



European Network of
Transmission System Operators
for Electricity

HVDC LINK DOCUMENT UML MODEL AND SCHEMA

2017-01-19
VERSION 1.0

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Table of Contents

1	Objective	5
2	HVDCLink_MarketDocument	6
2.1	HVDCLink document contextual model	6
2.1.1	Overview of the model	6
2.1.2	IsBasedOn relationships from the European style market profile	7
2.2	HVDCLink document assembly model	8
2.2.1	Overview of the model	8
2.2.2	IsBasedOn relationships from the European style market profile	9
2.2.3	Detailed HVDCLink document assembly model	9
2.2.3.1	HVDCLink_MarketDocument root class	9
2.2.3.2	Point	10
2.2.3.3	Series_Period	10
2.2.3.4	TimeSeries	11
2.2.4	Datatypes	12
2.3	HVDCLink_MarketDocument XML schema	14
2.3.1	HVDCLink_MarketDocument XML schema structure	14
2.3.2	HVDCLink_MarketDocument XML schema	16
List of figures		
Figure 1	- HVDCLink document contextual model	6
Figure 2	- HVDCLink document assembly model	8
Figure 3	- HVDCLink_MarketDocument schema structure 1/3	14
Figure 4	- HVDCLink_MarketDocument schema structure 2/3	15
Figure 5	- HVDCLink_MarketDocument schema structure 3/3	16
List of tables		
Table 1	- IsBasedOn dependency	7
Table 2	- IsBasedOn dependency	9
Table 3	- Attributes of HVDCLink document assembly model::HVDCLink_MarketDocument	9
Table 4	- Association ends of HVDCLink document assembly model::HVDCLink_MarketDocument with other classes	10
Table 5	- Attributes of HVDCLink document assembly model::Point	10
Table 6	- Attributes of HVDCLink document assembly model::Series_Period	11
Table 7	- Association ends of HVDCLink document assembly model::Series_Period with other classes	11
Table 8	- Attributes of HVDCLink document assembly model::TimeSeries	11
Table 9	- Association ends of HVDCLink document assembly model::TimeSeries with other classes	12

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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.

61

62 1 Objective

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

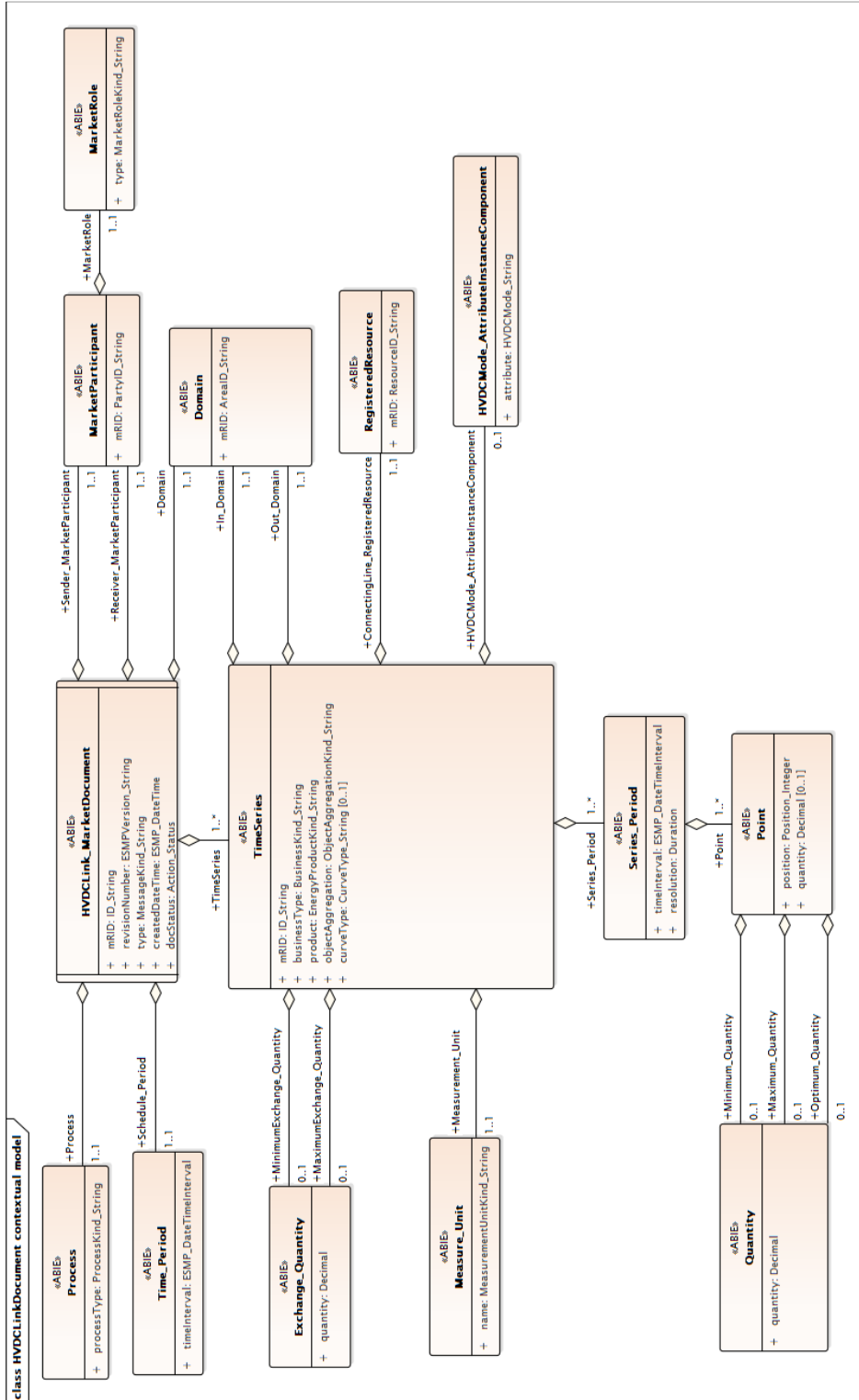
65 The schema of the HVDCLink_MarketDocument could be used in various business processes.

