



European Network of
Transmission System Operators
for Electricity

BALANCING DOCUMENT UML MODEL AND SCHEMA

2022-02-01
APPROVED DOCUMENT
VERSION 2.5

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Revision History

Version	Release	Date	Comments
0	0	2017-01-19	First drafting of the document.
1	0	2017-01-30	Version to be submitted to Market Committee following WG EDI meeting in March 2017.
2	0	2018-03-08	Approved by MC. XSD version 4.0: Add new attributes: <ul style="list-style-type: none"> • MarketProduct • AllocationDecision • UnavailableQuantity Added two new relations between TimeSeries and MarketProduct
2	1	2019-09-10	XSD version 4.1: <ul style="list-style-type: none"> • controlArea_Domain.mRID in Balancing_MarketDocument class changed to area_Domain.mRID • mRID of Document, Series and Timeseries (ID_String type) was enlarged from 35 to 60 characters. Approved by MC.
2	2	2020-09-16	XSD version 4.2: Auction mRID attribute has been linked to Timeseries with Cardinality 0..1 Approved by MC.
2	3	2021-05-14	XSD version 4.3: New reason class linked to Balancing_MarketDocument, Timeseries and Point with cardinality 0..*.
2	4	2021-09-15	XSD version 4.4: New priceDescriptor class linked to FinancialPrice class with cardinality 0..1. Approved by MC.
2	5	2022-02-01	XSD version 4.5: Quantity_Measure_Unit.name attribute was renamed to Quantity_Measurement_Unit.name to be compliant with the ESMP. Approved by MC.

62

63 **Objective**

64 The purpose of this document is to provide the contextual and assembly UML models and the
65 schema of the Balancing_MarketDocument.

66 The schema of the Balancing_MarketDocument could be used in various business processes.

67 It is not the purpose of this document to describe all the use cases, sequence diagrams,
68 business processes, etc. for which this schema is to be used.

69 This document shall only be referenced in an implementation guide of a specific business
70 process. The content of the business process implementation guide shall be as follows:

- 71 • Description of the business process;
- 72 • Use case of the business process;
- 73 • Sequence diagrams of the business process;
- 74 • List of the schema (XSD) to be used in the business process and versions of the
75 schema;
- 76 • For each schema, dependency tables providing the necessary information for the
77 generation of the XML instances, i.e. when the optional attributes are to be used, which
78 codes from which ENTSO-E codelist are to be used.

