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**Kommunikation im Energiemarkt –
Teil 451-6: Veröffentlichung von Marktinformationen, kontextbezogene
Modelle und Einbindungsmodelle für den europäischen Markt
(IEC 62325-451-6:2016);
Englische Fassung EN 62325-451-6:2016**

Framework for energy market communications –
Part 451-6: Publication of information on market, contextual and assembly models for
European style market
(IEC 62325-451-6:2016);
English version EN 62325-451-6:2016

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 62325-451-6:2016);
Version anglaise EN 62325-451-6:2016

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DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2016-07-12 angenommene Europäische Norm als DIN-Norm ist 2017-05-01.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN EN 62325-451-6:2015-07.

Für dieses Dokument ist das nationale Arbeitsgremium K 952 „Netzleittechnik“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE (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 dieser Publikation bis zu dem Datum (stability date) unverändert bleiben soll, das auf der IEC-Website unter „<http://webstore.iec.ch>“ zu dieser Publikation angegeben ist. Zu diesem Zeitpunkt wird entsprechend der Entscheidung des Komitees die Publikation

- 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 62325-451-6 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt, und Abschnitt 3, der die Begriffe 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.

Nationaler Anhang NA (informativ)

Auszugsweise Übersetzung^{N1)}

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.

ANMERKUNG Siehe Internationales Elektrotechnisches Wörterbuch, IEC 600500, für allgemeine Glossardefinitionen.

3.1

aggregierte Geschäfts-Informationseinheit

ABIE

(en: aggregate business information entity)

Wiederverwendung einer aggregierten Kernkomponente (ACC) in einem festgelegten Geschäftsbereich

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.

[QUELLE: ISO/TS 15000-5:2005, Abschnitt 9, modifiziert (zweiter 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

^{N1)} Nationale Fußnote: Die Nummerierung aus IEC 62325-451-6:2016-06 wurde beibehalten.

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**)

das Profil des Europäischen Marktes, das Gegenstand des Teils der IEC 62325-351 ist, beschreibt die Gruppe von Klassen und Zusammenhängen, die zur Erzeugung aller Teile IEC 62325-451-x verwendet werden

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.

3.10

Geschäfts-Informationseinheiten-Nachrichten

MBIE

(en: message business information entity)

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

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]

– Leerseite –

English Version

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models for European style market
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Cadre pour les communications pour le marché de l'énergie
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Kommunikation im Energiemarkt - Teil 451-6:
Veröffentlichung von Marktinformationen, kontextbezogene
Modelle und Einbindungsmodelle für den europäischen
Markt
(IEC 62325-451-6:2016)

This European Standard was approved by CENELEC on 2016-07-12. 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.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 57/1689/FDIS, future edition 1 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 62325-451-6:2016.

The following dates are fixed:

- latest date by which the document has to be (dop) 2017-04-12
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2019-07-12
standards conflicting with the
document have to be withdrawn

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Endorsement notice

The text of the International Standard IEC 62325-451-6:2016 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.

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INTRODUCTION

This part of IEC 62325 is one of the IEC 62325-451-x 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 part of IEC 62325 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 market

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

IEC 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 62325-351:2013, *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, as well as the following apply.

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

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.

[SOURCE: ISO TS 15000-5:2005, Clause 9, modified (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

3.4

assembly model

assembly model is a 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

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

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.

3.10

message business information entity

MBIE

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

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

The part 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.