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

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

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

- 78 **2 HVDCLink_MarketDocument**
- 79 **2.1 HVDCLink document contextual model**
- 80 **2.1.1 Overview of the model**
- 81 Figure 1 shows the model.



82

83

Figure 1 - HVDCLink document contextual model

84 **2.1.2 IsBasedOn relationships from the European style market profile**

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

87 **Table 1 - IsBasedOn dependency**

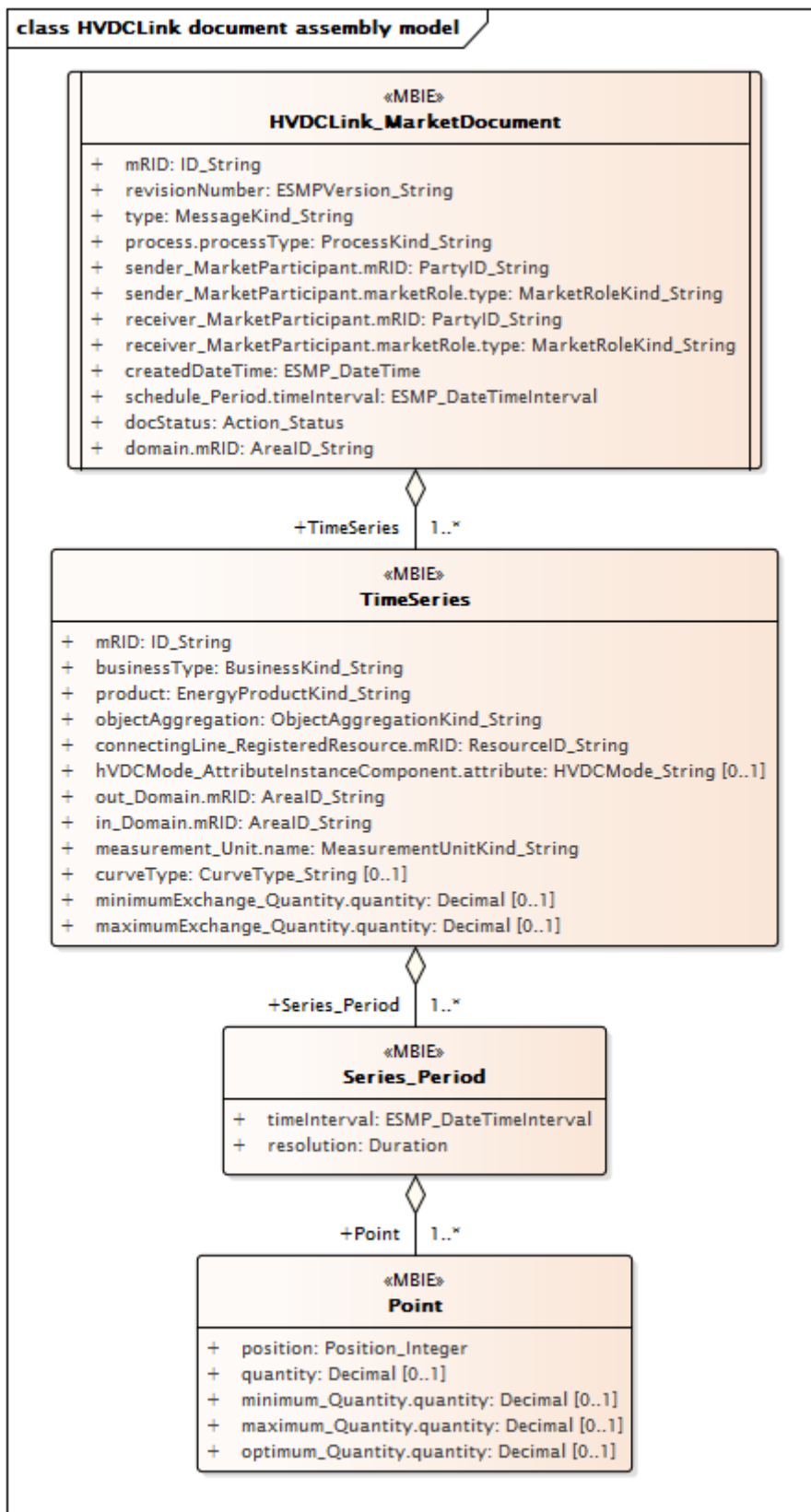
Name	Complete IsBasedOn Path
Domain	TC57CIM::IEC62325::MarketManagement::Domain
Exchange_Quantity	TC57CIM::IEC62325::MarketManagement::Quantity
HVDCLink_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
HVDCMode_AttributeInstanceComponent	TC57CIM::IEC62325::MarketManagement::AttributeInstanceComponent
MarketParticipant	TC57CIM::IEC62325::MarketCommon::MarketParticipant
MarketRole	TC57CIM::IEC62325::MarketCommon::MarketRole
Measure_Unit	TC57CIM::IEC62325::MarketManagement::Unit
Point	TC57CIM::IEC62325::MarketManagement::Point
Process	TC57CIM::IEC62325::MarketManagement::Process
Quantity	TC57CIM::IEC62325::MarketManagement::Quantity
RegisteredResource	TC57CIM::IEC62325::MarketCommon::RegisteredResource
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
Time_Period	TC57CIM::IEC62325::MarketManagement::Period
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

