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**Kommunikation im Energiemarkt –
Teil 451-4: Abwicklungs- und Abstimmungsgeschäftsprozesse,
kontextbezogene Modelle und Einbindungsmodelle für den
europäischen Markt
(IEC 62325-451-4:2014);
Englische Fassung EN 62325-451-4:2015**

Framework for energy market communications –
Part 451-4: Settlement and reconciliation business process, contextual and assembly
models for European market
(IEC 62325-451-4:2014);
English version EN 62325-451-4:2015

Cadre pour les communications pour le marché de l'énergie –
Partie 451-4: Processus métier de règlement des écarts et de réconciliation, modèles
contextuels et modèles d'assemblage pour le marché européen
(IEC 62325-451-4:2014);
Version anglaise EN 62325-451-4:2015

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DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE

Anwendungsbeginn

Anwendungsbeginn für die von CENELEC am 2014-12-25 angenommene Europäische Norm als DIN-Norm ist 2015-09-01.

Nationales Vorwort

Vorausgegangener Norm-Entwurf: E DIN IEC 62325-451-4:2014-07.

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.

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Der Zusammenhang der zitierten Normen mit den entsprechenden Deutschen Normen 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 vorliegenden Normentwurf erfüllt.

Da sich die Benutzer der vorliegenden Norm der englischen Sprache als Fachsprache bedienen, wird die Englische Fassung der EN 62325-451-4 veröffentlicht. Zu deren Abschnitt 1, der den Anwendungsbereich festlegt, sowie deren Abschnitt 3, der die Begriffe festlegt, wurde eine Übersetzung angefertigt und als informativer Nationaler Anhang NA dem vorliegenden Normentwurf hinzugefügt. Für viele 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)

1 Anwendungsbereich

Basierend auf dem Markt-Profil nach europäischer Art (IEC 62325-351) spezifiziert dieser Teil der IEC 62325-451 ein Paket für die Abwicklungs- und Abstimmungsgeschäftsprozesse und die damit verbundenen Dokument-kontextbezogenen Modelle, Einbindungsmodelle (en: assembly models) und XML-Schemata zum Gebrauch innerhalb eines Marktes nach europäischer Art.

Die relevanten aggregierten Kernkomponenten (ACCs) (en: aggregated core components), die in IEC 62325-351 definiert sind, wurden kontextualisiert in die aggregierten Geschäfts-Informationseinheiten (ABIEs) (en: aggregated business information entities), um die Anforderungen dieses Geschäftsprozesses zu erfüllen. Die kontextualisierten ABIE wurden in die relevanten Dokument-kontextbasierten Modelle eingebunden. Verwandte Einbindungsmodelle und XML-Schemata für den Informationsaustausch zwischen Marktteilnehmern werden automatisch aus dem zusammengesetzten Dokument-kontextbasierten Modell erstellt.

Diese Internationale Norm stellt einen einheitlichen Aufbau bereit für die Übertragung von gesammelten Daten, um einen Strommarkt festzulegen. Es ist jedoch nicht das Ziel dieser Internationaler Norm, das Schema festzulegen, das bei einer Abwicklung oder Abstimmung eines Marktes berücksichtigt wird. Der Zweck dieser Norm ist lediglich, den Informationsaustausch zu definieren, der notwendig ist, um die Berechnung zur Abwicklung und Abstimmung durchzuführen.

Der Abwicklungs- und Abstimmungsgeschäftsprozess ist die Methode, um die endgültige Position für jeden Marktteilnehmer sowie dessen unausgeglichene Mengen zu berechnen.

3 Begriffe

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

ANMERKUNG Für allgemeine Glossardefinitionen siehe das Internationale Elektrotechnische Wörterbuch IEC 60050.

3.1

aggregierte Geschäfts-Informationseinheit **ABIE**

(en: aggregated business information entity; ABIE)

aggregierte Geschäfts-Informationseinheit ist eine Wiederverwendung einer aggregierten Kernkomponente (ACC) in einem festgelegten Geschäftsbereich

[QUELLE: ISO/TS 15000-5:2005, Abschnitt 9, mod. (Anpassung des Begriffs)]

3.2

aggregierte Kernkomponente **ACC**

(en: aggregated core component; ACC)

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

Anmerkung 1 zum Begriff: Als Terme bei der Modellierung stellen diese unabhängig von einem bestimmten Geschäftskontext eine Objektklasse dar.