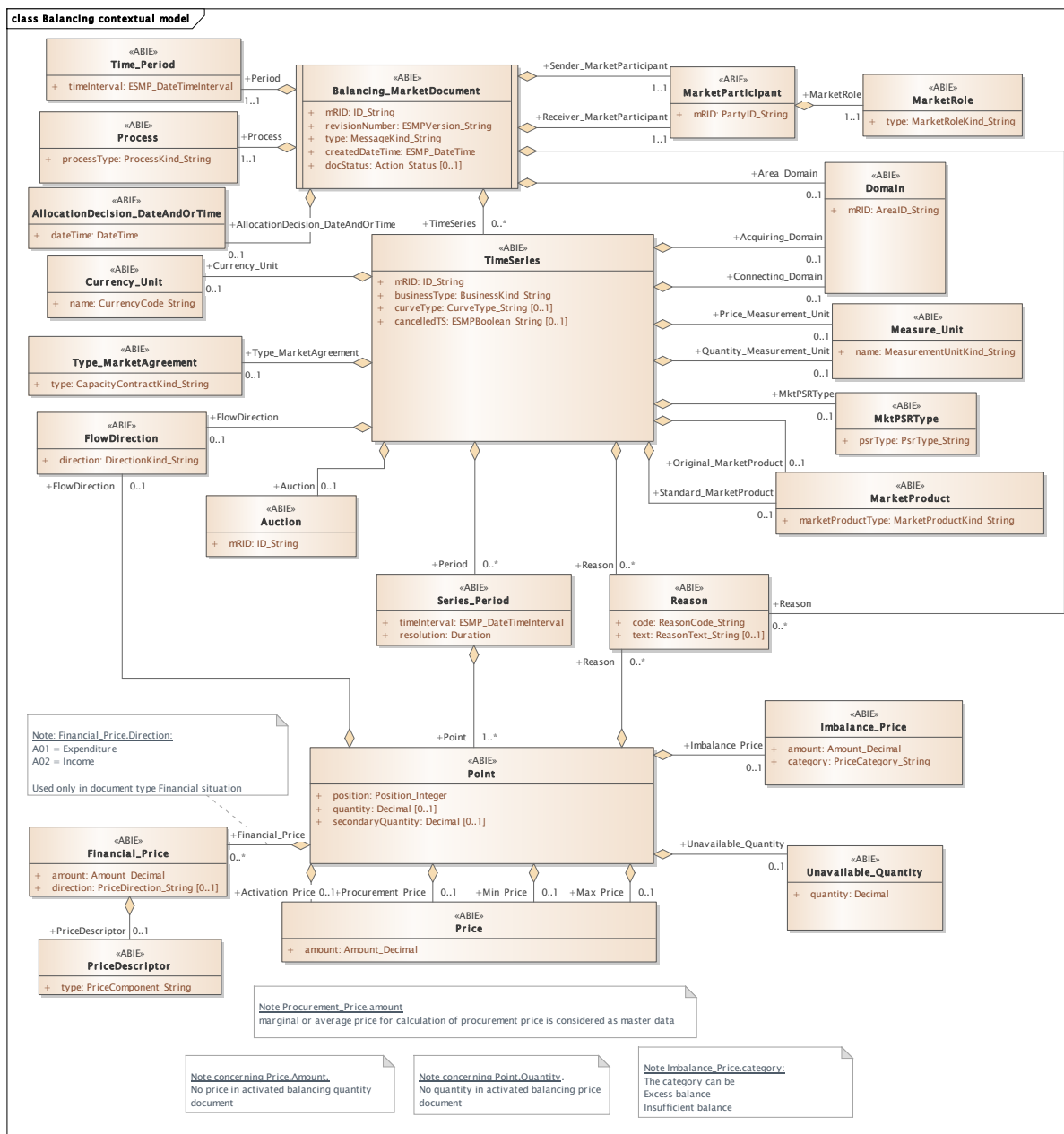
79

80 **Balancing_MarketDocument**

81 **2.1 Balancing contextual model**

82 **2.1.1 Overview of the model**

83 Figure 1 shows the model.



84

85

86

Figure 1 - Balancing contextual model

87

88 **2.1.2 IsBasedOn relationships from the European style market profile**

89 Table 1 shows the traceability dependency of the classes used in this package towards the
90 upper level.

91

Table 1 - IsBasedOn dependency

Name	Complete IsBasedOn Path
AllocationDecision_DateAndOrTime	TC57CIM::IEC62325::MarketManagement::DateAndOrTime
Auction	TC57CIM::IEC62325::MarketManagement::Auction
Balancing_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
Currency_Unit	TC57CIM::IEC62325::MarketManagement::Unit
Domain	TC57CIM::IEC62325::MarketManagement::Domain
Financial_Price	TC57CIM::IEC62325::MarketManagement::Price
FlowDirection	TC57CIM::IEC62325::MarketManagement::FlowDirection
Imbalance_Price	TC57CIM::IEC62325::MarketManagement::Price
MarketParticipant	TC57CIM::IEC62325::MarketCommon::MarketParticipant
MarketProduct	TC57CIM::IEC62325::MarketCommon::MarketProduct
MarketRole	TC57CIM::IEC62325::MarketCommon::MarketRole
Measure_Unit	TC57CIM::IEC62325::MarketManagement::Unit
MktPSRType	TC57CIM::IEC62325::MarketManagement::MktPSRType
Point	TC57CIM::IEC62325::MarketManagement::Point
Price	TC57CIM::IEC62325::MarketManagement::Price
PriceDescriptor	TC57CIM::IEC62325::MarketCommon::PriceDescriptor
Process	TC57CIM::IEC62325::MarketManagement::Process
Reason	TC57CIM::IEC62325::MarketManagement::Reason
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
Time_Period	TC57CIM::IEC62325::MarketManagement::Period
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries
Type_MarketAgreement	TC57CIM::IEC62325::MarketManagement::MarketAgreement
Unavailable_Quantity	TC57CIM::IEC62325::MarketManagement::Quantity

