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European Network of
Transmission System Operators
for Electricity

CODING SCHEMES MAPPING DOCUMENT
UML MODEL AND SCHEMA

2022-03-15
APPROVED DOCUMENT
VERSION 1.0

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Revision History

Version	Release	Date	Comments
1	0	2022-03-15	Updates in XSD v1.1: mRID of Document, Series and Timeseries (ID_String type) was enlarged from 35 to 60 characters. Approved by MC.

56

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57 **Objective**

58 The purpose of this document is to provide the contextual and assembly UML models and the
59 schema of the Resource Mapping document.

60 The schema of the Resource Mapping document could be used in various business processes.

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

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

65 • Description of the business process;

66 • Use case of the business process;

67 • Sequence diagrams of the business process;

68 • List of the schema (XSD) to be used in the business process and versions of the
69 schema;

70 • For each schema, dependency tables providing the necessary information for the
71 generation of the XML instances, i.e. when the optional attributes are to be used, which
72 codes from which ENTSO-E codelist are to be used.

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74   **Coding schemes mapping model**

75   **2.1   Coding schemes mapping document contextual model**

76   **2.1.1   Overview of the model**

77   Figure 1 shows the model.
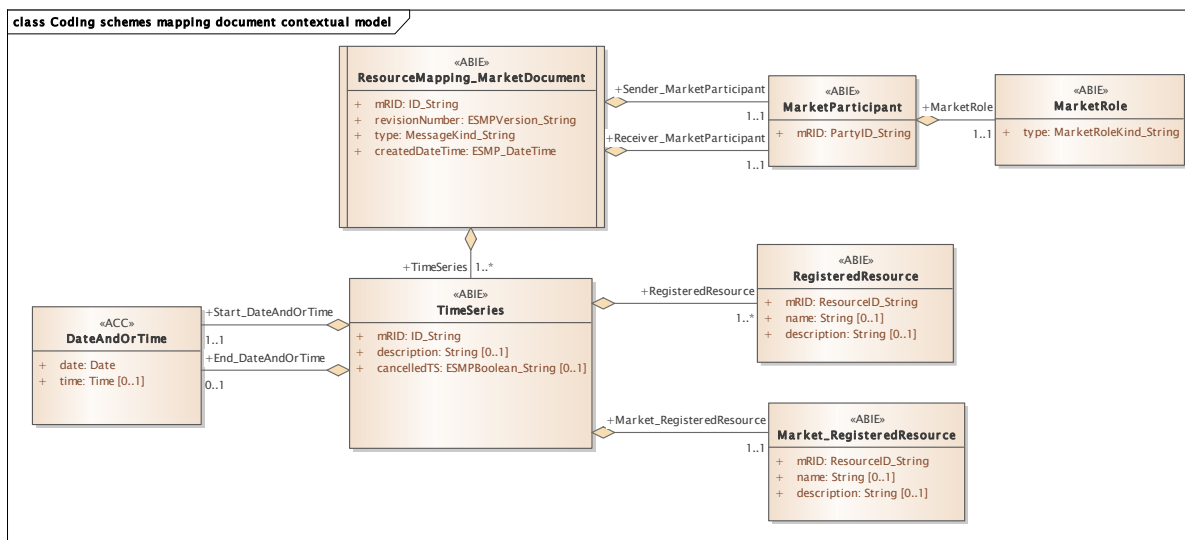
78

79   **Figure 1 - Coding schemes mapping document contextual model**

80   **2.1.2   IsBasedOn relationships from the European style market profile**

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

83   **Table 1 - IsBasedOn dependency**

Name	Complete IsBasedOn Path
DateAndOrTime	TC57CIM::IEC62325::MarketManagement::DateAndOrTime
Market_RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
MarketParticipant	TC57CIM::IEC62325::MarketCommon::MarketParticipant
MarketRole	TC57CIM::IEC62325::MarketCommon::MarketRole
RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
ResourceMapping_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

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85

2.2   Coding schemes mapping document assembly model

2.2.1   Overview of the model

88   Figure 2 shows the model.

89

Figure 2 - Coding schemes mapping document assembly model

2.2.2   IsBasedOn relationships from the European style market profile

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

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94 <p align="center">**Table 2 - IsBasedOn dependency**</p>