[QUELLE: ISO/TS 15000-5:2005, Abschnitt 9, mod. (Anpassung des Begriffs)]

3.3

Anwendungsprogramm-Schnittstelle

API;

(en: **application program interface; API**)

Menge von öffentlichen Funktionen, die von einer ausführbaren Komponente zum Aufruf durch andere Anwendungskomponenten zur Verfügung gestellt wird

3.4

Einbindungsmodell

(en: **assembly Model**)

Modell, das Informationen in einem Geschäftskontext für die Einbindung in elektronische Dokumente für den Datenaustausch aufbereitet

3.5

basiert auf oder IsBasedOn

(en: **based on or IsBasedOn**)

Einsetzen eines Artefakts, das Einschränkungen besitzt, die nach den Anforderungen eines bestimmten Geschäftskontextes vorgenommen wurden

[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; ESMP**)

Profil, das am Europäischen Markt ausgerichtet und Ziel dieser Internationalen Norm ist

3.8

Informationsmodell

(en: **information model**)

Repräsentation von Konzeptionen, Beziehungen, Beschränkungen, Regeln und Operationen zur Festlegung von Datensemantiken für ein ausgewähltes Diskursuniversum

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

3.9

Marktmanagementsystem

MMS

(en: **market management system; MMS**)

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 für einen Elektrizitätsmarkt können eine Unterstützung bei der Kapazitätsaufteilung, der Energieplanung, Hilfs- oder anderen Diensten, Echtzeit-Abläufen und Abrechnungen einschließen.

3.10

Geschäfts-Informationseinheiten-Nachrichten

MBIE

(en: message business information entity; MBIE)

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

– Leerseite –

English Version

**Framework for energy market communications - Part 451-4:
Settlement and reconciliation business process, contextual and
assembly models for European market
(IEC 62325-451-4:2014)**

Cadre pour les communications pour le marché de l'énergie
- Partie 451-4: Processus métier de règlement des écarts et
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Kommunikation im Energiemarkt - Teil 451-4: Abwicklungs-
und Abstimmungsgeschäftsprozesse, kontextbezogene
Modelle und Einbindungsmodelle für den europäischen
Markt
(IEC 62325-451-4:2014)

This European Standard was approved by CENELEC on 2014-12-25. 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

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Foreword

The text of document 57/1449/CDV, future edition 1 of IEC 62325-451-4, 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 62325-451-4:2015.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-09-27
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2017-12-25

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

Endorsement notice

The text of the International Standard IEC 62325-451-4:2014 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.
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IEC 61970-301	NOTE	Harmonized as EN 61970-301.
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INTRODUCTION

This standard is one of the IEC 62325 series which define protocols for deregulated energy market communications.

The principal objective of the IEC 62325 series of standards 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 enable these applications or systems access to public data and exchange information independent of how such information is represented internally.

The common information model (CIM) specifies the basis for the semantics for this message exchange.

The European style market profile is based on different parts of the CIM IEC standard. The CIM is defined through a series of standards, i.e. IEC 62325-301, IEC 61970-301 and IEC 61968-11 standards.

This document provides for the European style market profile the settlement and reconciliation business process that can be used throughout a European style market. This standard was originally based upon the work of the European Transmission System Operators (ETSO) Task Force EDI (Electronic Data Interchange) and then on the work of the European Network of Transmission System Operators (ENTSO-E) Working Group EDI.

This document describes the settlement and reconciliation process for wholesale markets; it is brought to the attention of the reader that it is envisaged to initiate work on a combined reconciliation process for retail and wholesale markets.

FRAMEWORK FOR ENERGY MARKET COMMUNICATIONS –

Part 451-4: Settlement and reconciliation business process, contextual and assembly models for European market

1 Scope

Based on the European style market profile (IEC 62325-351), this part of IEC 62325-451 specifies a package for the settlement and reconciliation business process and the associated document contextual model, assembly model and XML schema for use within European style markets.

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 this business process. The contextualised ABIEs have been assembled into the relevant document contextual models. Related assembly models and XML schema for the exchange of information between market participants are automatically generated from the assembled document contextual models.

