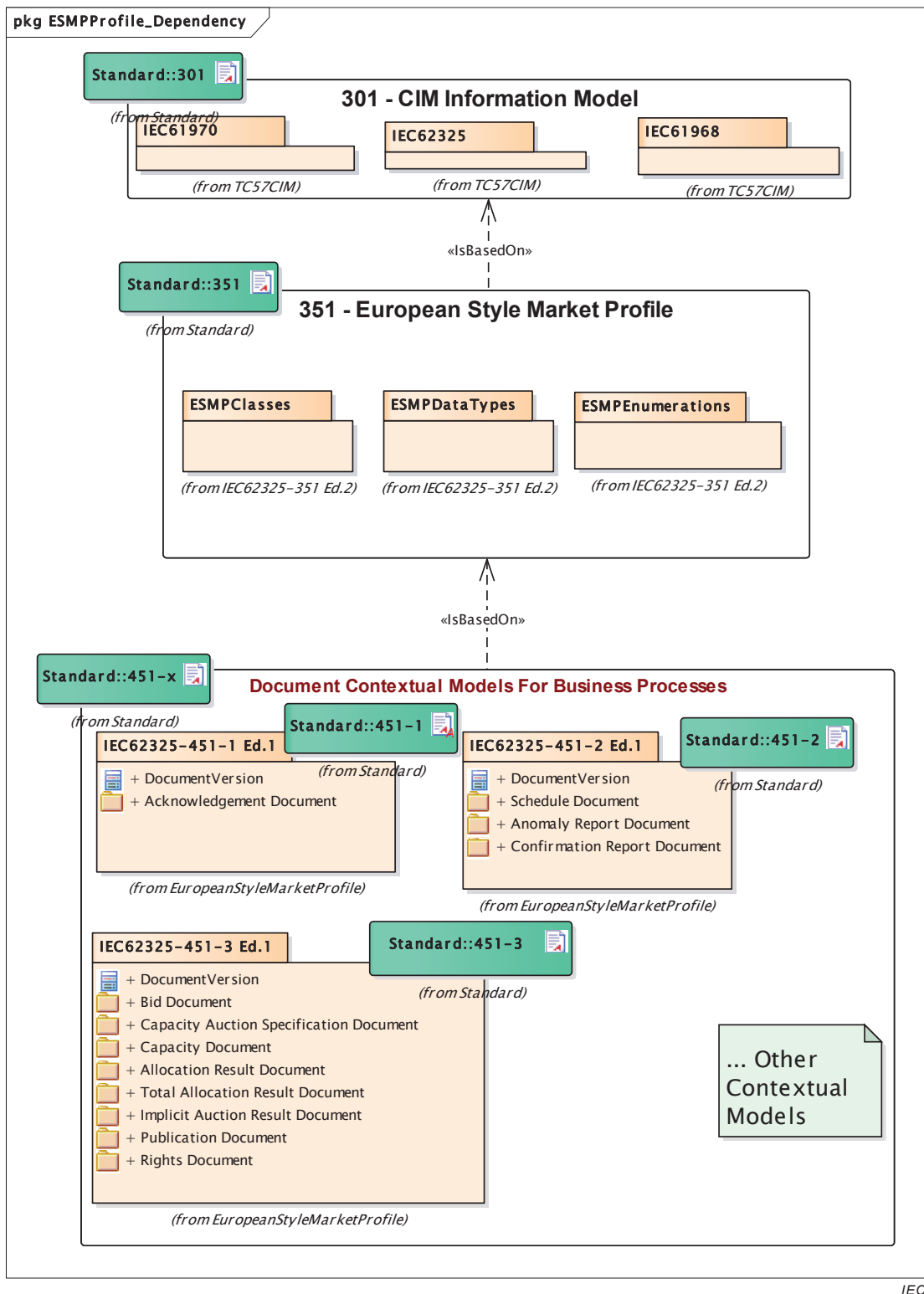


Figure 2 – Overview of European style market profile dependency

For each business process, a business process package is described in an IEC 62325-451-x standard. A business process package contains:

- the document contextual model (ABIE) and the automatically generated message assembly model (MBIE) for each electronic document required to enable the completion of the business

process. Each document is a sub contextual model derived by restriction from the European-style market profile;

- the XML schema of the business document that is automatically generated from the message assembly model.

The European style market profile (ESMP), as defined in IEC 62325-351, provides the core components permitted for use in an IEC 62325-451-x standard. All ABIEs shall be “based on” the IEC 62325-351 core components:

- **ESMPClasses:** defining all the semi-contextual classes of the European-style market profile derived by restriction from the CIM information model;
- **ESMPDataTypes:** defining all the core Datatypes used within the ESMP classes.

All the core components that are used in every electronic document structure have been harmonized and centralized in the European-style market profile. These core components are consequently the basic building blocks from which all electronic document ABIEs are derived.

### **4.3 From the European-style market profile to the document contextual model**

The document contextual model for a given business process is constructed by an information analyst who identifies all the information requirements necessary to satisfy the business process.

Once the information requirements have been identified, the information analyst identifies the related ACCs that are available in the European-style market profile and contextualises them to meet the information requirements. This contextualisation step creates a set of aggregate business information entities (ABIEs).

In a final step, the information analyst assembles together into a specific document contextual model package the ABIEs to form a document model satisfying the business requirements.

### **4.4 From the document contextual model to the message assembly model**

Once the document contextual model has been finalised, the message assembly model may be automatically generated.

All document contextual models share the same core components and core datatypes. These are defined in the European-style market profile (IEC 62325-351) and are contextualised and refined in all document contextual models (IEC 62325-451-x series) respecting the rules as described in IEC 62325-450.

### **4.5 From the assembly model to the XML schema**

The final modelling step applies a standardized set of criteria in order to generate a uniform XML schema from the assembly model. This transformation process respects the rules defined in IEC 62361-100.