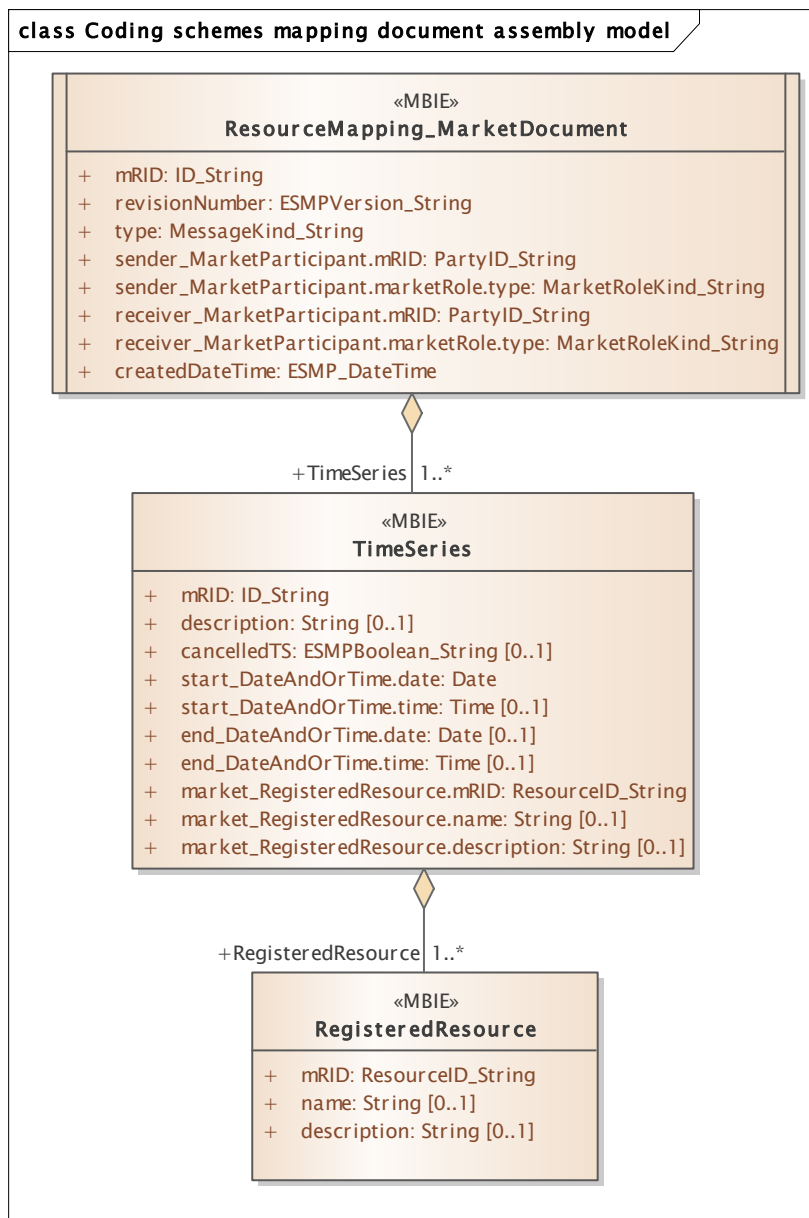| Name	Complete IsBasedOn Path
RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
ResourceMapping_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

95

2.2.3 Detailed Coding schemes mapping document assembly model

2.2.3.1 ResourceMapping_MarketDocument root class

98
99 An electronic document containing the information necessary to satisfy the requirements of a given business process.

100
101 The mapping document provides association between an object identified by a code in a given
102 coding scheme and all the detailed objects in the CGMES detailed topology (e.g. a line with one EIC code is composed of N object for CGMES, segments, isolators, circuit breakers, etc.).

103 Table 3 shows all attributes of ResourceMapping_MarketDocument.

104
105 <p align="center">**Table 3 - Attributes of Coding schemes mapping document assembly
model::ResourceMapping_MarketDocument**</p>

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. In the ESMP context, the "model authority" is defined as a party (originator of the exchange) that provides an identification in the context of a business exchange such as document identification, ... 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.
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]	sender_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. In the ESMP context, the "model authority" is defined as an authorized issuing office that provides an agreed identification coding scheme for market participant, domain, measurement point, resources (generator, lines, substations, etc.) identification. 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 MarketParticipant associated with an electronic document header.