This International Standard provides a uniform layout for the transmission of aggregated data in order to settle the electricity market. It is however not the purpose of this International Standard to define the formula to be taken into account to settle or reconcile a market. The purpose of this standard is only to enable the information exchange necessary to carry out the computation of settlement and reconciliation.

The settlement process or reconciliation process is the way to compute the final position of each market participant as well as its imbalance amounts.

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, *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 62325-451-2, *Framework for energy market communications – Part 451-2: Scheduling business process and contextual model for CIM European market*

3 Terms and definitions

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

NOTE Refer to IEC 60050, *International Electrotechnical Vocabulary*, for general glossary definitions.

3.1 aggregate business information entity ABIE

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

[SOURCE: ISO/TS 15000-5:2005, Clause 9, modified (modification of the definition)]

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 (modification of the definition)]

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 or 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]

¹ To be published.

3.7

European style market profile

ESMP

the European style market profile, the object of this International Standard

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.

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

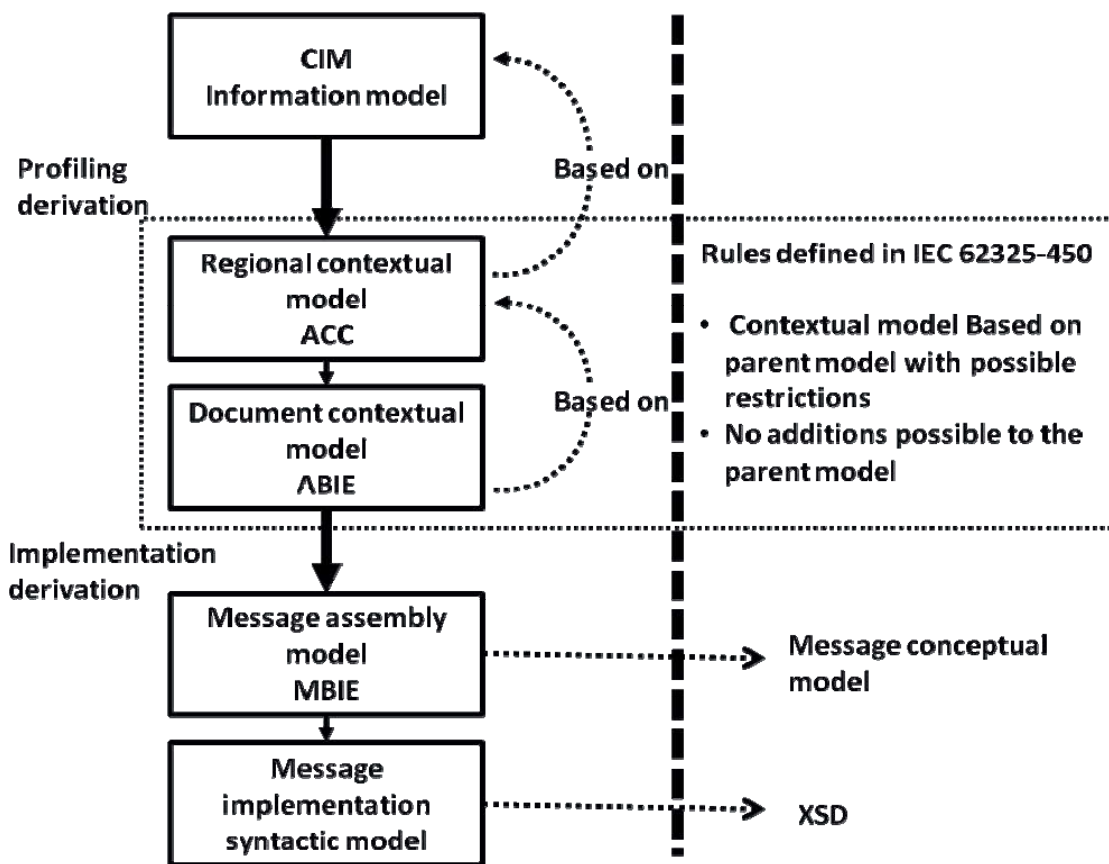
MBIE

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

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, IEC 61968-11, IEC 61970-301 and IEC 62325-301), to different regional contextual models and their subsequent contextualized documents for information exchange; the final step being the message specifications for information interchange.