## **5 The market information publication business process**

### **5.1 General**

The market information publication (transparency) business process enables all the relevant information concerning the electricity markets to be made available in a transparent and coherent fashion.

The availability of such information is vital for market participants to take efficient production, consumption and trading decisions.

Deeper market integration and the rapid development of intermittent renewable energy generation sources, such as wind and solar, require the disclosure of complete, timely available, high quality and easily digestible information relating to supply and demand fundamentals (EU Commission Regulation No. 543/2013).

Thus, the documents described in this document enable the publication of the market consumption and production information along with the identification of structural unavailability in the power system network that may impact the normal availability of energy.

## **5.2 The market information aggregator role**

As concerns the European-style market profile, a market information aggregator may be defined as follows:

- “This is a party that is responsible for the assembling of collected information (integration, processing and storage) and their publishing (formatting and presentation) to a market information receiver”.

The role market information aggregator is tied to the role “data provider” which is to say:

- “This may either be a transmission system operator or a third party acting as a data provider. The data provider is not necessarily the primary owner of information but it is the entity that submits information to the market information aggregator”.

## **5.3 Market information publication business process**

Figure 3 provides the overview of the business process. This incorporates the information that a market information aggregator has to provide to an information receiver; this may be done in the context of a transparency platform, i.e. an IT system allowing to publish the market data.

The use cases that outline the market information publication process make use of several different generic electronic document structures to provide the information to the market information aggregator. The electronic document structures themselves are detailed later in this document.

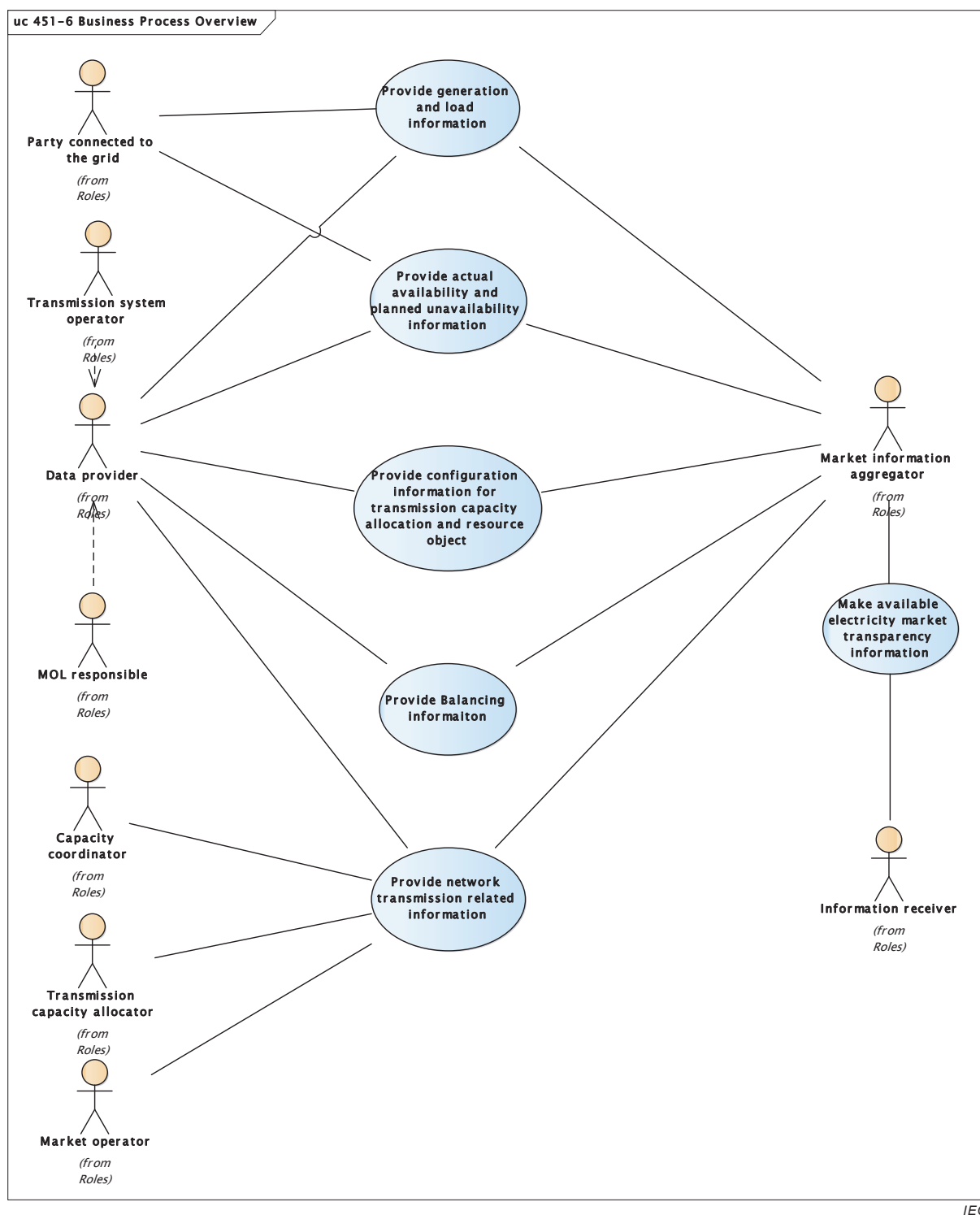


Figure 3 – Market information publication process overview

## 5.4 Use cases

### 5.4.1 General overview

As indicated in Figure 3, the basic information requirements are for the transmission of the relevant information assembled together by a data provider to a market information aggregator.

The data provider may englobe several different market roles. In certain contexts, the data provider may delegate this information to specific roles that may provide information directly to the market

information aggregator. For example, as shown in Figure 3, the roles of capacity coordinator, transmission capacity allocator or market operator may directly send information to the market information aggregator.