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Order	mult.	Attribute name / Attribute type	Description
4	[1..1]	sender_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- The MarketParticipant associated with an electronic document header. --- The role associated with a MarketParticipant.
5	[1..1]	receiver_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. In the ESMP context, the "model authority" is defined as an authorized issuing office that provides an agreed identification coding scheme for market participant, domain, measurement point, resources (generator, lines, substations, etc.) identification. 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 MarketParticipant associated with an electronic document header.
6	[1..1]	receiver_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- The MarketParticipant associated with an electronic document header. --- The role associated with a MarketParticipant.
7	[1..1]	createdDateTime ESMP_DateTime	The date and time of the creation of the document.

106

107   Table 4 shows all association ends of ResourceMapping_MarketDocument with other classes.

108   **Table 4 - Association ends of Coding schemes mapping document assembly**
109   **model::ResourceMapping_MarketDocument with other classes**

Order	mult.	Class name / Role	Description
8	[1..*]	TimeSeries TimeSeries	The time series that is associated with an electronic document. Association Based On: Coding schemes mapping document contextual model::TimeSeries.TimeSeries[1..*] ----- Coding schemes mapping document contextual model::ResourceMapping_MarketDocument.[]

110

111   2.2.3.2   RegisteredResource

112   A resource that is registered through the market participant registration system. Examples
113   include generating unit, load, and non-physical generator or load.

114   Table 5 shows all attributes of RegisteredResource.

115
116
Table 5 - Attributes of Coding schemes mapping document assembly model::RegisteredResource

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ResourceID_String	The unique identification of a resource. In the ESMP context, the "model authority" is defined as an authorized issuing office that provides an agreed identification coding scheme for market participant, domain, measurement point, resources (generator, lines, substations, etc.) identification. 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.
1	[0..1]	name String	The name is any free human readable and possibly non unique text naming the object.
2	[0..1]	description String	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.

117

118 **2.2.3.3 TimeSeries**

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

120 In the ESMP profile, the TimeSeries provides not only time-ordered quantities but also time-
121 ordered information.

122 Table 6 shows all attributes of TimeSeries.

123
124
Table 6 - Attributes of Coding schemes mapping document assembly model::TimeSeries

Order	mult.	Attribute name / Attribute type	Description
0	[1..1]	mRID ID_String	A unique identification of the time series. In the ESMP context, the "model authority" is defined as a party (originator of the exchange) that provides a unique identification in the context of a business exchange such as time series identification, bid identification, ... 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.
1	[0..1]	description String	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.
2	[0..1]	cancelledTS ESMPBoolean_String	An indicator stating that the TimeSeries, identified by the mRID, is withdrawn as well as all the values sent in a previous version of the TimeSeries in a previous document.
3	[1..1]	start_DateAndOrTime.date Date	The date as "YYYY-MM-DD", which conforms with ISO 8601. --- A date and/or time associated with a TimeSeries.
4	[0..1]	start_DateAndOrTime.time Time	The time as "hh:mm:ss.sssZ", which conforms with ISO 8601. --- A date and/or time associated with a TimeSeries.

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Order	mult.	Attribute name / Attribute type	Description
5	[0..1]	end_DateAndOrTime.date Date	The date as "YYYY-MM-DD", which conforms with ISO 8601. --- A date and/or time associated with a TimeSeries.
6	[0..1]	end_DateAndOrTime.time Time	The time as "hh:mm:ss.sssZ", which conforms with ISO 8601. --- A date and/or time associated with a TimeSeries.
7	[1..1]	market_RegisteredResource.mRID ResourceID_String	The unique identification of a resource. In the ESMP context, the "model authority" is defined as an authorized issuing office that provides an agreed identification coding scheme for market participant, domain, measurement point, resources (generator, lines, substations, etc.) identification. 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 identification of a resource associated with a TimeSeries.
8	[0..1]	market_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 TimeSeries.
9	[0..1]	market_RegisteredResource.description String	The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy. --- The identification of a resource associated with a TimeSeries.

125

126   Table 7 shows all association ends of TimeSeries with other classes.

127   **Table 7 - Association ends of Coding schemes mapping document assembly**
128   **model::TimeSeries with other classes**

Order	mult.	Class name / Role	Description
10	[1..*]	RegisteredResource RegisteredResource	The identification of a resource associated with a TimeSeries. Association Based On: Coding schemes mapping document contextual model::RegisteredResource.RegisteredResource[1..*] ----- Coding schemes mapping document contextual model::TimeSeries.[]