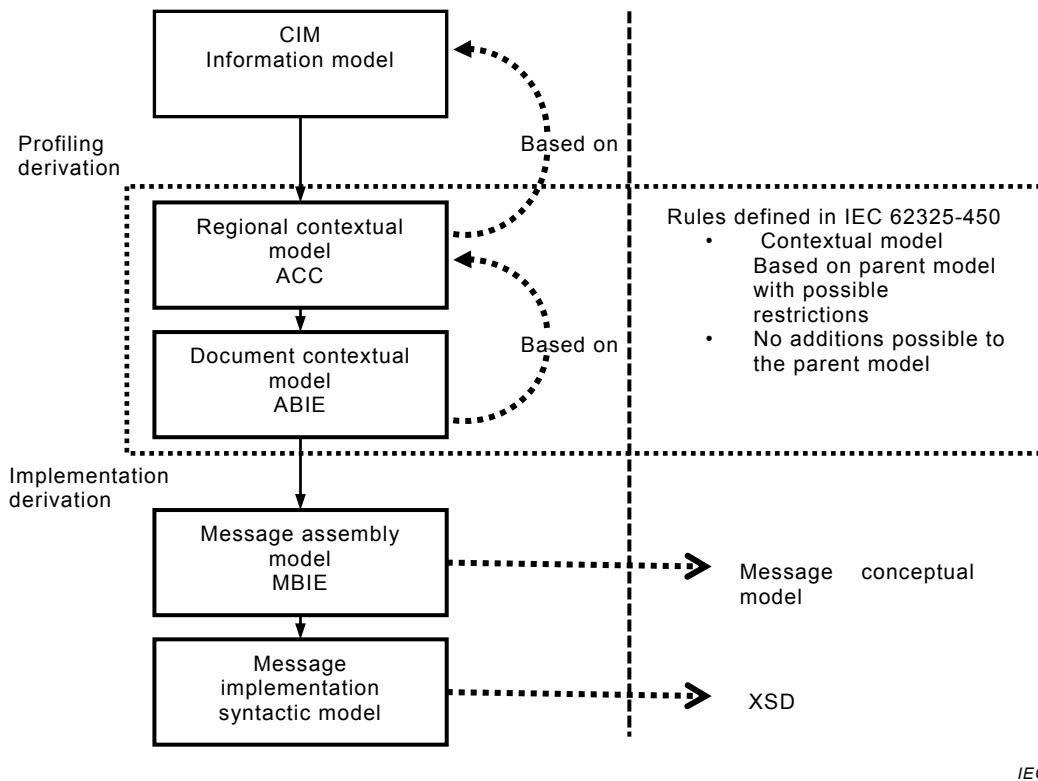


Figure 1 – IEC 62325-450 modelling framework

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).

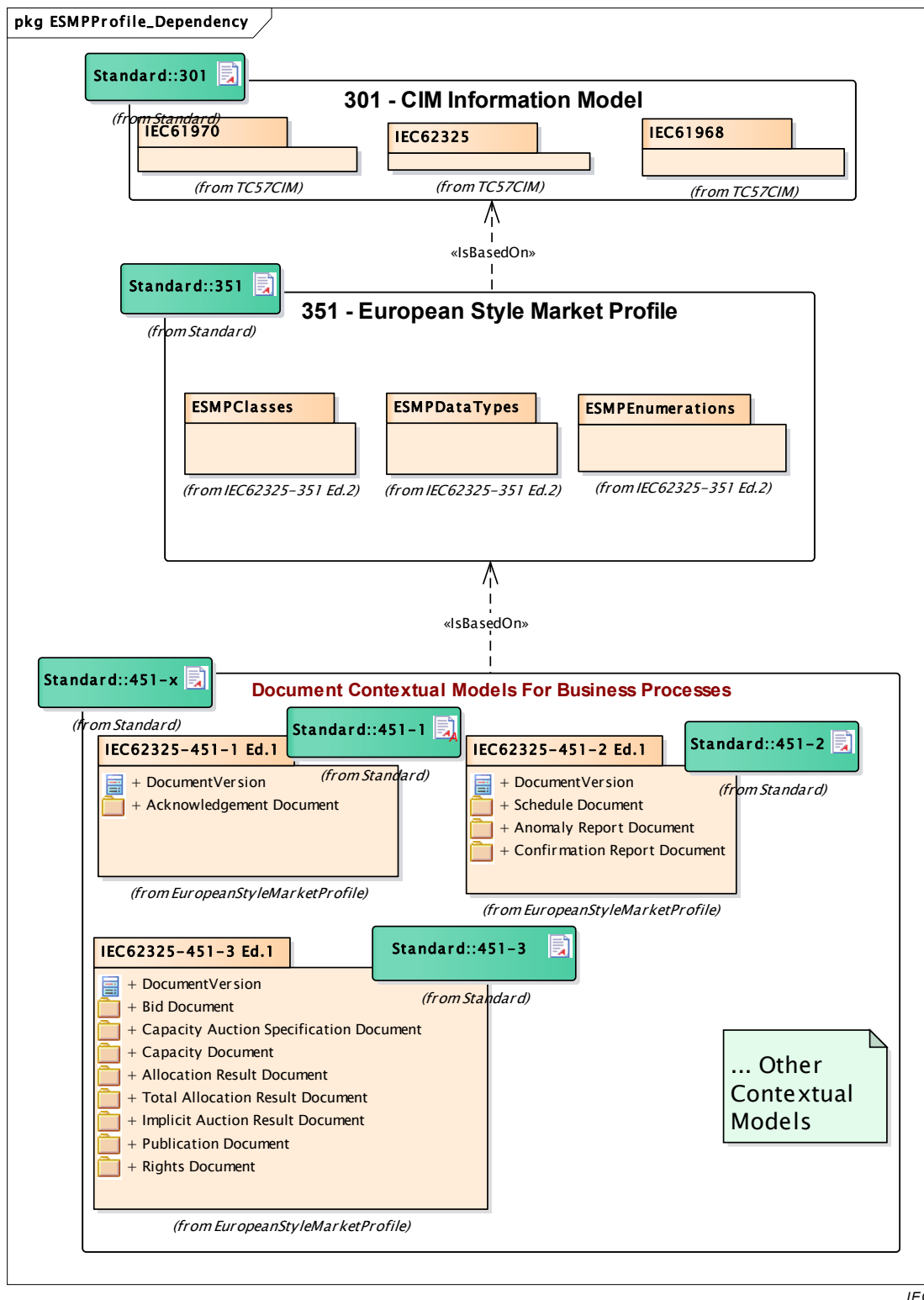
A document contextual model is based upon a specific business requirements specification and is constructed from the contextualisation of the ACCs that can be found in the European style market contextual model. The contextualised ACCs at this stage are termed aggregate business information entities (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 then may 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.



IEC

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 the 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 part of IEC 62325 enable the publication of the market consumption and production information along with the identification of structural unavailabilities 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.