The market information aggregator has the task of assembling the information together and of harmonising its content (for example ensuring the information is provided with the same measurement granularity). Once the information has been assembled together and harmonised the market information aggregator publishes it, for instance, on a transparency platform whose access is publically available.

#### **5.4.2 Provide configuration information for transmission capacity allocation and resource object**

The provision of configuration information for transmission capacity allocation and assets is used to provide transmission capacity allocation and resource object configuration information.

The configuration of transmission capacity allocation describes the parties that will issue the data at the various steps of auctions, i.e. offered capacity, already allocated capacity, etc.

The configuration of resource object includes:

- a) production unit configuration information and may include generation unit configuration information. The management of a generation unit is handled through the production unit. Consequently, if there is an addition of a generation unit or change to a generation unit, this requires that the change is carried out as a change of the production unit;
- b) provision of transmission asset configuration information;
- c) provision of consumption unit configuration information.

This basic configuration is required in order to ensure the validation and coherence of the information that is transmitted by the data providers for publication. The configuration information may evolve over time and, consequently, modifications or deactivations will have to be provided.

#### **5.4.3 Provide generation and load information**

The generation and load information is provided depending on the granularity required for the production and consumption units that have to be reported. It covers both realised and forecast information.

#### **5.4.4 Provide actual availability and planned unavailability information**

The provision of unavailability (outages and forced outages) information is relatively straightforward and covers basically the provision of planned unavailability information and the provision of changes in actual availability.

#### **5.4.5 Provide balancing information**

The provision of balancing information covers the information requirements within a given time interval for such things as contractual reserves, accepted offers, activated balancing energy, imbalance volumes and prices.

#### **5.4.6 Provide network transmission related information**

The provision of network transmission information covers the information requirements for the network evolution of critical network elements, capacity information, explicit and implicit auctions, and nomination information as well as congestion management measures.

## 5.5 Sequence diagram

The sequence diagram in Figure 4 presents the information flows that are exchanged between the different actors that intervene in the transparency process.

The information flows outlined in the sequence diagram are used to transmit all the information necessary in order to ensure the market information publication.

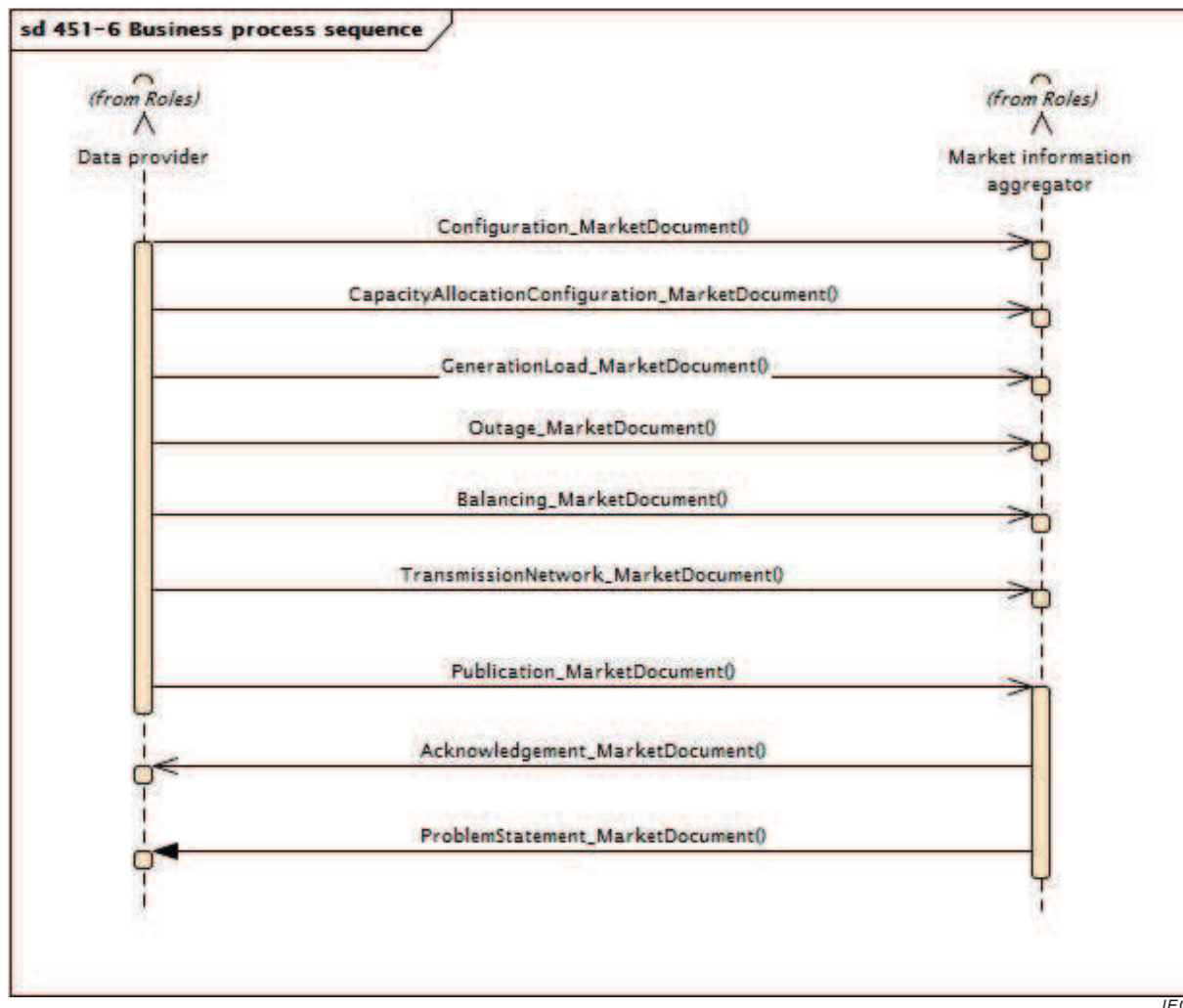


Figure 4 – Sequence diagram of the information flows

## 5.6 Electronic documents used

### 5.6.1 Configuration\_MarketDocument

Configuration\_MarketDocument enables the initialisation and update of basic configuration data for resource object. It is required to ensure the validity of the market information that is submitted by the other electronic documents. The information provided essentially concerns:

- production unit information;
- transmission asset information;
- consumption unit information.