88

89 **2.2 HVDCLink document assembly model**

90 **2.2.1 Overview of the model**

91 Figure 2 shows the model.



92

93

Figure 2 - HVDCLink document assembly model

94 **2.2.2 IsBasedOn relationships from the European style market profile**

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

97 **Table 2 - IsBasedOn dependency**

Name	Complete IsBasedOn Path
HVDCLink_MarketDocument	TC57CIM::IEC62325::MarketManagement::MarketDocument
Point	TC57CIM::IEC62325::MarketManagement::Point
Series_Period	TC57CIM::IEC62325::MarketManagement::Period
TimeSeries	TC57CIM::IEC62325::MarketManagement::TimeSeries

98

99 **2.2.3 Detailed HVDCLink document assembly model**

100 **2.2.3.1 HVDCLink_MarketDocument root class**

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

103 This document is to be used to exchange the following information for a HVDC link:

- 104 - operational power range through the HVDC link constraints document type
- 105 - power control mode through the HVDC operating mode document type
- 106 - power setpoint through the HVDC configuration document type
- 107 - operational table through the HVDC schedule document type

108 Table 3 shows all attributes of HVDCLink_MarketDocument.

109 **Table 3 - Attributes of HVDCLink document assembly
110 model::HVDCLink_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. --- The process dealt with in the document depending upon the document type.
4	[1..1]	sender_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- The document owner.
5	[1..1]	sender_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- The document owner. --- The role associated with a MarketParticipant.
6	[1..1]	receiver_MarketParticipant.mRID PartyID_String	The identification of a party in the energy market. --- The document recipient.
7	[1..1]	receiver_MarketParticipant.marketRole.type MarketRoleKind_String	The identification of the role played by a market player. --- The document recipient. --- The role associated with a MarketParticipant.

Order	mult.	Attribute name / Attribute type	Description
8	[1..1]	createdDateTime ESMP_DateTime	The date and time of the creation of the document.
9	[1..1]	schedule_Period.timeInterval ESMP_DateTimeInterval	The start and end date and time for a given interval. --- This information provides the start and end date and time of the schedule time interval.
10	[1..1]	docStatus Action_Status	The identification of the condition or position of the document with regard to its standing.
11	[1..1]	domain.mRID AreaID_String	The unique identification of the domain. --- The Domain associated with an electronic document header.