IEC

Figure 1 – IEC 62325-450 modelling framework

The regional contextual models are the basic core components that are necessary to build electronic documents for information interchange. This is defined in the European style market contextual model (IEC 62325-351). These core 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.

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 legacy names.

4.2 European style market package structure

Figure 2 describes the main package structure of the European style market profile.

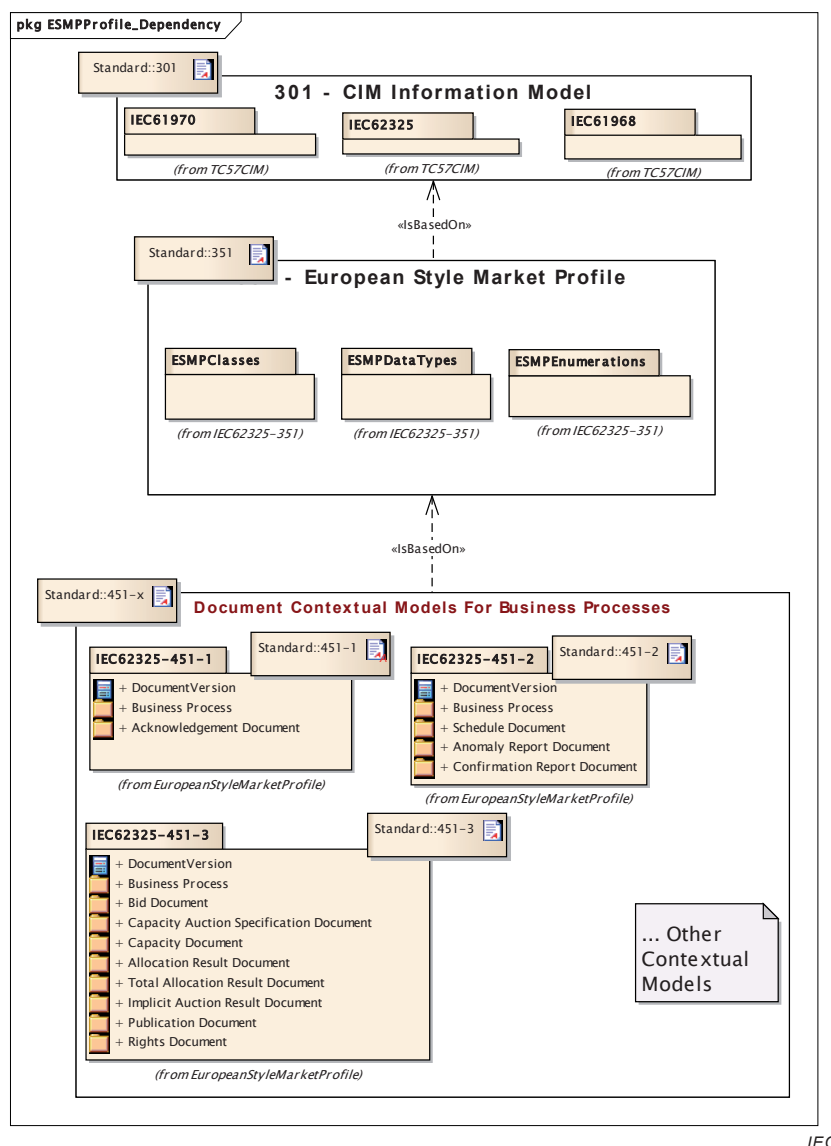


Figure 2 – Overview of European style market profile dependency

For each business process, a business process package is described in an IEC 62325-451-x (x from 1 to n) 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 as 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 model.
- ESMPCDataTypes: 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 settlement and reconciliation business process

5.1 Balance responsible party and settlement

As indicated in the IEC 62325-301 "MarketRoleKind enumeration", in the European style electricity market, a balance responsible party could be defined as:

- A party that has a contract proving financial security and identifying balance responsibility with the imbalance settlement responsible for the market balance area entitling the party to operate in the market. This is the only role allowing a party to nominate energy on a wholesale level.

NOTE The meaning of the word "balance" in this context signifies that the quantity contracted to provide or to consume shall be equal to the quantity really provided or consumed.