The document may also be used to update any information initially provided as changes or evolutions occur. It may also be used to ensure the synchronisation of the data between the transparency platform and the data providers.

### 5.6.2 CapacityAllocationConfiguration\_MarketDocument

CapacityAllocationConfiguration\_MarketDocument enables the initialisation and update of the actors that will provided the various sets of information at the various stages of the auction process (e.g. offered capacity, already allocated capacity).

The document may also be used to update any information initially provided as changes or evolutions occur.

### 5.6.3 GenerationLoad\_MarketDocument

GenerationLoad\_MarketDocument enables the transmission of generation and load information on a regular basis. The frequency of the transmission of this information depends on the market requirements where the platform is implemented. The periodicity may be yearly, monthly, weekly, daily or hourly as necessary.

The information transmitted may be actual generation and load, planned generation and load or forecast generation and load depending on market requirements.

### 5.6.4 Outage\_MarketDocument

The unavailability process basically follows two different periodicities: a regular periodicity for the provision of the planned unavailability, and an event-based periodicity for the provision of changes in actual availability.

The unavailability process covers all the significant resources within the energy grid that may impact the quantity of energy that can be produced or consumed.

### 5.6.5 Balancing\_MarketDocument

The balancing transparency process can be basically divided into five groups of information requirements:

- balancing procurement requirements;
- accepted offers;
- reserve activation;
- imbalance;
- situation and financial settlement.

The process covers all the operations necessary to ensure that the bulk power system is always in balance.

### 5.6.6 TransmissionNetwork\_MarketDocument

TransmissionNetwork\_MarketDocument enables the information concerning the transmission network to be provided to the transparency platform. The information provided concerns:

- network evolution;
- redispatch measures;
- counter trade measures;
- congestion management costs;
- implicit transmission allocations on third countries borders.

The process covers all the information concerning the above mentioned areas and the reporting frequency necessary to ensure transparency.

### 5.6.7 Publication\_MarketDocument

Publication\_MarketDocument is a generic document that is defined in IEC 62325-451-3. It is used in the case of transmission to the transparency platform to provide transmission capacity and auction information concerning the electricity market. The sort of information in this respect that it can provide is as follows:

- forecasted transmission capacity;
- offered transmission capacity;
- DC link capacity restrictions;
- explicit transmission capacity auction information;
- already allocated transmission capacity;
- day ahead prices;
- net bidding zone positions;
- total nominated transmission capacity;
- aggregated day ahead schedule information;
- physical flows;
- internal market and external allocations.

### 5.6.8 ProblemStatement\_MarketDocument

ProblemStatement\_MarketDocument is described in IEC 62325-451-5.

This document is used to report troubles to deliver information.

## 5.7 Generic business rules for documents

### 5.7.1 General

All the business rules described in IEC 62325-351 are also valid for this document. Additional rules are provided hereafter.

When a document is received, it shall be checked at the application level to ensure that there are no faults in it that could prevent its normal processing. After this check, an acknowledgement document, as defined in IEC 62325-451-1, shall be generated either accepting in its entirety the document in question or rejecting it with the reasons for the rejection.

### 5.7.2 Document instance implementation

The XML documents described in this document are to be used for the upload of information to a transparency platform managed by the information market aggregator; 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) have been included in the XML documents as optional attributes that may be used only in the case where information is provided to an information receiver. This information shall not be used in the case where information is uploaded to the market information aggregator.

The implementation of a data exchange shall be based upon dependency tables that are constructed as outlines in Table 1. In the case of the European market such tables are used to describe the different conditions in which all the optional attributes (i.e. the attributes that have a multiplicity of [0..1]) within a document structure are used.

Table 1 contains in the left hand column the mandatory coded attributes as well as the optional attributes. The top row provides the context where the contexts in which the use of the model is intended (for example, installed production capacity aggregated per production type, day-ahead aggregated generation, transmission assets).

Within each context row, the possible values for the mandatory coded attributes are provided and an indication if the optional attributes are to be used (used, not used, used for upload only, etc.).

**Table 1 – Dependency table outline for the market information publication processes**

| Information model attribute | Usage context 1   | Usage context 2   | Usage context 3   | Usage context n   |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|
| type (Document)             | Type code value 1 | Type code value 2 | Type code value 3 | Type code value n |
| process.processType         | Type code value   | Type code value   | Type code value   | Type code value   |
| businessType (TimeSeries)   | Type code value   | Type code value   | Type code value   | Type code value   |
| Attribute value 1           | Usage indication  | Usage indication  | Usage indication  | Usage indication  |
| Attribute value n           | Usage indication  | Usage indication  | Usage indication  | Usage indication  |

Table 2 provides a partial example of dependency table for the transmission network market document.