111

112 Table 4 shows all association ends of HVDCLink_MarketDocument with other classes.

113 **Table 4 - Association ends of HVDCLink document assembly**
114 **model::HVDCLink_MarketDocument with other classes**

Order	mult.	Class name / Role	Description
12	[1..*]	TimeSeries TimeSeries	Association Based On: HVDCLink document contextual model::HVDCLink_MarketDocument.[] ----- HVDCLink document contextual model::TimeSeries.TimeSeries[1..*]

115

116 2.2.3.2 Point

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

118 Table 5 shows all attributes of Point.

119 **Table 5 - Attributes of HVDCLink document 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 identified for a point. --- The value of the scheduled product. This information is dependent. The attribute quantity is used in case there is only one quantity needed for a given market period, otherwise the optimum quantity is used.
2	[0..1]	minimum_Quantity.quantity Decimal	Quantity value. --- The minimum value of power exchange on the HVDC line for a scheduled point. This information is dependent of the document type.
3	[0..1]	maximum_Quantity.quantity Decimal	Quantity value. --- The maximum value of power exchange on the HVDC line for a scheduled point. This information is dependent of the document type.
4	[0..1]	optimum_Quantity.quantity Decimal	Quantity value. --- The value of the optimum power exchange on the HVDC line for a scheduled point. This information is dependent on the document type.

120

121 2.2.3.3 Series_Period

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

123 Table 6 shows all attributes of Series_Period.

124 **Table 6 - Attributes of HVDCLink document 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.

125

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

127 **Table 7 - Association ends of HVDCLink document assembly model::Series_Period with**
128 **other 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: HVDCLink document contextual model::Series_Period.[] ----- HVDCLink document contextual model::Point.Point[1..*]

129

130 2.2.3.4 TimeSeries

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

132 Table 8 shows all attributes of TimeSeries.

133 **Table 8 - Attributes of HVDCLink document 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	[1..1]	product EnergyProductKind_String	The identification of the nature of an energy product such as power, energy, reactive power, etc.
3	[1..1]	objectAggregation ObjectAggregationKind_String	The identification of the domain that is the common denominator used to aggregate a time series.
4	[1..1]	connectingLine_RegisteredResource.mRID ResourceID_String	The unique identification of a resource. --- The identification of the HVDC link or group of HVDC links.
5	[0..1]	hVDCMode_AttributeInstanceComponent.attribute HVDCMode_String	The identification of an attribute for a given request component. --- A specific characteristic associated with a TimeSeries. This information provides the mode in which the HVDC link is set. This information is dependent of the document type.
6	[1..1]	out_Domain.mRID AreaID_String	The unique identification of the domain. --- The area where the product is being extracted.
7	[1..1]	in_Domain.mRID AreaID_String	The unique identification of the domain. --- The area where the product is being delivered.

Order	mult.	Attribute name / Attribute type	Description
8	[1..1]	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.
9	[0..1]	curveType CurveType_String	The identification of the coded representation of the type of curve being described.
10	[0..1]	minimumExchange_Quantity.quantity Decimal	The quantity value. --- The minimum value of a power exchange range between the In_Domain and the Out_Domain of the timeseries. This information is dependent of the document type.
11	[0..1]	maximumExchange_Quantity.quantity Decimal	The quantity value. --- The maximum value of a power exchange range between the In_Domain and the Out_Domain of the timeseries. This information is dependent of the document type.

134

135 Table 9 shows all association ends of TimeSeries with other classes.

136 **Table 9 - Association ends of HVDCLink document assembly model::TimeSeries with**
137 **other classes**

Order	mult.	Class name / Role	Description
12	[1..*]	Series_Period Series_Period	The time interval and resolution for a period associated with a TimeSeries. Association Based On: HVDCLink document contextual model::TimeSeries.[] ----- HVDCLink document contextual model::Series_Period.Series_Period[1..*]