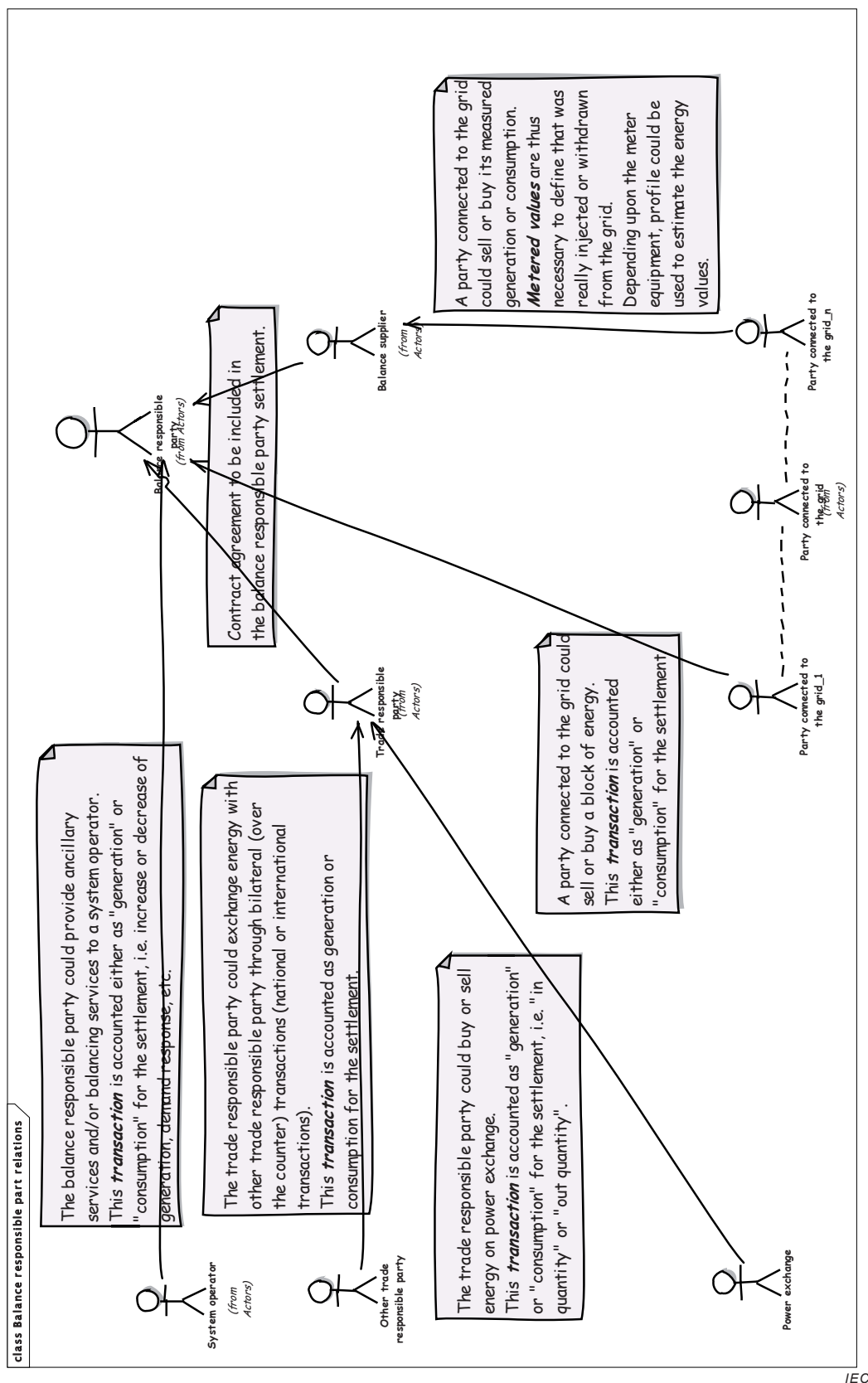
The role of balance responsible party is linked to the role of balance supplier, i.e.

- A party that markets the difference between actual metered energy consumption and the energy bought with firm energy contracts by the party connected to the grid. In addition the balance supplier markets any difference with the firm energy contract (of the party connected to the grid) and the metered production. There is one balance supplier for each accounting point.

A party connected to the grid could be defined as:

- A party that contracts for the right to consume or produce electricity at an accounting point.

Figure 3 describes the different transactions of a balance responsible party that could have to be considered when carrying out a settlement or a reconciliation process:



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Figure 3 – Balance responsible party relations