**Table 2 – Informative example of dependency table for the TransmissionNetwork\_MarketDocument**

| Information model attribute | Article 9.1<br>Transmission infrastructure                              | Article 13 (a)<br>Redispatch                         | Article 13 (b)<br>Countertrading | Article 13 (c)<br>Congestion costs                              |
|-----------------------------|-------------------------------------------------------------------------|------------------------------------------------------|----------------------------------|-----------------------------------------------------------------|
| type (Document)             | Interconnector network expansion                                        | Redispatch notice                                    | Counter trade notice             | Congestion costs                                                |
| process.processType         | Network information                                                     | Realised                                             | Realised                         | Realised                                                        |
| businessType (TimeSeries)   | Interconnector network evolution<br>Interconnector network dismanteling | System operator redispatching<br>Internal redispatch | Counter trade                    | Congestion costs<br>Counter trade<br>System operator redispatch |
| in_Domain.mRid              | used                                                                    | used                                                 | used                             | in_Domain same as out_Domain                                    |
| out_Domain.mRID             | used                                                                    | used                                                 | used                             | out_Domain same as in_Domain                                    |
| measurement_Unit.name       | MAW                                                                     | MAW                                                  | MAW                              | not used                                                        |
| currency_Unit.name          | not used                                                                | not used                                             | not used                         | used                                                            |
| mktPSRType.psrType          | not used                                                                | used                                                 | not used                         | not used                                                        |
| curveType                   | used                                                                    | used                                                 | used                             | used                                                            |
| end_Date.date               | used                                                                    | not used                                             | not used                         | not used                                                        |
| flowDirection               | not used                                                                | used                                                 | used                             | not used                                                        |
| etc.                        |                                                                         |                                                      |                                  |                                                                 |

Such tables are to be provided in dedicated implementation guides for each relevant information to be delivered.

### **5.7.3 Rules governing the GenerationLoad\_MarketDocument**

#### **5.7.3.1 Retransmission of historical information**

Information for a given period in time (for example, a day) may, depending of the nature of the information, be sent via several distinct transmissions (for example, 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 (for example, 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.

#### **5.7.3.2 Missing information**

If, for a given period, there is missing information, then the use of gaps as defined in Subclause 4.5.6 of IEC 62325-351:2016 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 start of the second period. The difference between the two periods represents a gap where data is missing.

#### **5.7.3.3 Absence of time series in a document**

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.

#### **5.7.3.4 Rules governing the TimeSeries class**

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 cancelledTS being put to "cancelled". All the Periods below the time series shall be removed.

### **5.7.4 Rules governing the Outage\_MarketDocument**

#### **5.7.4.1 The transmission of unavailability information**

Each unavailability (planned maintenance or forced unavailability) should be transmitted in a single document with the identification of the document being used as the identification of the unavailability in question.

Outage\_MarketDocument may be revised through the use of the revisionNumber attribute, i.e. a new version. The latest version of the document provides the current state of the unavailability.

#### **5.7.4.2 Status information**

Outage\_MarketDocument, when transmitted, may have two states: it is by default always active, or it has the status of cancelled or withdrawn.

A cancellation is foreseen where a planned unavailability will not take place.

A withdrawal is foreseen where there has been an error in the transmission of the information (in this case, a reason should be given).

An unavailability is deemed terminated when its end date is past. If the end date approaches and the unavailability is still in vigor, the data provider shall provide an update to the unavailability with a new end date.

#### **5.7.4.3 Rules governing the TimeSeries class**

A time series shall exist to describe a specific piece of an unavailability situation. It conveys the data related to the unavailability. For consumption or generation unit unavailability, it identifies the available capacity during the event. For transmission asset unavailability, it identifies the impact on cross zonal capacity per direction.

#### **5.7.4.4 Rules governing the Series\_Period class**

There may be several series period classes for a time series per object type (installed, unavailable or wind power feedin). The overall time interval covered by the period shall be within the complete TimeInterval of the series period.

The number of periods within a time series as characterized by the resolution shall completely cover the period's time interval.

### **5.7.5 Rules governing the Balancing\_MarketDocument**

#### **5.7.5.1 The transmission of balancing information**

Each transmission of balancing information should be transmitted in a single document. Any changes necessary to the information transmitted should be adjusted through the use of a new version of the document in question. This is particularly true in the case of the transmission of activated balancing energy, the imbalance volumes and the settlement information.

The latest version of a document provides the current state of the information contained in the document.

#### **5.7.5.2 Status information**

A balancing document shall have a docStatus class instance in the case where the information provided is final.

### **5.7.6 Rules governing the TransmissionNetwork\_MarketDocument**

#### **5.7.6.1 Status information**

Network information when transmitted may have two states; either it is active or it has been cancelled.

Two other cases are foreseen:

- a status of cancelled where the planned network evolution will not take place,
- a status of withdrawn where there has been an error in the transmission of the information (in this case, a "proper" reason should be given).

#### **5.7.6.2 Rules governing the Time Series class**

A time series shall exist to describe a specific piece of a transmission network structure or congestion management information. It conveys the data related to the evolution of a network or

provides congestion management measures. It identifies the impact on cross zonal capacity per direction.

#### **5.7.7 Rules governing the Configuration\_MarketDocument**

The creation of a production unit shall be composed of all dependent generation units.

The creation, modification or deactivation of a generation unit represents a change in the production unit configuration and consequently a modification to the production unit is necessary with all the valid generation units.

#### **5.7.8 Rules governing the CapacityAllocationConfiguration\_MarketDocument**

##### **5.7.8.1 Submission of document**

There shall be two different documents for the submission of explicit and implicit transmission capacity allocation configuration, i.e. submitting these configurations information in a single document is not allowed.

##### **5.7.8.2 Cancellation of allocation instance**

The cancellation of an allocation instance is carried out as an update with the attribute cancelledTS set to "A01" (yes).

#### **5.7.9 Rules governing the ProblemStatement\_MarketDocument**

ProblemStatement\_MarketDocument is described in IEC 62325-451-5.

This document is used to report troubles to deliver information.

#### **5.7.10 Rules governing the Publication\_MarketDocument**

Publication\_MarketDocument is described in IEC 62325-451-3.

This document is used to exchange information related to transmission capacity auction.

## **6 Contextual and assembly models**

### **6.1 GenerationLoad contextual model**

#### **6.1.1 Overview of the model**

Figure 5 shows the model.