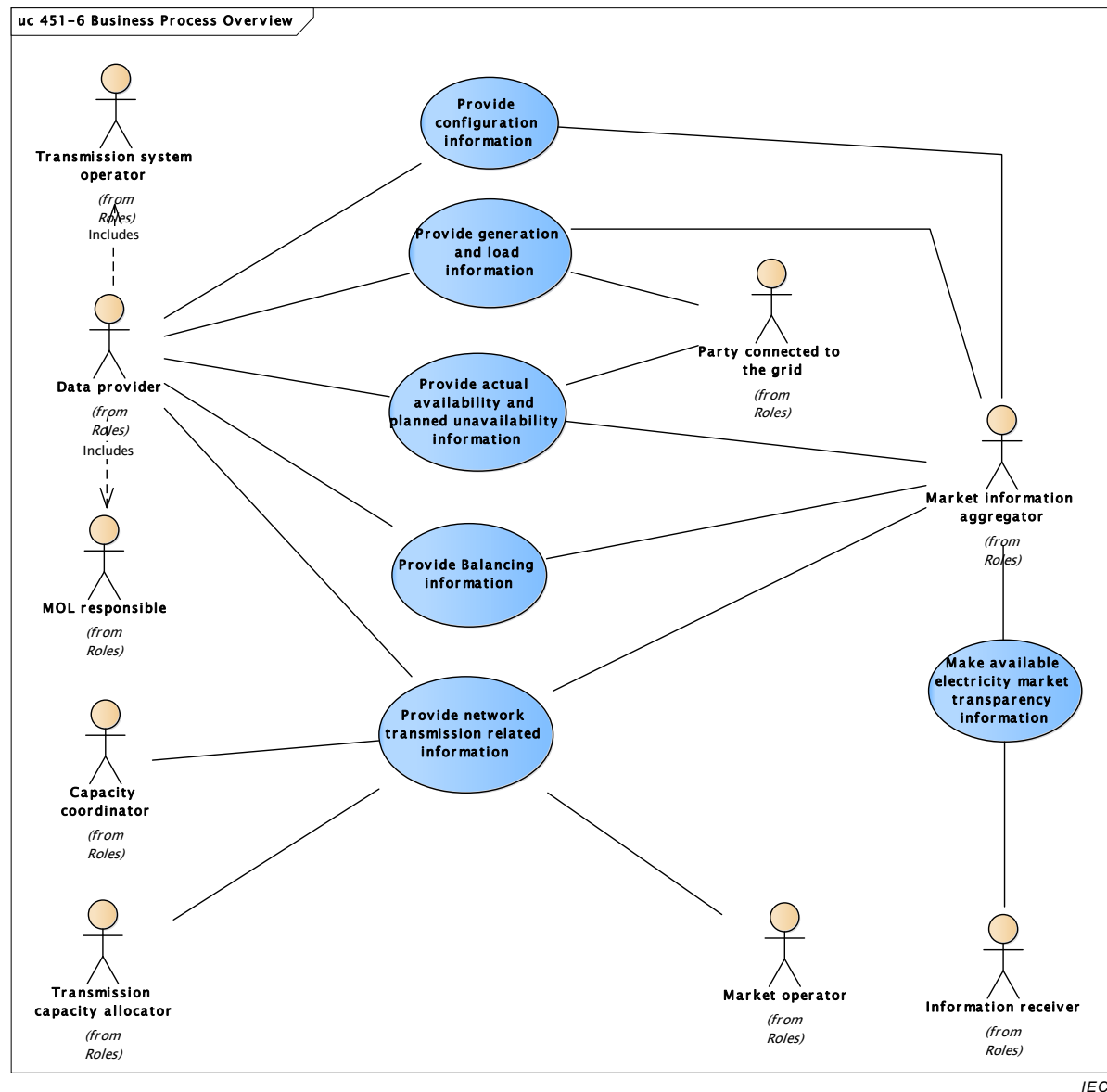


Figure 3 – Market information publication process overview

5.4 The 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 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

The provision of configuration information is used to provide resource object configuration information; this 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) Provide transmission asset configuration information.
- c) Provide 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 etc.

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.