129

2.2.4   Datatypes

131   The list of datatypes used for the Coding schemes mapping document assembly model is as
132   follows:

133   • ESMP_DateTime datatype
134   • ESMPBoolean_String datatype, codelist IndicatorTypeList
135   • ESMPVersion_String datatype
136   • ID_String datatype
137   • MarketRoleKind_String datatype, codelist RoleTypeList
138   • MessageKind_String datatype, codelist MessageTypeList
139   • PartyID_String datatype, codelist CodingSchemeTypeList
140   • ResourceID_String datatype, codelist CodingSchemeTypeList
141

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142   **2.2.5   Coding schemes mapping XML schema**
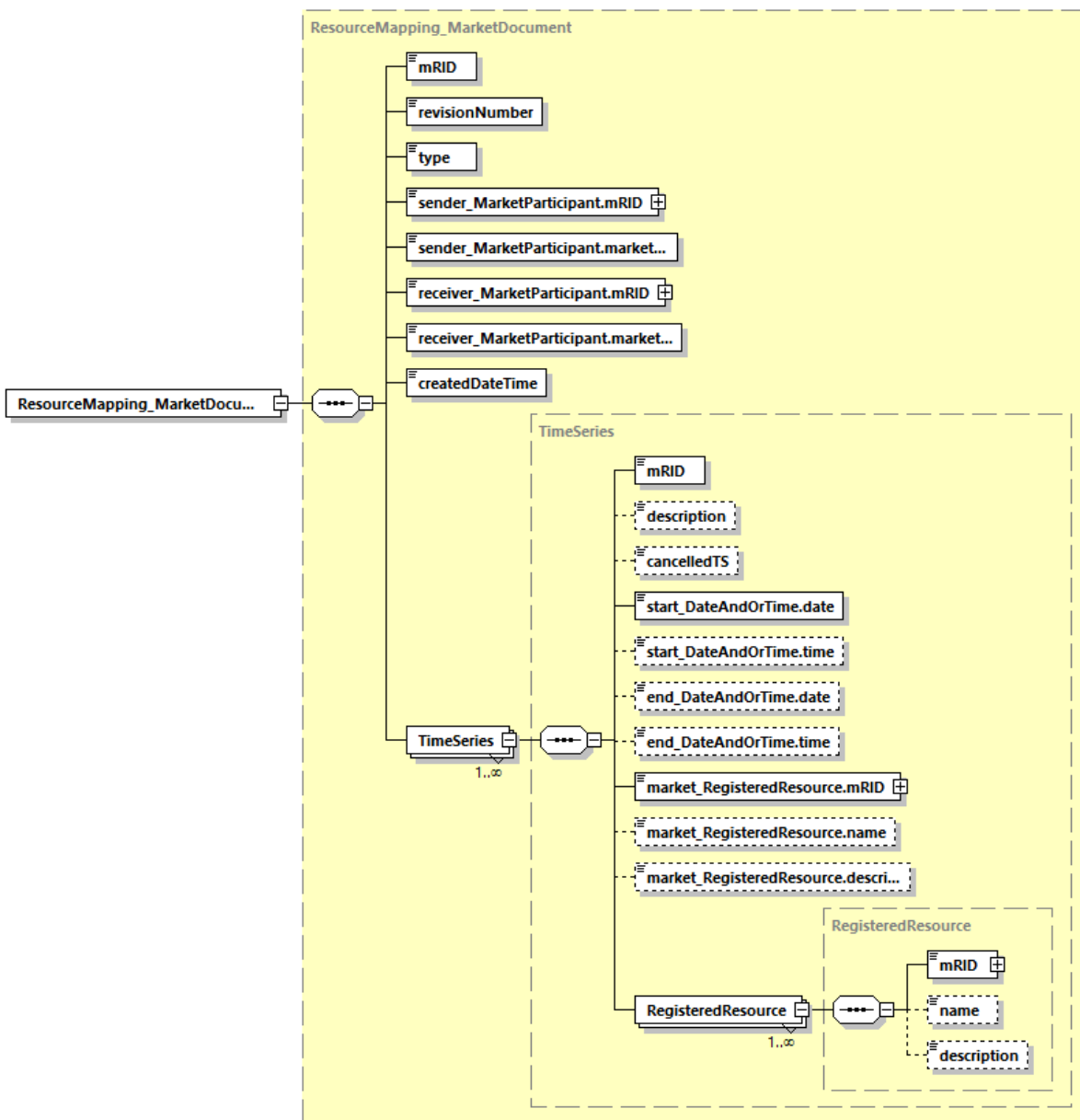
143