92

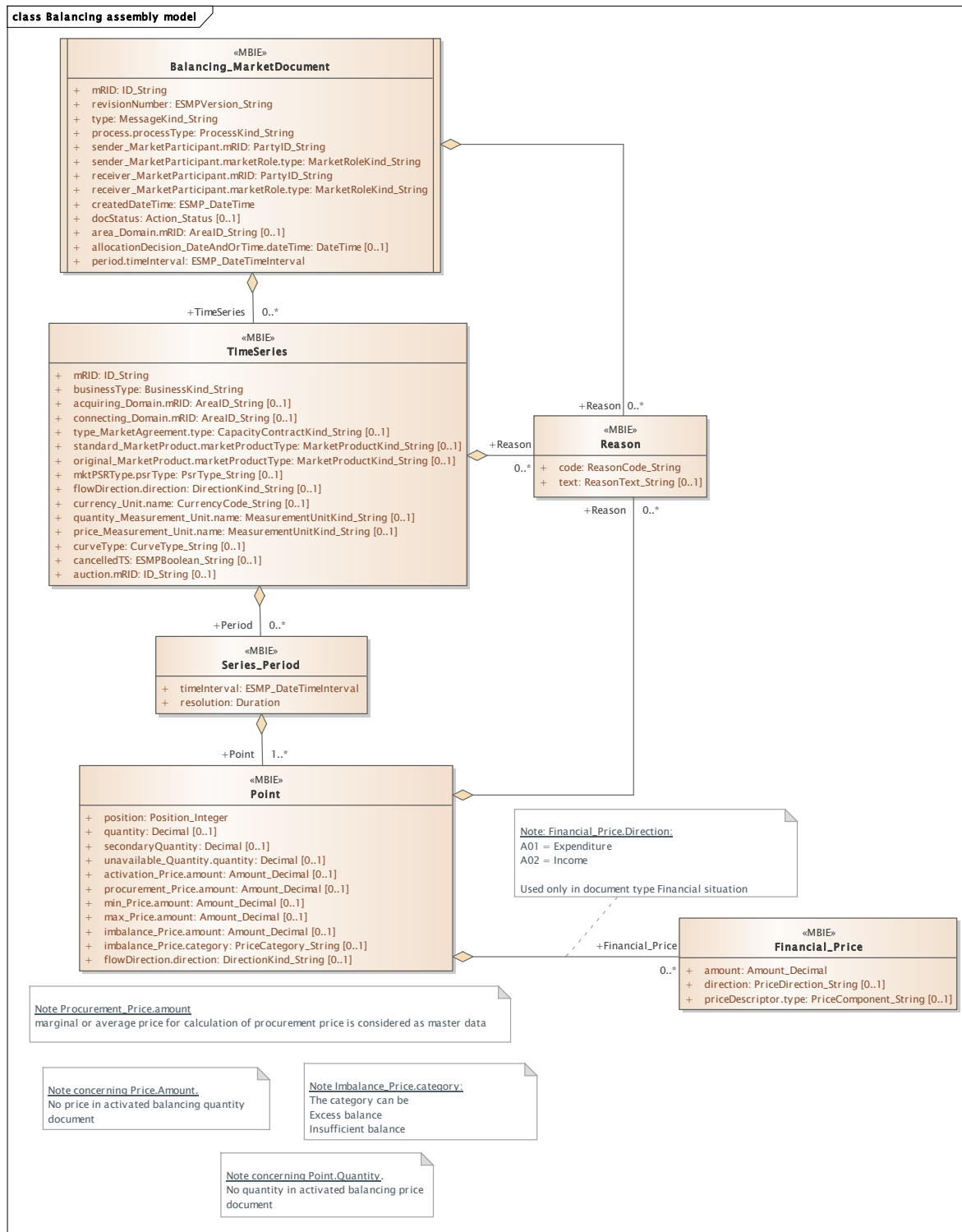
93

94

95 **2.2 Balancing assembly model**

96 **2.2.1 Overview of the model**

97 Figure 2 shows the model.



98

99

Figure 2 - Balancing assembly model

100

101 **2.2.2 IsBasedOn relationships from the European style market profile**

102 Table 2 shows the traceability dependency of the classes used in this package towards the
103 upper level.

104

Table 2 - IsBasedOn dependency

Name	Complete IsBasedOn Path
Balancing_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
Financial_Price	TC57CIM::IEC62325::MarketManagement::Price
Point	TC57CIM::IEC62325::MarketManagement::Point
Reason	TC57CIM::IEC62325::MarketManagement::Reason
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

105

106 **2.2.3 Detailed Balancing assembly model**

107 **2.2.3.1 Balancing_MarketDocument root class**

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

110 The Balancing_MarketDocument describes a specific situation in the balancing information
111 exchange.

112 Table 3 shows all attributes of Balancing_MarketDocument.

113

Table 3 - Attributes of Balancing assembly model::Balancing_MarketDocument

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ID_String	The unique identification of the document being exchanged within a business process flow.
1	[1..1]	revisionNumber ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
2	[1..1]	type MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.
3	[1..1]	process.processType ProcessKind_String	The identification of the nature of process that the document addresses.
4	[1..1]	sender_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- Document owner.
5	[1..1]	sender_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- Document owner. --- The role associated with a MarketParticipant.
6	[1..1]	receiver_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- Document recipient
7	[1..1]	receiver_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- Document recipient --- The role associated with a MarketParticipant.

Order	mult.	Attribute name / Attribute type	Description
8	[1..1]	createdDateTime ESMP_DateTime	The date and time of the creation of the document.
9	[0..1]	docStatus Action_Status	The identification of the condition or position of the document with regard to its standing.
10	[0..1]	area_Domain.mRID AreaID_String	The unique identification of the domain. --- The identification of the control area of the issuer.
11	[0..1]	allocationDecision_DateAndOrTime.dateTime DateTime	Date and time as per ISO 8601 YYYY-MM-DDThh:mm:ss.sssZ. --- Date and time when the decision on allocation was made
12	[1..1]	period.timeInterval ESMP_DateTimeInterval	The start and end date and time for a given interval.

114

115 Table 4 shows all association ends of Balancing_MarketDocument with other classes.

116 **Table 4 - Association ends of Balancing assembly model::Balancing_MarketDocument**
117 **with other classes**

Order	mult.	Class name / Role	Description
13	[0..*]	TimeSeries TimeSeries	A time series should exist to describe the specific information associated with balancing reserves, imbalance, financial report or cross-border balancing. Association Based On: Balancing contextual model::Balancing_MarketDocument.[] ----- Balancing contextual model::TimeSeries.TimeSeries[0..*]
14	[0..*]	Reason Reason	The Reason associated with the electronic document header providing different motivations for the creation of the document. Association Based On: Balancing contextual model::Reason.Reason[0..*] ----- Balancing contextual model::Balancing_MarketDocument.[]

118

119 2.2.3.2 Financial_Price

120 The cost corresponding to a specific entity expressed in a currency.

121 Table 5 shows all attributes of Financial_Price.

122 **Table 5 - Attributes of Balancing assembly model::Financial_Price**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	amount Amount_Decimal	A number of monetary units specified in a unit of currency.
1	[0..1]	direction PriceDirection_String	The direction of a price payment (i.e. an impacted area system operator pays to internal market parties or inverse). This is to be used only in a document describing the financial situation. The code A01 is to be used for expenditure. The code A02 is to be used for income.

Order	mult.	Attribute name / Attribute type	Description
2	[0..1]	priceDescriptor.type PriceComponent_String	The type of price being described. In general, the priceType will either be "total" to signify that the price is the price paid to buy or sell the commodity, sometimes referred to as an "all-in" price, or one of potentially many components.

123

124 2.2.3.3 Point

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

126 Table 6 shows all attributes of Point.

127 **Table 6 - Attributes of Balancing assembly model::Point**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	position Position_Integer	A sequential value representing the relative position within a given time interval.
1	[0..1]	quantity Decimal	The principal quantity or the accepted offer quantity identified for a point.
2	[0..1]	secondaryQuantity Decimal	This information defines the activated quantity or the offered volume for a point.
3	[0..1]	unavailable_Quantity.quantity Decimal	The quantity value. The association role provides the information about what is expressed. --- The Quantity of balancing energy unavailable for the activation
4	[0..1]	activation_Price.amount Amount_Decimal	A number of monetary units specified in a unit of currency. --- The activation pricing information per quantity and interval.
5	[0..1]	procurement_Price.amount Amount_Decimal	A number of monetary units specified in a unit of currency. --- The procurement pricing information per quantity and interval.
6	[0..1]	min_Price.amount Amount_Decimal	A number of monetary units specified in a unit of currency. --- The minimum pricing information per quantity and interval.
7	[0..1]	max_Price.amount Amount_Decimal	A number of monetary units specified in a unit of currency. --- The maximum pricing information per quantity and interval
8	[0..1]	imbalance_Price.amount Amount_Decimal	A number of monetary units specified in a unit of currency. --- The imbalance pricing information per quantity and interval.
9	[0..1]	imbalance_Price.category PriceCategory_String	The category of a price to be used in a price calculation. Note: the price category is mutually agreed between system operators. --- The imbalance pricing information per quantity and interval.
10	[0..1]	flowDirection.direction DirectionKind_String	The coded identification of the direction of energy flow. --- The flow direction provides the indication if the reserve is activated upward or downward.