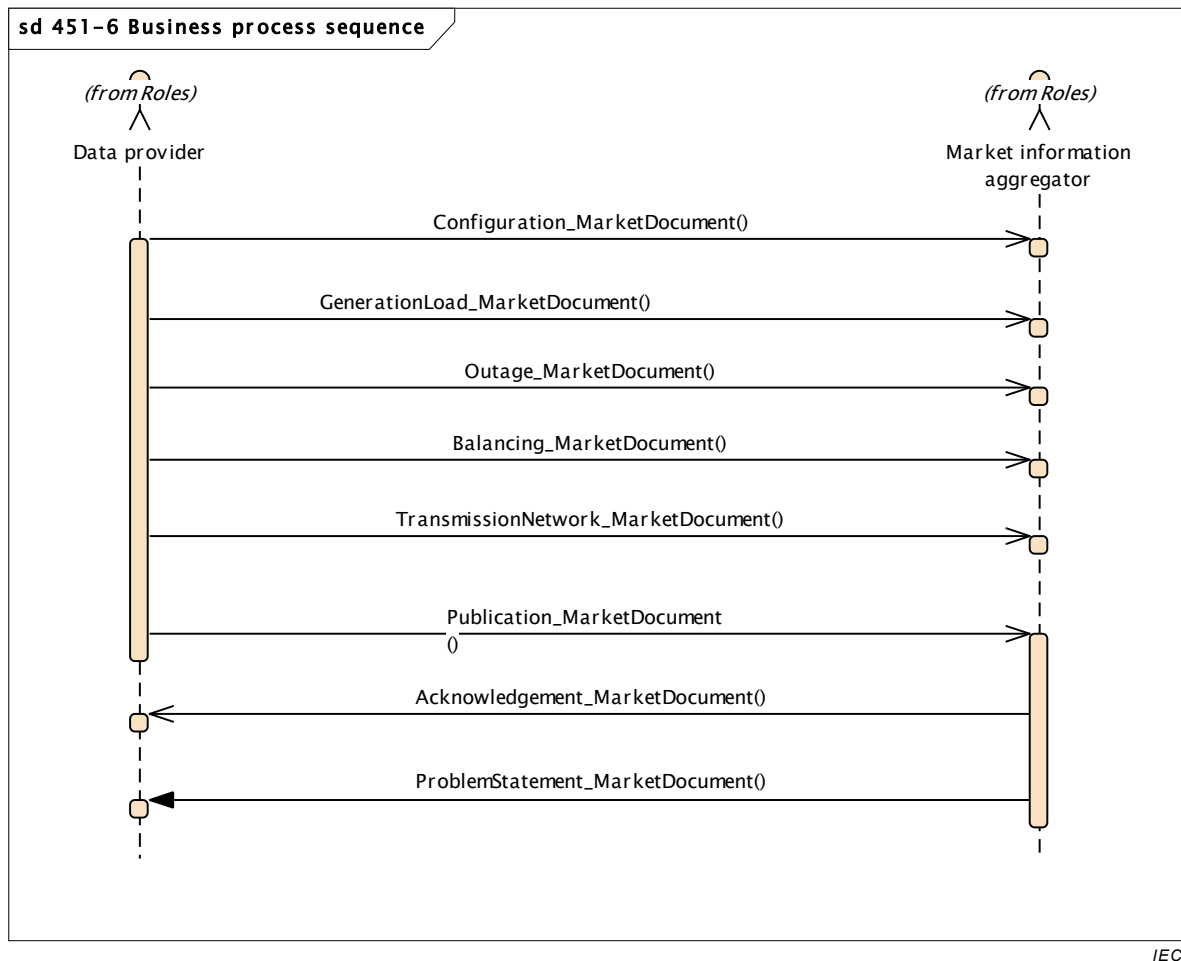


Figure 4 – Sequence diagram of the information flows

5.6 Electronic documents used.

5.6.1 Configuration_MarketDocument

The Configuration_MarketDocument enables the initialisation and update of basic configuration data 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 GenerationLoad_MarketDocument

The 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.

5.6.3 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.

5.6.4 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.

5.6.5 TransmissionNetwork_MarketDocument

The 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

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

5.6.6 Publication_MarketDocument

The Publication_MarketDocument is a generic document that is defined in IEC 62325-451-3. It is used in the case of the 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

5.7 Generic business rules for documents

5.7.1 General

All the business rules described in IEC 62325-351 are also valid for this part of IEC 62325. 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 part of IEC 62325 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, etc.) 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 (e.g. 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 Transmission infrastructure	Article 13 (a) Redispatch	Article 13 (b) Countertrading	Article 13 (c) 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 Interconnector network dismantling	System operator redispatching Internal redispatch	Counter trade	Congestion costs Counter trade 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 (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.

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 62325-351:2013 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.

An 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

An 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 are 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 always 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 must 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

5.7.7.1 Management of production unit configuration

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 Publication_MarketDocument

The Publication_MarketDocument is described in IEC 62325-451-3.

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

5.7.9 Rules governing the ProblemStatement_MarketDocument

The ProblemStatement_MarketDocument is described in IEC 62325-451-5.

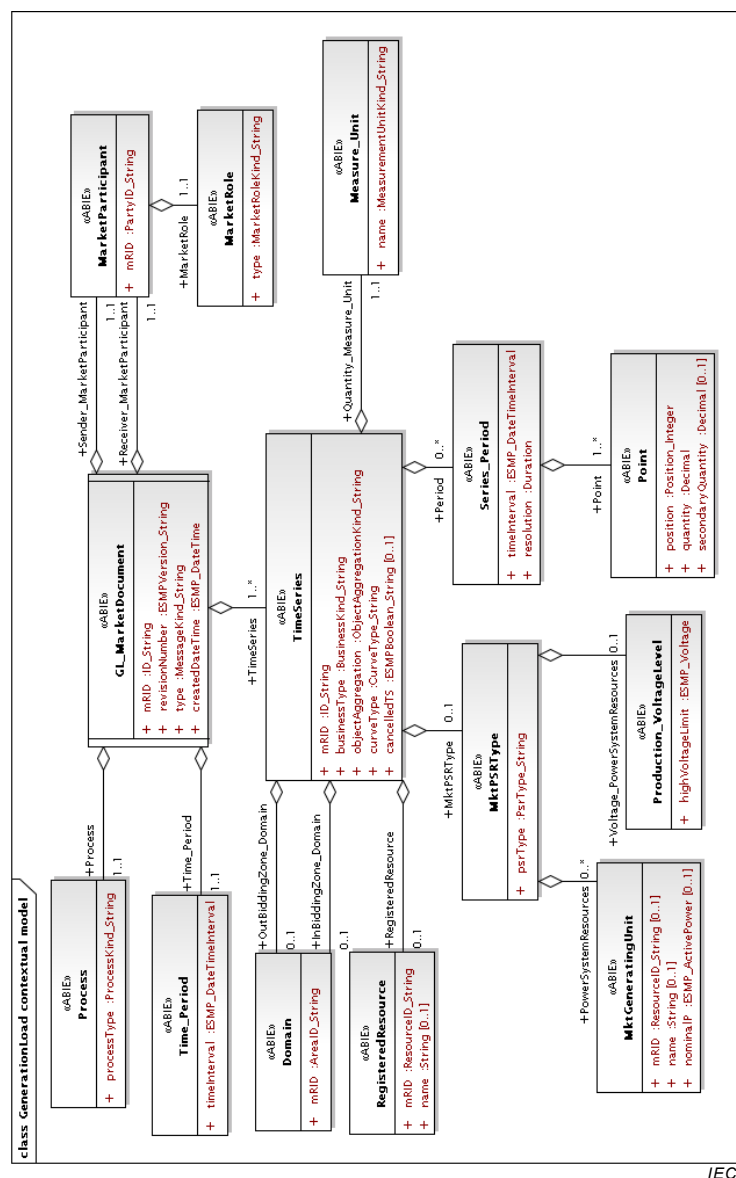
This document is used to report troubles to deliver information.