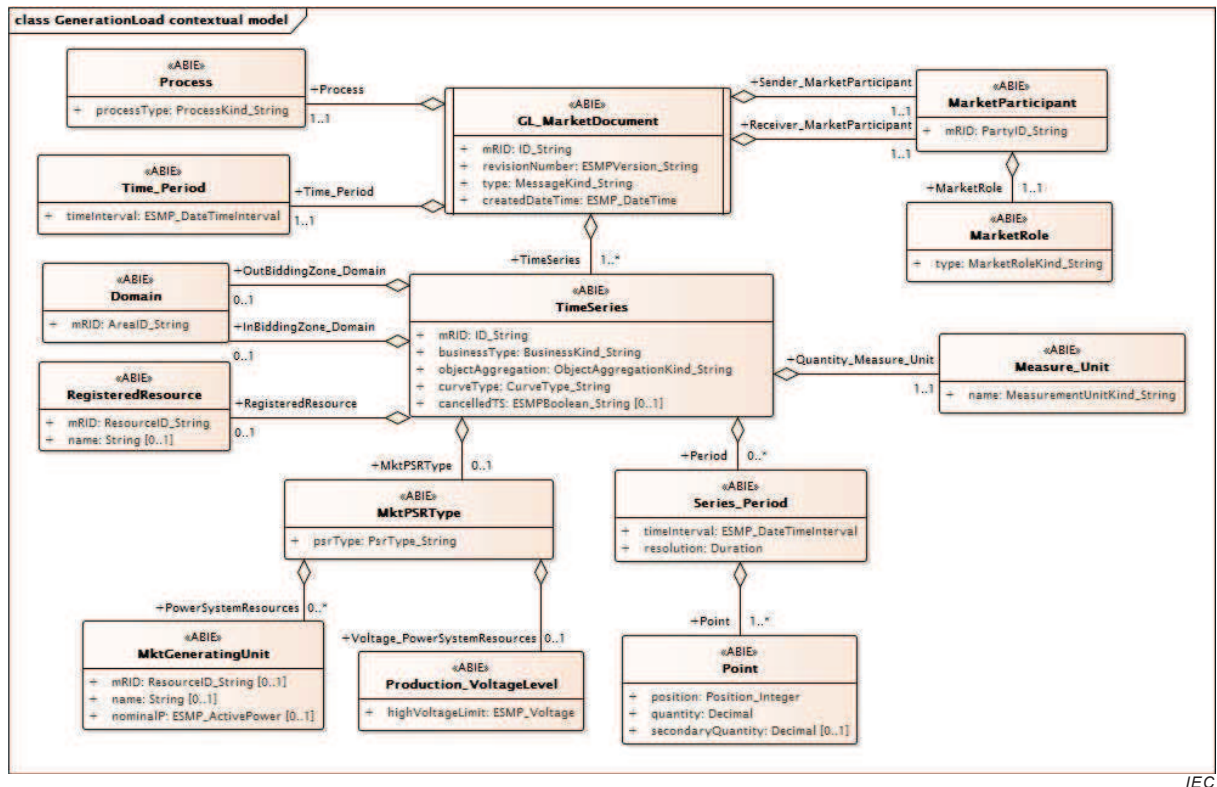


Figure 5 – GenerationLoad contextual model

### 6.1.2 IsBasedOn relationships from the European-style market profile

Table 3 shows the traceability dependency of the classes used in this package towards the upper level.

Table 3 – IsBasedOn dependency

| Name                    | Complete IsBasedOn Path                             |
|-------------------------|-----------------------------------------------------|
| Domain                  | TC57CIM::IEC62325::MarketManagement::Domain         |
| GL_MarketDocument       | TC57CIM::IEC62325::MarketManagement::MarketDocument |
| MarketParticipant       | TC57CIM::IEC62325::MarketCommon::MarketParticipant  |
| MarketRole              | TC57CIM::IEC62325::MarketCommon::MarketRole         |
| Measure_Unit            | TC57CIM::IEC62325::MarketManagement::Unit           |
| MktGeneratingUnit       | TC57CIM::IEC62325::MarketCommon::MktGeneratingUnit  |
| MktPSRType              | TC57CIM::IEC62325::MarketManagement::MktPSRType     |
| Point                   | TC57CIM::IEC62325::MarketManagement::Point          |
| Process                 | TC57CIM::IEC62325::MarketManagement::Process        |
| Production_VoltageLevel | TC57CIM::IEC61970::Base::Core::VoltageLevel         |
| RegisteredResource      | TC57CIM::IEC62325::MarketCommon::RegisteredResource |
| Series_Period           | TC57CIM::IEC62325::MarketManagement::Period         |
| Time_Period             | TC57CIM::IEC62325::MarketManagement::Period         |
| TimeSeries              | TC57CIM::IEC62325::MarketManagement::TimeSeries     |

### 6.1.3 Detailed GenerationLoad contextual model

#### 6.1.3.1 GL\_MarketDocument root class

An electronic document containing the information necessary to satisfy the requirements of a given business process.

This electronic document enables the transmission of the following forms of generation and load information for given periods:

- daily, monthly, weekly and yearly generation and load forecasts;
- yearly forecast margin;
- actual load information;
- actual generation unit information;
- available and installed capacity;
- wind and solar information;
- pumped storage and reservoir capacity.

Table 4 shows all attributes of GL\_MarketDocument.

**Table 4 – Attributes of GenerationLoad contextual model::GL\_MarketDocument**

| Order | mult.  | Attribute name / Attribute type      | Description                                                                                             |
|-------|--------|--------------------------------------|---------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | mRID<br>ID_String                    | The unique identification of the document being exchanged within a business process flow.               |
| 1     | [1..1] | revisionNumber<br>ESMPVersion_String | The identification of the version that distinguishes one evolution of a document from another.          |
| 2     | [1..1] | type<br>MessageKind_String           | The coded type of a document. The document type describes the principal characteristic of the document. |
| 6     | [1..1] | createdDateTime<br>ESMP_DateTime     | The date and time of the creation of the document.                                                      |

Table 5 shows all association ends of GL\_MarketDocument with other classes.