128

129 Table 7 shows all association ends of Point with other classes.

130 **Table 7 - Association ends of Balancing assembly model::Point with other classes**

Order	mult.	Class name / Role	Description
11	[0..*]	Financial_Price Financial_Price	The price information associated with a given Point. This identifies the financial amount in relation to a specific direction associated with a transmission system operator for procuring, activating and settling balancing information. Association Based On: Balancing contextual model::Point.[] ----- Balancing contextual model::Financial_Price.Financial_Price[0..*]
12	[0..*]	Reason Reason	The Reason information associated with a Point providing motivation information. Association Based On: Balancing contextual model::Reason.Reason[0..*] ----- Balancing contextual model::Point.[]

131

132 **2.2.3.4 Reason**

133 The motivation of an act.

134 Table 8 shows all attributes of Reason.

135 **Table 8 - Attributes of Balancing assembly model::Reason**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	code ReasonCode_String	The motivation of an act in coded form.
1	[0..1]	text ReasonText_String	The textual explanation corresponding to the reason code.

136

137 **2.2.3.5 Series_Period**

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

139 Table 9 shows all attributes of Series_Period.

140 **Table 9 - Attributes of Balancing assembly model::Series_Period**

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

141

142 Table 10 shows all association ends of Series_Period with other classes.

143 **Table 10 - Association ends of Balancing assembly model::Series_Period with other**
144 **classes**

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

145

146 **2.2.3.6 TimeSeries**

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

148 Table 11 shows all attributes of TimeSeries.

149 **Table 11 - Attributes of Balancing assembly model::TimeSeries**

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ID_String	A unique identification of the time series.
1	[1..1]	businessType BusinessKind_String	The identification of the nature of the time series.
2	[0..1]	acquiring_Domain.mRID AreaID_String	The unique identification of the domain. --- The identification of the acquiring area.
3	[0..1]	connecting_Domain.mRID AreaID_String	The unique identification of the domain. --- The identification of the connecting area
4	[0..1]	type_MarketAgreement.type CapacityContractKind_String	The specification of the kind of the contract, e.g. long term, daily contract. --- The identification of the procurement time unit.
5	[0..1]	standard_MarketProduct.marketProductType MarketProductKind_String	The Type of product on a market view
6	[0..1]	original_MarketProduct.marketProductType MarketProductKind_String	The Type of product on a market view
7	[0..1]	mktPSRType.psrType PsrType_String	The coded type of a power system resource. --- The identification of the source type of the reserve.
8	[0..1]	flowDirection.direction DirectionKind_String	The coded identification of the direction of energy flow. --- The flow direction associated with a TimeSeries for the balance reserve.
9	[0..1]	currency_Unit.name CurrencyCode_String	The identification of the formal code for a currency (ISO 4217). --- The currency associated with a TimeSeries.
10	[0..1]	quantity_Measurement_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.
11	[0..1]	price_Measurement_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 prices in a TimeSeries.

Order	mult.	Attribute name / Attribute type	Description
12	[0..1]	curveType CurveType_String	The identification of the coded representation of the type of curve being described.
13	[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.
14	[0..1]	auction.mRID ID_String	The unique identification of the auction. In the ESMP context, the "model authority" is defined as an emitting company that provides an agreed identification unique within a business context such as capacity auction identification, market agreement identification, etc. Master resource identifier issued by a model authority. The mRID is globally unique within an exchange context. Global uniqueness is easily achieved by using a UUID for the mRID. It is strongly recommended to do this. For CIMXML data files in RDF syntax, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements. --- The auction characteristics that are associated with a TimeSeries.

150

151 Table 12 shows all association ends of TimeSeries with other classes.

152 **Table 12 - Association ends of Balancing assembly model::TimeSeries with other**
153 **classes**

Order	mult.	Class name / Role	Description
15	[0..*]	Series_Period Period	The series period class provides the balancing time unit information in respect to the balancing reserve capacity. Association Based On: Balancing contextual model::TimeSeries.[] ----- Balancing contextual model::Series_Period.Period[0..*]
16	[0..*]	Reason Reason	The reason information associated with a TimeSeries providing motivation information. Association Based On: Balancing contextual model::Reason.Reason[0..*] ----- Balancing contextual model::TimeSeries.[]