6 Contextual and assembly models

6.1 GenerationLoad contextual model

6.1.1 Overview of the model

Figure 5 shows the model.



IEC

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

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

IsBasedOn: ESMPClasses::MarketDocument

Table 4 shows all attributes of GL_MarketDocument.

Table 4 – Attributes of GenerationLoad contextual model::GL_MarketDocument

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

mult.	Role	Class type name	Description
[1..1]	Process	Process	Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::Process.Process[0..*]
[1..1]	Sender_MarketParticipant	MarketParticipant	The document owner. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[1..1]	Receiver_MarketParticipant	MarketParticipant	The document recipient. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[1..1]	Time_Period	Time_Period	The time interval that is associated with an electronic document and which is valid for the whole document. Association Based On: ESMPClasses::MarketDocument.[] ----- ESMPClasses::Time_Period.Period[0..*]
[1..*]	TimeSeries	TimeSeries	The time series that is associated with an electronic document. Association Based On: ESMPClasses::MarketDocument.[] ----- 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.

IsBasedOn: ESMPClasses::Domain

Table 6 shows all attributes of Domain.

Table 6 – Attributes of GenerationLoad contextual model::Domain

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	AreaID_String	The unique identification of the domain.

6.1.3.3 MarketParticipant

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

IsBasedOn: ESMPClasses::MarketParticipant

Table 7 shows all attributes of MarketParticipant.

Table 7 – Attributes of GenerationLoad contextual model::MarketParticipant

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	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

mult.	Role	Class type name	Description
[1..1]	MarketRole	MarketRole	The role associated with a MarketParticipant. Association Based On: ESMPClasses::MarketParticipant.[] ----- 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.

IsBasedOn: ESMPClasses::MarketRole

Table 9 shows all attributes of MarketRole.

Table 9 – Attributes of GenerationLoad contextual model::MarketRole

mult.	Attribute name	Attribute type	Description
[1..1]	type	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.

IsBasedOn: ESMPClasses::Measure_Unit

Table 10 shows all attributes of Measure_Unit.

Table 10 – Attributes of GenerationLoad contextual model::Measure_Unit

mult.	Attribute name	Attribute type	Description
[1..1]	name	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.

IsBasedOn: ESMPClasses::MktGeneratingUnit

Table 11 shows all attributes of MktGeneratingUnit.

Table 11 – Attributes of GenerationLoad contextual model::MktGeneratingUnit

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

6.1.3.7 MktPSRType

The type of a power system resource

IsBasedOn: ESMPClasses::MktPSRType

Table 12 shows all attributes of MktPSRType.

Table 12 – Attributes of GenerationLoad contextual model::MktPSRType

mult.	Attribute name	Attribute type	Description
[1..1]	psrType	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**

mult.	Role	Class type name	Description
[0..*]	PowerSystemResources	MktGeneratingUnit	The generating unit(s) of the production unit identified by the RegisteredResource. Association Based On: ESMPClasses::MktGeneratingUnit.PowerSystemResources[0..*] ----- ESMPClasses::MktPSRType.[]
[0..1]	Voltage_PowerSystemResources	Production_VoltageLevel	The voltage level of the RegisteredResource. Association Based On: ESMPClasses::VoltageLevel.PowerSystemResources[0..1] ----- ESMPClasses::MktPSRType.[]

6.1.3.8 Point

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

IsBasedOn: ESMPClasses::Point

Table 14 shows all attributes of Point.

Table 14 – Attributes of GenerationLoad contextual model::Point

mult.	Attribute name	Attribute type	Description
[1..1]	position	Position_Integer	A sequential value representing the relative position within a given time interval.
[1..1]	quantity	Decimal	The principal quantity identified for a point. --- 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.
[0..1]	secondaryQuantity	Decimal	The secondary quantity identified for a point. --- 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.

IsBasedOn: ESMPClasses::Process

Table 15 shows all attributes of Process.