**Table 5 – Association ends of GenerationLoad contextual model::  
GL\_MarketDocument with other classes**

| Order | mult.  | Class name / Role                               | Description                                                                                                                                                                                                              |
|-------|--------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3     | [1..1] | Process<br>Process                              | Association based on:<br>ESMPClasses::MarketDocument.[]<br>-----<br>ESMPClasses::Process.Process[0..*]                                                                                                                   |
| 4     | [1..1] | MarketParticipant<br>Sender_MarketParticipant   | The document owner.<br>Association based on:<br>ESMPClasses::MarketDocument.[]<br>-----<br>ESMPClasses::MarketParticipant.MarketParticipant[0..*]                                                                        |
| 5     | [1..1] | MarketParticipant<br>Receiver_MarketParticipant | The document recipient.<br>Association based on:<br>ESMPClasses::MarketDocument.[]<br>-----<br>ESMPClasses::MarketParticipant.MarketParticipant[0..*]                                                                    |
| 7     | [1..1] | Time_Period<br>Time_Period                      | The time interval that is associated with an electronic document and which is valid for the whole document.<br>Association based on:<br>ESMPClasses::MarketDocument.[]<br>-----<br>ESMPClasses::Time_Period.Period[0..*] |
| 8     | [1..*] | TimeSeries<br>TimeSeries                        | The time series that is associated with an electronic document.<br>Association based on:<br>ESMPClasses::MarketDocument.[]<br>-----<br>ESMPClasses::TimeSeries.TimeSeries[0..*]                                          |

### 6.1.3.2 Domain

A domain covering a number of related objects, such as market balance area, grid area, borders etc.

Table 6 shows all attributes of Domain.

**Table 6 – Attributes of GenerationLoad contextual model::Domain**

| Order | mult.  | Attribute name / Attribute type | Description                              |
|-------|--------|---------------------------------|------------------------------------------|
| 0     | [1..1] | mRID<br>AreaID_String           | The unique identification of the domain. |

### 6.1.3.3 MarketParticipant

The identification of the party participating in energy market business processes.

Table 7 shows all attributes of MarketParticipant.

**Table 7 – Attributes of GenerationLoad contextual model::MarketParticipant**

| Order | mult.  | Attribute name / Attribute type | Description                                         |
|-------|--------|---------------------------------|-----------------------------------------------------|
| 0     | [1..1] | mRID<br>PartyID_String          | The identification of a party in the energy market. |

Table 8 shows all association ends of MarketParticipant with other classes.

**Table 8 – Association ends of GenerationLoad contextual model::  
MarketParticipant with other classes**

| Order | mult.  | Class name / Role        | Description                                                                                                                                                      |
|-------|--------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | [1..1] | MarketRole<br>MarketRole | The role associated with a MarketParticipant.<br>Association based on:<br>ESMPClasses::MarketParticipant.[]<br>-----<br>ESMPClasses::MarketRole.MarketRole[0..1] |

#### 6.1.3.4 MarketRole

The identification of the intended behaviour of a market participant played within a given business process.

Table 9 shows all attributes of MarketRole.

**Table 9 – Attributes of GenerationLoad contextual model::MarketRole**

| Order | mult.  | Attribute name / Attribute type | Description                                               |
|-------|--------|---------------------------------|-----------------------------------------------------------|
| 0     | [1..1] | type<br>MarketRoleKind_String   | The identification of the role played by a market player. |

#### 6.1.3.5 Measure\_Unit

A particular quantity, defined and adopted by convention, with which other quantities of the same kind are compared in order to express their magnitudes relative to that quantity.

Table 10 shows all attributes of Measure\_Unit.

**Table 10 – Attributes of GenerationLoad contextual model::Measure\_Unit**

| Order | mult.  | Attribute name / Attribute type    | Description                                                                              |
|-------|--------|------------------------------------|------------------------------------------------------------------------------------------|
| 0     | [1..1] | name<br>MeasurementUnitKind_String | The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). |

#### 6.1.3.6 MktGeneratingUnit

The information about a generating unit.

Table 11 shows all attributes of MktGeneratingUnit.

**Table 11 – Attributes of GenerationLoad contextual model::MktGeneratingUnit**

| Order | mult.  | Attribute name / Attribute type | Description                                                                                                                             |
|-------|--------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [0..1] | mRID<br>ResourceID_String       | The unique identification of a resource.                                                                                                |
| 1     | [0..1] | name<br>String                  | The name is any free human-readable and possibly non-unique text naming the object.                                                     |
| 2     | [0..1] | nominalP<br>ESMP_ActivePower    | The nominal power of the generating unit.<br>This represents the installed generation capacity for the generation unit being described. |

### 6.1.3.7 MktPSRType

The type of a power system resource.

Table 12 shows all attributes of MktPSRType.

**Table 12 – Attributes of GenerationLoad contextual model::MktPSRType**

| Order | mult.  | Attribute name / Attribute type | Description                                |
|-------|--------|---------------------------------|--------------------------------------------|
| 0     | [1..1] | psrType<br>PsrType_String       | The coded type of a power system resource. |

Table 13 shows all association ends of MktPSRType with other classes.

**Table 13 – Association ends of GenerationLoad contextual model::MktPSRType with other classes**

| Order | mult.  | Class name / Role                                       | Description                                                                                                                                                                                                      |
|-------|--------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | [0..1] | Production_VoltageLevel<br>Voltage_PowerSystemResources | The voltage level of the RegisteredResource.<br>Association based on:<br>ESMPClasses::VoltageLevel.PowerSystemResources[0..1]<br>-----<br>ESMPClasses::MktPSRType.[]                                             |
| 2     | [0..*] | MktGeneratingUnit<br>PowerSystemResources               | The generating unit(s) of the production unit identified by the RegisteredResource.<br>Association based on:<br>ESMPClasses::MktGeneratingUnit.PowerSystemResources[0..*]<br>-----<br>ESMPClasses::MktPSRType.[] |

### 6.1.3.8 Point

The identification of the values being addressed within a specific interval of time.