154

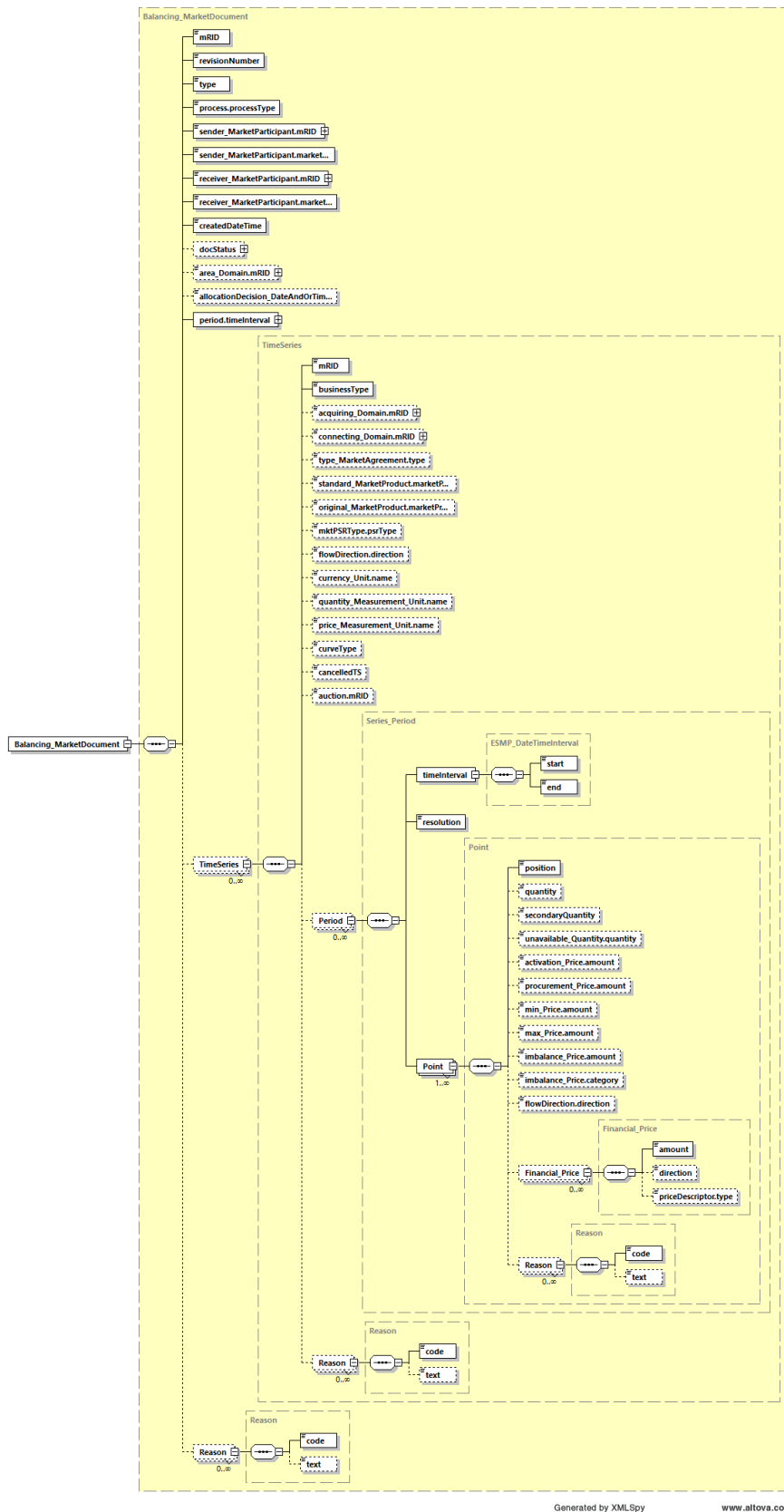
155 2.2.4 Datatypes

156 The list of datatypes used for the Balancing assembly model is as follows:

- 157 • Action_Status compound
- 158 • ESMP_DateTimeInterval compound
- 159 • Amount_Decimal datatype
- 160 • ArealD_String datatype, codelist CodingSchemeTypeList
- 161 • BusinessKind_String datatype, codelist BusinessTypeList
- 162 • CapacityContractKind_String datatype, codelist ContractTypeList
- 163 • CurrencyCode_String datatype, codelist CurrencyTypeList
- 164 • CurveType_String datatype, codelist CurveTypeList
- 165 • DirectionKind_String datatype, codelist DirectionTypeList
- 166 • ESMP_DateTime datatype

- 167 • ESMPBoolean_String datatype, codelist IndicatorTypeList
- 168 • ESMPVersion_String datatype
- 169 • ID_String datatype
- 170 • MarketProductKind_String datatype, codelist MarketProductTypeList
- 171 • MarketRoleKind_String datatype, codelist RoleTypeList
- 172 • MeasurementUnitKind_String datatype, codelist UnitOfMeasureTypeList
- 173 • MessageKind_String datatype, codelist MessageTypeList
- 174 • PartyID_String datatype, codelist CodingSchemeTypeList
- 175 • Position_Integer datatype
- 176 • PriceCategory_String datatype, codelist PriceCategoryTypeList
- 177 • PriceComponent_String datatype, codelist PriceComponentTypeList
- 178 • PriceDirection_String datatype, codelist PriceDirectionTypeList
- 179 • ProcessKind_String datatype, codelist ProcessTypeList
- 180 • PsrType_String datatype, codelist AssetTypeList
- 181 • ReasonCode_String datatype, codelist ReasonCodeTypeList
- 182 • ReasonText_String datatype
- 183 • Status_String datatype, codelist StatusTypeList
- 184 • YMDHM_DateTime datatype
- 185