Generated by XMLSpy   www.altova.com

144   **Figure 3 – ResourceMapping_MarketDocument schema structure**

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145   **2.2.6   Coding schemes mapping XML schema**

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

147   urn:iec62325.351:tc57wg16:451-n:resourcemappingdocument:1:1

148

```
149     <?xml version="1.0" encoding="utf-8"?>
150     <xs:schema xmlns:ecl="urn:entsoe.eu:wgedi:codelists"
151     xmlns="urn:iec62325.351:tc57wg16:451-n:resourcemappingdocument:1:1"
152     xmlns:sawsdl="http://www.w3.org/ns/sawsdl"
153     xmlns:cimp="http://www.iec.ch/cimprofile"
154     xmlns:xs="http://www.w3.org/2001/XMLSchema"
155     targetNamespace="urn:iec62325.351:tc57wg16:451-n:resourcemappingdocument:1:1"
156     elementFormDefault="qualified" attributeFormDefault="unqualified">
157             <xs:import namespace="urn:entsoe.eu:wgedi:codelists" schemaLocation="urn-
158     entsoe-eu-wgedi-codelists.xsd"/>
159             <xs:element name="ResourceMapping_MarketDocument"
160     type="ResourceMapping_MarketDocument"/>
161             <xs:simpleType name="ResourceID_String-base"
162     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
163                     <xs:restriction base="xs:string">
164                             <xs:maxLength value="60"/>
165                     </xs:restriction>
166             </xs:simpleType>
167             <xs:complexType name="ResourceID_String"
168     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
169                     <xs:simpleContent>
170                             <xs:extension base="ResourceID_String-base">
171                                     <xs:attribute name="codingScheme"
172     type="ecl:CodingSchemeTypeList" use="required"/>
173                             </xs:extension>
174                     </xs:simpleContent>
175             </xs:complexType>
176             <xs:complexType name="RegisteredResource"
177     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
178     cim16#RegisteredResource">
179                     <xs:sequence>
180                             <xs:element name="mRID" type="ResourceID_String" minOccurs="1"
181     maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
182     cim16#IdentifiedObject.mRID"/>
183                             <xs:element name="name" type="xs:string" minOccurs="0"
184     maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
185     cim16#IdentifiedObject.name"/>
186                             <xs:element name="description" type="xs:string" minOccurs="0"
187     maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
188     cim16#IdentifiedObject.description"/>
189                     </xs:sequence>
190             </xs:complexType>
191             <xs:simpleType name="ID_String"
192     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
193                     <xs:restriction base="xs:string">
194                             <xs:maxLength value="60"/>
195                     </xs:restriction>
196             </xs:simpleType>
197             <xs:simpleType name="ESMPVersion_String"
198     sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
199                     <xs:restriction base="xs:string">
```