Table 15 – Attributes of GenerationLoad contextual model::Process

mult.	Attribute name	Attribute type	Description
[1..1]	processType	ProcessKind_String	The identification of the nature of process that the document addresses. 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.

IsBasedOn: ESMPClasses::VoltageLevel

Table 16 shows all attributes of Production_VoltageLevel.

Table 16 – Attributes of GenerationLoad contextual model::Production_VoltageLevel

mult.	Attribute name	Attribute type	Description
[1..1]	highVoltageLimit	ESMP_Voltage	The bus bar'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.

IsBasedOn: ESMPClasses::RegisteredResource

Table 17 shows all attributes of RegisteredResource.

Table 17 – Attributes of GenerationLoad contextual model::RegisteredResource

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	ResourceID_String	The unique identification of a resource.
[0..1]	name	String	The name is any free human readable and possibly non unique text naming the object. 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.

IsBasedOn: ESMPClasses::Series_Period

Table 18 shows all attributes of Series_Period.

Table 18 – Attributes of GenerationLoad contextual model::Series_Period

mult.	Attribute name	Attribute type	Description
[1..1]	resolution	Duration	The definition of the number of units of time that compose an individual step within a period.
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end time of the 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**

mult.	Role	Class type name	Description
[1..*]	Point	Point	The Point information associated with a given Series_Period.within a TimeSeries. Association Based On: ESMPClasses::Series_Period.[] ----- ESMPClasses::Point.Point[1..*]

6.1.3.13 Time_Period

The identification of a time interval.

IsBasedOn: ESMPClasses::Time_Period

Table 20 shows all attributes of Time_Period.

Table 20 – Attributes of GenerationLoad contextual model::Time_Period

mult.	Attribute name	Attribute type	Description
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval. As a convention for these data exchanges: - a week 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.

6.1.3.14 TimeSeries

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

IsBasedOn: ESMPClasses::TimeSeries

Table 21 shows all attributes of TimeSeries.

Table 21 – Attributes of GenerationLoad contextual model::TimeSeries

mult.	Attribute name	Attribute type	Description
[1..1]	businessType	BusinessKind_String	The identification of the nature of the time series.
[0..1]	cancelledTS	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. When this indicator has a Yes value, the meaning is that the data for the time series has been withdrawn. This differentiates between a time series with no values and one with values that have been revoked.
[1..1]	curveType	CurveType_String	The identification of the coded representation of the type of curve being described.
[1..1]	mRID	ID_String	A unique identification of the time series.
[1..1]	objectAggregation	ObjectAggregationKind_String	The identification of the domain that is the common denominator used to aggregate a time series. The identified object aggregations are: - area; - resource object; - resource type.

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

**Table 22 – Association ends of GenerationLoad contextual model::
TimeSeries with other classes**

mult.	Role	Class type name	Description
[0..1]	InBiddingZone_Domain	Domain	The identification of the bidding zone where energy is going associated with a TimeSeries. Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Domain.Domain[0..*]
[0..1]	MktPSRType	MktPSRType	The identification of the type of the RegisteredResource associated with a TimeSeries. Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::MktPSRType.MktPSRType[0..*]
[0..1]	OutBiddingZone_Domain	Domain	The identification of the bidding zone where energy is taken from associated with a TimeSeries. In the case of generation, this indicates the load used by the generation unit (consumption). Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Domain.Domain[0..*]
[0..*]	Period	Series_Period	The time interval and resolution for a period associated with a TimeSeries Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Series_Period.Period[0..*]
[1..1]	Quantity_Measure_Unit	Measure_Unit	The unit of measure associated with the quantities in the Point class (quantity and secondaryQuantity). Association Based On: ESMPClasses::TimeSeries.[] ----- ESMPClasses::Measure_Unit.Measurement_Unit[0..*]
[0..1]	RegisteredResource	RegisteredResource	The identification of a resource associated with a time series. Association Based On: ESMPClasses::RegisteredResource.RegisteredResource[0..*] ----- ESMPClasses::TimeSeries.[]

6.2 GenerationLoad assembly model

6.2.1 Overview of the model

Figure 6 shows the model.