186 2.2.5 Balancing_MarketDocument XML schema structure



187

188

Figure 3 - Balancing_MarketDocument schema structure

189 2.2.6 Balancing_MarketDocument XML schema

190 The schema to be used to validate XML instances is to be identified by:

191 urn:iec62325.351:tc57wg16:451-6:balancingdocument:4:5

192

```

193 <?xml version="1.0" encoding="utf-8"?>
194 <xs:schema xmlns:ecl="urn:entsoe.eu:wgedi:codelists"
195 xmlns="urn:iec62325.351:tc57wg16:451-6:balancingdocument:4:5"
196 xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
197 xmlns:cimp="http://www.iec.ch/cimprofile"
198 xmlns:xs="http://www.w3.org/2001/XMLSchema"
199 targetNamespace="urn:iec62325.351:tc57wg16:451-6:balancingdocument:4:5"
200 elementFormDefault="qualified" attributeFormDefault="unqualified">
201   <xs:import namespace="urn:entsoe.eu:wgedi:codelists" schemaLocation="urn-
202 entsoe-eu-wgedi-codelists.xsd"/>
203   <xs:element name="Balancing_MarketDocument"
204 type="Balancing_MarketDocument"/>
205   <xs:simpleType name="ID_String"
206 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
207     <xs:restriction base="xs:string">
208       <xs:maxLength value="60"/>
209     </xs:restriction>
210   </xs:simpleType>
211   <xs:simpleType name="ESMPVersion_String"
212 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
213     <xs:restriction base="xs:string">
214       <xs:pattern value="[1-9]([0-9]){0,2}"/>
215     </xs:restriction>
216   </xs:simpleType>
217   <xs:simpleType name="MessageKind_String"
218 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
219     <xs:restriction base="ecl:MessageTypeList"/>
220   </xs:simpleType>
221   <xs:simpleType name="ProcessKind_String"
222 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
223     <xs:restriction base="ecl:ProcessTypeList"/>
224   </xs:simpleType>
225   <xs:simpleType name="PartyID_String-base"
226 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
227     <xs:restriction base="xs:string">
228       <xs:maxLength value="16"/>
229     </xs:restriction>
230   </xs:simpleType>
231   <xs:complexType name="PartyID_String"
232 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
233     <xs:simpleContent>
234       <xs:extension base="PartyID_String-base">
235         <xs:attribute name="codingScheme"
236 type="ecl:CodingSchemeTypeList" use="required"/>
237       </xs:extension>
238     </xs:simpleContent>
239   </xs:complexType>
240   <xs:simpleType name="MarketRoleKind_String"
241 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">