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```
200                        <xs:pattern value="[1-9]([0-9]){0,2}"/>
201                    </xs:restriction>
202            </xs:simpleType>
203            <xs:simpleType name="MessageKind_String"
204    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
205                    <xs:restriction base="ecl:MessageTypeList"/>
206            </xs:simpleType>
207            <xs:simpleType name="PartyID_String-base"
208    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
209                    <xs:restriction base="xs:string">
210                            <xs:maxLength value="16"/>
211                    </xs:restriction>
212            </xs:simpleType>
213            <xs:complexType name="PartyID_String"
214    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
215                    <xs:simpleContent>
216                            <xs:extension base="PartyID_String-base">
217                                    <xs:attribute name="codingScheme"
218    type="ecl:CodingSchemeTypeList" use="required"/>
219                            </xs:extension>
220                    </xs:simpleContent>
221            </xs:complexType>
222            <xs:simpleType name="MarketRoleKind_String"
223    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
224                    <xs:restriction base="ecl:RoleTypeList"/>
225            </xs:simpleType>
226            <xs:simpleType name="ESMP_DateTime"
227    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
228                    <xs:restriction base="xs:dateTime">
229                            <xs:pattern value="((([0-9]{4})[\-](0[13578]|1[02])[\-](0[1-
230    9]|[12][0-9]|3[01])|([0-9]{4})[\-]((0[469])|(11))[\-](0[1-9]|[12][0-
231    9]|30))T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-
232    9])Z)|(([13579][26][02468][048]|[13579][01345789](0)[48]|[13579][01345789][2468][0
233    48]|[02468][048][02468][048]|[02468][1235679](0)[48]|[02468][1235679][2468][048]|[
234    0-9][0-9][13579][26])[\-](02)[\-](0[1-9]|1[0-9]|2[0-9])T(([01][0-9]|2[0-3]):[0-
235    5][0-9]:[0-5][0-
236    9])Z)|(([13579][26][02468][1235679]|[13579][01345789](0)[01235679]|[13579][0134578
237    9][2468][1235679]|[02468][048][02468][1235679]|[02468][1235679](0)[01235679]|[0246
238    8][1235679][2468][1235679]|[0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9]|1[0-
239    9]|2[0-8])T(([01][0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])Z)"/>
240                    </xs:restriction>
241            </xs:simpleType>
242            <xs:complexType name="ResourceMapping_MarketDocument"
243    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
244                    <xs:sequence>
245                            <xs:element name="mRID" type="ID_String" minOccurs="1"
246    maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
247    cim16#IdentifiedObject.mRID"/>
248                            <xs:element name="revisionNumber" type="ESMPVersion_String"
249    minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
250    schema-cim16#Document.revisionNumber"/>
251                            <xs:element name="type" type="MessageKind_String" minOccurs="1"
252    maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
253    cim16#Document.type"/>
254                            <xs:element name="sender_MarketParticipant.mRID"
255    type="PartyID_String" minOccurs="1" maxOccurs="1"
```

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```
256   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
257   cim16#IdentifiedObject.mRID"/>
258                   <xs:element name="sender_MarketParticipant.marketRole.type"
259   type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
260   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
261                   <xs:element name="receiver_MarketParticipant.mRID"
262   type="PartyID_String" minOccurs="1" maxOccurs="1"
263   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
264   cim16#IdentifiedObject.mRID"/>
265                   <xs:element name="receiver_MarketParticipant.marketRole.type"
266   type="MarketRoleKind_String" minOccurs="1" maxOccurs="1"
267   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type"/>
268                   <xs:element name="createdDateTime" type="ESMP_DateTime"
269   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
270   schema-cim16#Document.createdDateTime"/>
271                   <xs:element name="TimeSeries" type="TimeSeries" minOccurs="1"
272   maxOccurs="unbounded" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
273   cim16#MarketDocument.TimeSeries"/>
274           </xs:sequence>
275       </xs:complexType>
276       <xs:simpleType name="ESMPBoolean_String"
277   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
278           <xs:restriction base="ecl:IndicatorTypeList"/>
279       </xs:simpleType>
280       <xs:complexType name="TimeSeries"
281   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
282           <xs:sequence>
283                   <xs:element name="mRID" type="ID_String" minOccurs="1"
284   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
285   cim16#IdentifiedObject.mRID"/>
286                   <xs:element name="description" type="xs:string" minOccurs="0"
287   maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
288   cim16#IdentifiedObject.description"/>
289                   <xs:element name="cancelledTS" type="ESMPBoolean_String"
290   minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
291   schema-cim16#TimeSeries.cancelledTS"/>
292                   <xs:element name="start_DateAndOrTime.date" type="xs:date"
293   minOccurs="1" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
294   schema-cim16#DateAndOrTime.date"/>
295                   <xs:element name="start_DateAndOrTime.time" type="xs:time"
296   minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
297   schema-cim16#DateAndOrTime.time"/>
298                   <xs:element name="end_DateAndOrTime.date" type="xs:date"
299   minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
300   schema-cim16#DateAndOrTime.date"/>
301                   <xs:element name="end_DateAndOrTime.time" type="xs:time"
302   minOccurs="0" maxOccurs="1" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
303   schema-cim16#DateAndOrTime.time"/>
304                   <xs:element name="market_RegisteredResource.mRID"
305   type="ResourceID_String" minOccurs="1" maxOccurs="1"
306   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
307   cim16#IdentifiedObject.mRID"/>
308                   <xs:element name="market_RegisteredResource.name"
309   type="xs:string" minOccurs="0" maxOccurs="1"
310   sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
311   cim16#IdentifiedObject.name"/>
```

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```
312                        <xs:element name="market_RegisteredResource.description"
313    type="xs:string" minOccurs="0" maxOccurs="1"
314    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
315    cim16#IdentifiedObject.description"/>
316                        <xs:element name="RegisteredResource" type="RegisteredResource"
317    minOccurs="1" maxOccurs="unbounded"
318    sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
319    cim16#TimeSeries.RegisteredResource"/>
320                </xs:sequence>
321        </xs:complexType>
322    </xs:schema>
323
```