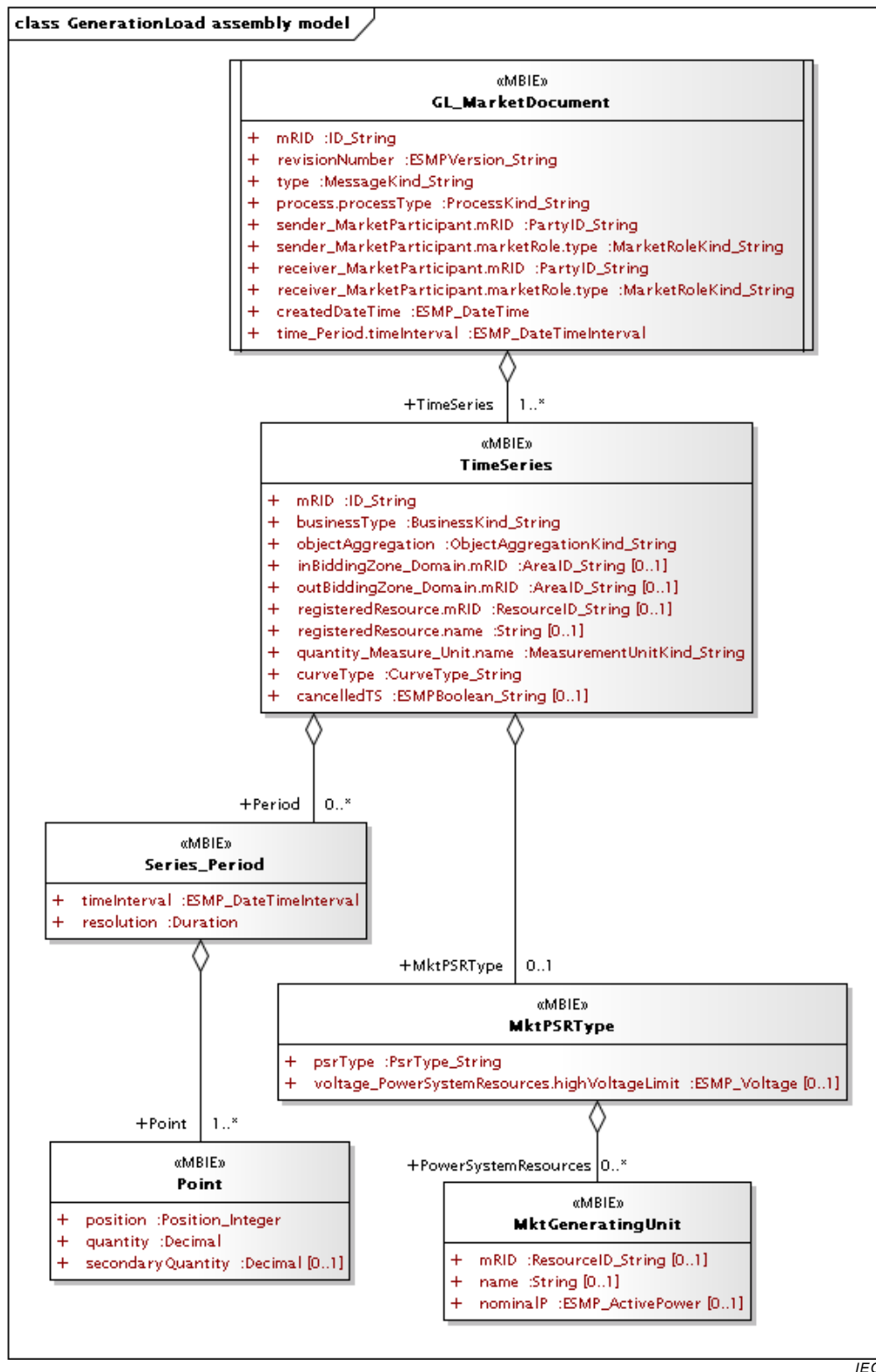


Figure 6 – GenerationLoad assembly model

6.2.2 IsBasedOn relationships from the European style market profile

Table 23 shows the traceability dependency of the classes used in this package towards the upper level.

Table 23 – IsBasedOn dependency

Name	Is BasedOn Class	Complete IsBasedOn Path
GL_MarketDocument	MarketManagement::MarketDocument	TC57CIM::IEC62325::MarketManagement
MktGeneratingUnit	MarketCommon::MktGeneratingUnit	TC57CIM::IEC62325::MarketCommon
MktPSRType	MarketManagement::MktPSRType	TC57CIM::IEC62325::MarketManagement
Point	MarketManagement::Point	TC57CIM::IEC62325::MarketManagement
Series_Period	MarketManagement::Period	TC57CIM::IEC62325::MarketManagement
TimeSeries	MarketManagement::TimeSeries	TC57CIM::IEC62325::MarketManagement

6.2.3 Detailed GenerationLoad assembly model

6.2.3.1 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

IsBasedOn: GenerationLoad contextual model::GL_MarketDocument

Table 24 shows all attributes of GL_MarketDocument.

Table 24 – Attributes of GenerationLoad assembly model::GL_MarketDocument

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[1..1]	process.processType	ProcessKind_String	The identification of the nature of process that the document addresses.
[1..1]	receiver_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- The document recipient. --- The role associated with a MarketParticipant.
[1..1]	receiver_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- The document recipient.
[1..1]	revisionNumber	ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
[1..1]	sender_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- The document owner. --- The role associated with a MarketParticipant.
[1..1]	sender_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- The document owner.
[1..1]	time_Period.timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval. As a convention for these data exchanges: - a week 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. --- The time interval that is associated with an electronic document and which is valid for the whole document.
[1..1]	type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.

Table 25 shows all association ends of GL_MarketDocument with other classes.

Table 25 – Association ends of GenerationLoad assembly model::GL_MarketDocument with other classes

mult.	Role	Class type name	Description
[1..*]	TimeSeries	TimeSeries	The time series that is associated with an electronic document. Association Based On: GenerationLoad contextual model::GL_MarketDocument.[] ----- GenerationLoad contextual model::TimeSeries.TimeSeries[1..*]

6.2.3.2 MktGeneratingUnit

The information about a generating unit.

IsBasedOn: GenerationLoad contextual model::MktGeneratingUnit

Table 26 shows all attributes of MktGeneratingUnit.

Table 26 – Attributes of GenerationLoad assembly model::MktGeneratingUnit

mult.	Attribute name	Attribute type	Description
[0..1]	mRID	ResourceID_String	The unique identification of a resource.
[0..1]	name	String	The name is any free human readable and possibly non unique text naming the object.
[0..1]	nominalP	ESMP_ActivePower	The nominal power of the generating unit.