```

```

242         <xs:restriction base="ecl:RoleTypeList"/>
243     </xs:simpleType>
244     <xs:simpleType name="ESMP_DateTime"
245 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
246         <xs:restriction base="xs:dateTime">
247             <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02]))[\-](0[1-
248 9]|[12][0-9]|3[01]))|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|12)[0-
249 9]|30))T((([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-
250 9])Z)|(((13579)[26][02468][048]|13579[01345789](0)[48]|13579[01345789][2468][0
251 48]|02468[048][02468][048]|02468[1235679](0)[48]|02468[1235679][2468][048]|[
252 0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T((([01][0-9]|2[0-3]):[0-
253 5][0-9]:[0-5][0-
254 9])Z)|(((13579)[26][02468][1235679]|13579[01345789](0)[01235679]|13579[0134578
255 9][2468][1235679]|02468[048][02468][1235679]|02468[1235679](0)[01235679]|0246
256 8][1235679][2468][1235679]|0-9[0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
257 9]|2[0-8])T((([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)"/>
258         </xs:restriction>
259     </xs:simpleType>
260     <xs:simpleType name="AreaID_String-base"
261 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
262         <xs:restriction base="xs:string">
263             <xs:maxLength value="18"/>
264         </xs:restriction>
265     </xs:simpleType>
266     <xs:complexType name="AreaID_String"
267 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
268         <xs:simpleContent>
269             <xs:extension base="AreaID_String-base">
270                 <xs:attribute name="codingScheme"
271 type="ecl:CodingSchemeTypeList" use="required"/>
272             </xs:extension>
273         </xs:simpleContent>
274     </xs:complexType>
275     <xs:simpleType name="Status_String"
276 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
277         <xs:restriction base="ecl:StatusTypeList"/>
278     </xs:simpleType>
279     <xs:complexType name="Action_Status"
280 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status">
281         <xs:sequence>
282             <xs:element name="value" type="Status_String" minOccurs="1"
283 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
284 cim16#Status.value"/>
285         </xs:sequence>
286     </xs:complexType>
287     <xs:simpleType name="YMDHM_DateTime"
288 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
289         <xs:restriction base="xs:string">
290             <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02]))[\-](0[1-
291 9]|[12][0-9]|3[01]))|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|12)[0-
292 9]|30))T((([01][0-9]|2[0-3]):[0-5][0-
293 9])Z)|(((13579)[26][02468][048]|13579[01345789](0)[48]|13579[01345789][2468][0
294 48]|02468[048][02468][048]|02468[1235679](0)[48]|02468[1235679][2468][048]|[
295 0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T((([01][0-9]|2[0-3]):[0-
296 5][0-
297 9])Z)|(((13579)[26][02468][1235679]|13579[01345789](0)[01235679]|13579[0134578

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298 9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
299 8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])(\-(02)(\-(0[1-9]|1[0-
300 9]|2[0-8]))T((([01][0-9]|2[0-3]):[0-5][0-9])Z)"/>
301     </xs:restriction>
302   </xs:simpleType>
303   <xs:complexType name="ESMP_DateTimeInterval"
304 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTimeInterval">
305     <xs:sequence>
306       <xs:element name="start" type="YMDHM_DateTime" minOccurs="1"
307 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
308 cim16#DateTimeInterval.start"/>
309       <xs:element name="end" type="YMDHM_DateTime" minOccurs="1"
310 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
311 cim16#DateTimeInterval.end"/>
312     </xs:sequence>
313   </xs:complexType>
314   <xs:complexType name="Balancing_MarketDocument"
315 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
316     <xs:sequence>
317       <xs:element name="mRID" type="ID_String" minOccurs="1"
318 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
319 cim16#IdentifiedObject.mRID"/>
320       <xs:element name="revisionNumber" type="ESMPVersion_String"
321 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
322 schema-cim16#Document.revisionNumber"/>
323       <xs:element name="type" type="MessageKind_String" minOccurs="1"
324 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
325 cim16#Document.type"/>
326       <xs:element name="process.processType"
327 type="ProcessKind_String" minOccurs="1" maxOccurs="1"
328 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
329 cim16#Process.processType"/>
330       <xs:element name="sender_MarketParticipant.mRID"
331 type="PartyID_String" minOccurs="1" maxOccurs="1"
332 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
333 cim16#IdentifiedObject.mRID"/>
334       <xs:element name="sender_MarketParticipant.marketRole.type"
335 type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
336 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
337       <xs:element name="receiver_MarketParticipant.mRID"
338 type="PartyID_String" minOccurs="1" maxOccurs="1"
339 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
340 cim16#IdentifiedObject.mRID"/>
341       <xs:element name="receiver_MarketParticipant.marketRole.type"
342 type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
343 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
344       <xs:element name="createdDateTime" type="ESMP_DateTime"
345 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
346 schema-cim16#Document.createdDateTime"/>
347       <xs:element name="docStatus" type="Action_Status" minOccurs="0"
348 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
349 cim16#Document.docStatus"/>
350       <xs:element name="area_Domain.mRID" type="AreaID_String"
351 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
352 schema-cim16#IdentifiedObject.mRID"/>

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353         <xs:element name="allocationDecision_DateAndOrTime.dateTime"
354 type="xs:dateTime" minOccurs="0" maxOccurs="1"
355 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
356 cim16#DateAndOrTime.dateTime"/>
357         <xs:element name="period.timeInterval"
358 type="ESMP_DateTimeInterval" minOccurs="1" maxOccurs="1"
359 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
360 cim16#Period.timeInterval"/>
361         <xs:element name="TimeSeries" type="TimeSeries" minOccurs="0"
362 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
363 cim16#MarketDocument.TimeSeries"/>
364         <xs:element name="Reason" type="Reason" minOccurs="0"
365 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
366 cim16#MarketDocument.Reason"/>
367     </xs:sequence>
368 </xs:complexType>
369 <xs:simpleType name="Amount_Decimal"
370 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Decimal">
371     <xs:restriction base="xs:decimal">
372         <xs:totalDigits value="17"/>
373     </xs:restriction>
374 </xs:simpleType>
375 <xs:simpleType name="PriceDirection_String"
376 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
377     <xs:restriction base="ecl:PriceDirectionTypeList"/>
378 </xs:simpleType>
379 <xs:simpleType name="PriceComponent_String"
380 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
381 cim16#PriceComponent_String">
382     <xs:restriction base="ecl:PriceComponentTypeList"/>
383 </xs:simpleType>
384 <xs:complexType name="Financial_Price"
385 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Price">
386     <xs:sequence>
387         <xs:element name="amount" type="Amount_Decimal" minOccurs="1"
388 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
389 cim16#Price.amount"/>
390         <xs:element name="direction" type="PriceDirection_String"
391 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
392 schema-cim16#Price.direction"/>
393         <xs:element name="priceDescriptor.type"
394 type="PriceComponent_String" minOccurs="0" maxOccurs="1"
395 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
396 cim16#PriceDescriptor.type"/>
397     </xs:sequence>
398 </xs:complexType>
399 <xs:simpleType name="Position_Integer"
400 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Integer">
401     <xs:restriction base="xs:integer">
402         <xs:maxInclusive value="999999"/>
403         <xs:minInclusive value="1"/>
404     </xs:restriction>
405 </xs:simpleType>
406 <xs:simpleType name="PriceCategory_String"
407 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
408     <xs:restriction base="ecl:PriceCategoryTypeList"/>

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409     </xs:simpleType>
410     <xs:simpleType name="DirectionKind_String"
411     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
412         <xs:restriction base="ecl:DirectionTypeList"/>
413     </xs:simpleType>
414     <xs:complexType name="Point"
415     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point">
416         <xs:sequence>
417             <xs:element name="position" type="Position_Integer"
418             minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