Table 14 shows all attributes of Point.

**Table 14 – Attributes of GenerationLoad contextual model::Point**

| Order | mult.  | Attribute name / Attribute type | Description                                                                                                                                                                                                |
|-------|--------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | position<br>Position_Integer    | A sequential value representing the relative position within a given time interval.                                                                                                                        |
| 1     | [1..1] | quantity<br>Decimal             | The principal quantity identified for a point.<br>--- This information defines the quantity of the load or generation that is taken from or put into the area for the position within the interval period. |
| 2     | [0..1] | secondaryQuantity<br>Decimal    | The secondary quantity identified for a point.<br>--- This quantity corresponds to the value for the previous year that is taken from or put into the area for the position within the interval period.    |

#### 6.1.3.9 Process

The formal identification of the business process in which a flow of information is exchanged.

Table 15 shows all attributes of Process.

**Table 15 – Attributes of GenerationLoad contextual model::Process**

| Order | mult.  | Attribute name / Attribute type   | Description                                                                                                                                                           |
|-------|--------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | processType<br>ProcessKind_String | The identification of the nature of process that the document addresses.<br>The identified processes are year ahead, month ahead, week ahead, day ahead and realised. |

#### 6.1.3.10 Production\_VoltageLevel

For a production unit or a generating unit, the high voltage level at the network side.

For other network equipment the voltage level.

Table 16 shows all attributes of Production\_VoltageLevel.

**Table 16 – Attributes of GenerationLoad contextual model::Production\_VoltageLevel**

| Order | mult.  | Attribute name / Attribute type  | Description                     |
|-------|--------|----------------------------------|---------------------------------|
| 0     | [1..1] | highVoltageLimit<br>ESMP_Voltage | The busbar's high voltage limit |

#### 6.1.3.11 RegisteredResource

A resource that is registered with a recognized registration authority. Examples include generating unit, customer meter, and a non-physical generator or load.

Table 17 shows all attributes of RegisteredResource.

**Table 17 – Attributes of GenerationLoad contextual model::RegisteredResource**

| Order | mult.  | Attribute name / Attribute type | Description                                                                                                                                                              |
|-------|--------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | mRID<br>ResourceID_String       | The unique identification of a resource.                                                                                                                                 |
| 1     | [0..1] | name<br>String                  | The name is any free human-readable and possibly non-unique text naming the object.<br>The name of the production unit for which the generation information is provided. |

#### 6.1.3.12 Series\_Period

The identification of the period of time corresponding to a given time interval and resolution.

Table 18 shows all attributes of Series\_Period.

**Table 18 – Attributes of GenerationLoad contextual model::Series\_Period**

| Order | mult.  | Attribute name / Attribute type       | Description                                                                                    |
|-------|--------|---------------------------------------|------------------------------------------------------------------------------------------------|
| 0     | [1..1] | timeInterval<br>ESMP_DateTimeInterval | The start and end time of the period.                                                          |
| 1     | [1..1] | resolution<br>Duration                | The definition of the number of units of time that compose an individual step within a period. |

Table 19 shows all association ends of Series\_Period with other classes.

**Table 19 – Association ends of GenerationLoad contextual model::Series\_Period with other classes**

| Order | mult.  | Class name / Role | Description                                                                                                                                                                           |
|-------|--------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2     | [1..*] | Point<br>Point    | The Point information associated with a given Series_Period.within a TimeSeries.<br>Association based on:<br>ESMPClasses::Series_Period.[]<br>-----<br>ESMPClasses::Point.Point[1..*] |

#### 6.1.3.13 Time\_Period

The identification of a time interval.

Table 20 shows all attributes of Time\_Period.

**Table 20 – Attributes of GenerationLoad contextual model::Time\_Period**

| Order | mult.  | Attribute name / Attribute type       | Description                                                                                                                                                                                                                                                                                   |
|-------|--------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | timeInterval<br>ESMP_DateTimeInterval | The start and end date and time for a given interval.<br>As a convention for these data exchanges:<br>- a week starts on a Monday and ends on a Sunday;<br>- 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. |

#### 6.1.3.14 TimeSeries

A set of time-ordered quantities being exchanged in relation to a product.

Table 21 shows all attributes of TimeSeries.

**Table 21 – Attributes of GenerationLoad contextual model::TimeSeries**

| Order | mult.  | Attribute name / Attribute type                   | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|--------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | [1..1] | mRID<br>ID_String                                 | A unique identification of the time series.                                                                                                                                                                                                                                                                                                                                                        |
| 1     | [1..1] | businessType<br>BusinessKind_String               | The identification of the nature of the time series.                                                                                                                                                                                                                                                                                                                                               |
| 2     | [1..1] | objectAggregation<br>ObjectAggregationKind_String | The identification of the domain that is the common denominator used to aggregate a time series.<br>The identified object aggregations are:<br>- area;<br>- resource object;<br>- resource type.                                                                                                                                                                                                   |
| 7     | [1..1] | curveType<br>CurveType_String                     | The identification of the coded representation of the type of curve being described.                                                                                                                                                                                                                                                                                                               |
| 8     | [0..1] | cancelledTS<br>ESMPBoolean_String                 | An indicator stating that the TimeSeries, identified by the mRID, is cancelled as well as all the values sent in a previous version of the TimeSeries in a previous document.<br>When this indicator has a Yes value, the meaning is that the data for the time series has been withdrawn.<br>This differentiates between a time series with no values and one with values that have been revoked. |

Table 22 shows all association ends of TimeSeries with other classes.