6.2.3.3 MktPSRType

The type of a power system resource

IsBasedOn: GenerationLoad contextual model::MktPSRType

Table 27 shows all attributes of MktPSRType.

Table 27 – Attributes of GenerationLoad assembly model::MktPSRType

mult.	Attribute name	Attribute type	Description
[1..1]	psrType	PsrType_String	The coded type of a power system resource.
[0..1]	voltage_PowerSystemResources.highVoltageLimit	ESMP_Voltage	The bus bar's high voltage limit --- The voltage level of the RegisteredResource.

Table 28 shows all association ends of MktPSRType with other classes.

**Table 28 – Association ends of GenerationLoad assembly model::
MktPSRType with other classes**

mult.	Role	Class type name	Description
[0..*]	PowerSystemResources	MktGeneratingUnit	The generating unit(s) of the production unit identified by the RegisteredResource. Association Based On: GenerationLoad contextual model::MktGeneratingUnit.PowerSystemResources[0..*] ----- GenerationLoad contextual model::MktPSRType.[]

6.2.3.4 Point

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

IsBasedOn: GenerationLoad contextual model::Point

Table 29 shows all attributes of Point.

Table 29 – Attributes of GenerationLoad assembly model::Point

mult.	Attribute name	Attribute type	Description
[1..1]	position	Position_Integer	A sequential value representing the relative position within a given time interval.
[1..1]	quantity	Decimal	The principal quantity identified for a point. --- 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.
[0..1]	secondaryQuantity	Decimal	The secondary quantity identified for a point. --- 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.

6.2.3.5 Series_Period

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

IsBasedOn: GenerationLoad contextual model::Series_Period

Table 30 shows all attributes of Series_Period.

Table 30 – Attributes of GenerationLoad assembly model::Series_Period

mult.	Attribute name	Attribute type	Description
[1..1]	resolution	Duration	The definition of the number of units of time that compose an individual step within a period.
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end time of the period.

Table 31 shows all association ends of Series_Period with other classes.

Table 31 – Association ends of GenerationLoad assembly model::Series_Period with other classes

mult.	Role	Class type name	Description
[1..*]	Point	Point	The Point information associated with a given Series_Period.within a TimeSeries. Association Based On: GenerationLoad contextual model::Series_Period.[] ----- GenerationLoad contextual model::Point.Point[1..*]

6.2.3.6 TimeSeries

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

IsBasedOn: GenerationLoad contextual model::TimeSeries

Table 32 shows all attributes of TimeSeries.

Table 32 – Attributes of GenerationLoad assembly model::TimeSeries

mult.	Attribute name	Attribute type	Description
[1..1]	businessType	BusinessKind_String	The identification of the nature of the time series.
[0..1]	cancelledTS	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. When this indicator has a Yes value, the meaning is that the data for the time series has been withdrawn. This differentiates between a time series with no values and one with values that have been revoked.
[1..1]	curveType	CurveType_String	The identification of the coded representation of the type of curve being described.
[0..1]	inBiddingZone_Domain.mRID	AreaID_String	The unique identification of the domain. --- The bidding zone where energy is going associated with a TimeSeries.
[1..1]	mRID	ID_String	A unique identification of the time series.
[1..1]	objectAggregation	ObjectAggregationKind_String	The identification of the domain that is the common denominator used to aggregate a time series. The identified object aggregations are: - area; - resource object; - resource type.
[0..1]	outBiddingZone_Domain.mRID	AreaID_String	The unique identification of the domain. --- The identification of the bidding zone where energy is taken from associated with a TimeSeries. In the case of generation, this indicates the load used by the generation unit (consumption).
[1..1]	quantity_Measure_Unit.name	MeasurementUnitKind_String	The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit of measure associated with the quantities in a TimeSeries.
[0..1]	registeredResource.mRID	ResourceID_String	The unique identification of a resource. --- The identification of a resource associated with a time series.
[0..1]	registeredResource.name	String	The name is any free human readable and possibly non unique text naming the object. --- The identification of a resource associated with a time series.

Table 33 shows all association ends of TimeSeries with other classes.

**Table 33 – Association ends of GenerationLoad assembly model::
TimeSeries with other classes**

mult.	Role	Class type name	Description
[0..1]	MktPSRType	MktPSRType	The identification of the type of the RegisteredResource associated with a TimeSeries. Association Based On: GenerationLoad contextual model::TimeSeries.[] ----- GenerationLoad contextual model::MktPSRType.MktPSRType[0..1]
[0..*]	Period	Series_Period	The time interval and resolution for a period associated with a TimeSeries Association Based On: GenerationLoad contextual model::TimeSeries.[] ----- GenerationLoad contextual model::Series_Period.Period[0..*]

6.2.4 Enumerations

The list of enumerations used for the GenerationLoad assembly model is as follows:

- AssetTypeList
- BusinessTypeList
- CodingSchemeTypeList
- CurveTypeList
- IndicatorTypeList
- MessageTypeList
- ObjectAggregationTypeList
- ProcessTypeList
- RoleTypeList
- UnitOfMeasureTypeList
- Unit Symbol

6.3 Outage contextual model

6.3.1 Overview of the model

Figure 7 shows the model.