419             schema-cim16#Point.position"/>
420             <xs:element name="quantity" type="xs:decimal" minOccurs="0"
421             maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
422             cim16#Point.quantity"/>
423             <xs:element name="secondaryQuantity" type="xs:decimal"
424             minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
425             schema-cim16#Point.secondaryQuantity"/>
426             <xs:element name="unavailable_Quantity.quantity"
427             type="xs:decimal" minOccurs="0" maxOccurs="1"
428             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
429             cim16#Quantity.quantity"/>
430             <xs:element name="activation_Price.amount"
431             type="Amount_Decimal" minOccurs="0" maxOccurs="1"
432             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Price.amount"/>
433             <xs:element name="procurement_Price.amount"
434             type="Amount_Decimal" minOccurs="0" maxOccurs="1"
435             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Price.amount"/>
436             <xs:element name="min_Price.amount" type="Amount_Decimal"
437             minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
438             schema-cim16#Price.amount"/>
439             <xs:element name="max_Price.amount" type="Amount_Decimal"
440             minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
441             schema-cim16#Price.amount"/>
442             <xs:element name="imbalance_Price.amount" type="Amount_Decimal"
443             minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
444             schema-cim16#Price.amount"/>
445             <xs:element name="imbalance_Price.category"
446             type="PriceCategory_String" minOccurs="0" maxOccurs="1"
447             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Price.category"/>
448             <xs:element name="flowDirection.direction"
449             type="DirectionKind_String" minOccurs="0" maxOccurs="1"
450             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
451             cim16#FlowDirection.direction"/>
452             <xs:element name="Financial_Price" type="Financial_Price"
453             minOccurs="0" maxOccurs="unbounded"
454             sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
455             cim16#Point.Financial_Price"/>
456             <xs:element name="Reason" type="Reason" minOccurs="0"
457             maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
458             cim16#Point.Reason"/>
459         </xs:sequence>
460     </xs:complexType>
461     <xs:simpleType name="ReasonCode_String"
462     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
463         <xs:restriction base="ecl:ReasonCodeTypeList"/>
464     </xs:simpleType>

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465     <xs:simpleType name="ReasonText_String"
466 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
467     <xs:restriction base="xs:string">
468         <xs:maxLength value="512"/>
469     </xs:restriction>
470 </xs:simpleType>
471 <xs:complexType name="Reason"
472 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Reason">
473     <xs:sequence>
474         <xs:element name="code" type="ReasonCode_String" minOccurs="1"
475 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
476 cim16#Reason.code"/>
477         <xs:element name="text" type="ReasonText_String" minOccurs="0"
478 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
479 cim16#Reason.text"/>
480     </xs:sequence>
481 </xs:complexType>
482 <xs:complexType name="Series_Period"
483 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period">
484     <xs:sequence>
485         <xs:element name="timeInterval" type="ESMP_DateTimeInterval"
486 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
487 schema-cim16#Period.timeInterval"/>
488         <xs:element name="resolution" type="xs:duration" minOccurs="1"
489 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
490 cim16#Period.resolution"/>
491         <xs:element name="Point" type="Point" minOccurs="1"
492 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
493 cim16#Period.Point"/>
494     </xs:sequence>
495 </xs:complexType>
496 <xs:simpleType name="BusinessKind_String"
497 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
498     <xs:restriction base="ecl:BusinessTypeList"/>
499 </xs:simpleType>
500 <xs:simpleType name="CapacityContractKind_String"
501 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
502     <xs:restriction base="ecl:ContractTypeList"/>
503 </xs:simpleType>
504 <xs:simpleType name="MarketProductKind_String"
505 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
506     <xs:restriction base="ecl:MarketProductTypeList"/>
507 </xs:simpleType>
508 <xs:simpleType name="PsrType_String"
509 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
510     <xs:restriction base="ecl:AssetTypeList"/>
511 </xs:simpleType>
512 <xs:simpleType name="CurrencyCode_String"
513 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
514     <xs:restriction base="ecl:CurrencyTypeList"/>
515 </xs:simpleType>
516 <xs:simpleType name="MeasurementUnitKind_String"
517 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
518     <xs:restriction base="ecl:UnitOfMeasureTypeList"/>
519 </xs:simpleType>

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520     <xs:simpleType name="CurveType_String"
521 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
522     <xs:restriction base="ecl:CurveTypeList"/>
523     </xs:simpleType>
524     <xs:simpleType name="ESMPBoolean_String"
525 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
526     <xs:restriction base="ecl:IndicatorTypeList"/>
527     </xs:simpleType>
528     <xs:complexType name="TimeSeries"
529 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
530     <xs:sequence>
531         <xs:element name="mRID" type="ID_String" minOccurs="1"
532 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
533 cim16#IdentifiedObject.mRID"/>
534         <xs:element name="businessType" type="BusinessKind_String"
535 minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
536 schema-cim16#TimeSeries.businessType"/>
537         <xs:element name="acquiring_Domain.mRID" type="AreaID_String"
538 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
539 schema-cim16#IdentifiedObject.mRID"/>
540         <xs:element name="connecting_Domain.mRID" type="AreaID_String"
541 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
542 schema-cim16#IdentifiedObject.mRID"/>
543         <xs:element name="type_MarketAgreement.type"
544 type="CapacityContractKind_String" minOccurs="0" maxOccurs="1"
545 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Document.type"/>
546         <xs:element name="standard_MarketProduct.marketProductType"
547 type="MarketProductKind_String" minOccurs="0" maxOccurs="1"
548 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
549 cim16#MarketProduct.marketProductType"/>
550         <xs:element name="original_MarketProduct.marketProductType"
551 type="MarketProductKind_String" minOccurs="0" maxOccurs="1"
552 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
553 cim16#MarketProduct.marketProductType"/>
554         <xs:element name="mktPSRType.psrType" type="PsrType_String"
555 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
556 schema-cim16#MktPSRType.psrType"/>
557         <xs:element name="flowDirection.direction"
558 type="DirectionKind_String" minOccurs="0" maxOccurs="1"
559 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
560 cim16#FlowDirection.direction"/>
561         <xs:element name="currency_Unit.name"
562 type="CurrencyCode_String" minOccurs="0" maxOccurs="1"
563 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Unit.name"/>
564         <xs:element name="quantity_Measurement_Unit.name"
565 type="MeasurementUnitKind_String" minOccurs="0" maxOccurs="1"
566 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Unit.name"/>
567         <xs:element name="price_Measurement_Unit.name"
568 type="MeasurementUnitKind_String" minOccurs="0" maxOccurs="1"
569 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Unit.name"/>
570         <xs:element name="curveType" type="CurveType_String"
571 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
572 schema-cim16#TimeSeries.curveType"/>
573         <xs:element name="cancelledTS" type="ESMPBoolean_String"
574 minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
575 schema-cim16#TimeSeries.cancelledTS"/>

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576         <xs:element name="auction.mRID" type="ID_String" minOccurs="0"  
577 maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-  
578 cim16#IdentifiedObject.mRID"/>  
579         <xs:element name="Period" type="Series_Period" minOccurs="0"  
580 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-  
581 cim16#TimeSeries.Period"/>  
582         <xs:element name="Reason" type="Reason" minOccurs="0"  
583 maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-  
584 cim16#TimeSeries.Reason"/>  
585     </xs:sequence>  
586 </xs:complexType>  
587 </xs:schema>  
588
```