138

139 2.2.4 Datatypes

140 The list of datatypes used for the HVDCLink document assembly model is as follows:

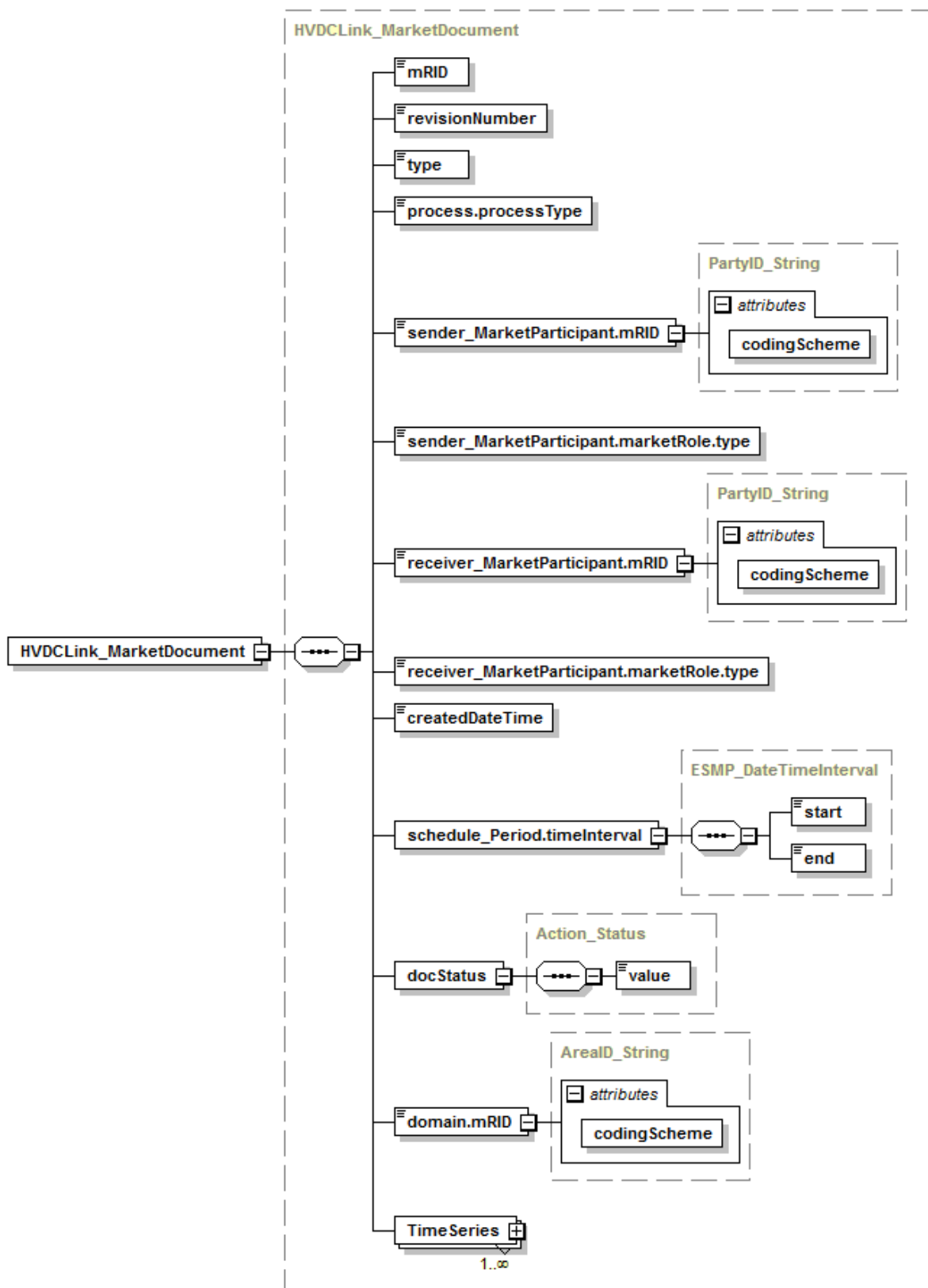
- 141 • Action_Status compound
- 142 • ESMP_DateTimeInterval compound
- 143 • AreaID_String datatype, codelist CodingSchemeTypeList
- 144 • BusinessKind_String datatype, codelist BusinessTypeList
- 145 • CurveType_String datatype, codelist CurveTypeList
- 146 • EnergyProductKind_String datatype, codelist EnergyProductTypeList
- 147 • ESMP_DateTime datatype
- 148 • ESMPVersion_String datatype
- 149 • HVDCMode_String datatype, codelist HVDCModeTypeList
- 150 • ID_String datatype
- 151 • MarketRoleKind_String datatype, codelist RoleTypeList
- 152 • MeasurementUnitKind_String datatype, codelist UnitOfMeasureTypeList
- 153 • MessageKind_String datatype, codelist MessageTypeList
- 154 • ObjectAggregationKind_String datatype, codelist ObjectAggregationTypeList
- 155 • PartyID_String datatype, codelist CodingSchemeTypeList
- 156 • Position_Integer datatype
- 157 • ProcessKind_String datatype, codelist ProcessTypeList

- 158 • ResourceID_String datatype, codelist CodingSchemeTypeList
- 159 • Status_String datatype, codelist StatusTypeList
- 160 • YMDHM_DateTime datatype

161 **2.3 HVDCLink_MarketDocument XML schema**

162 **2.3.1 HVDCLink_MarketDocument XML schema structure**

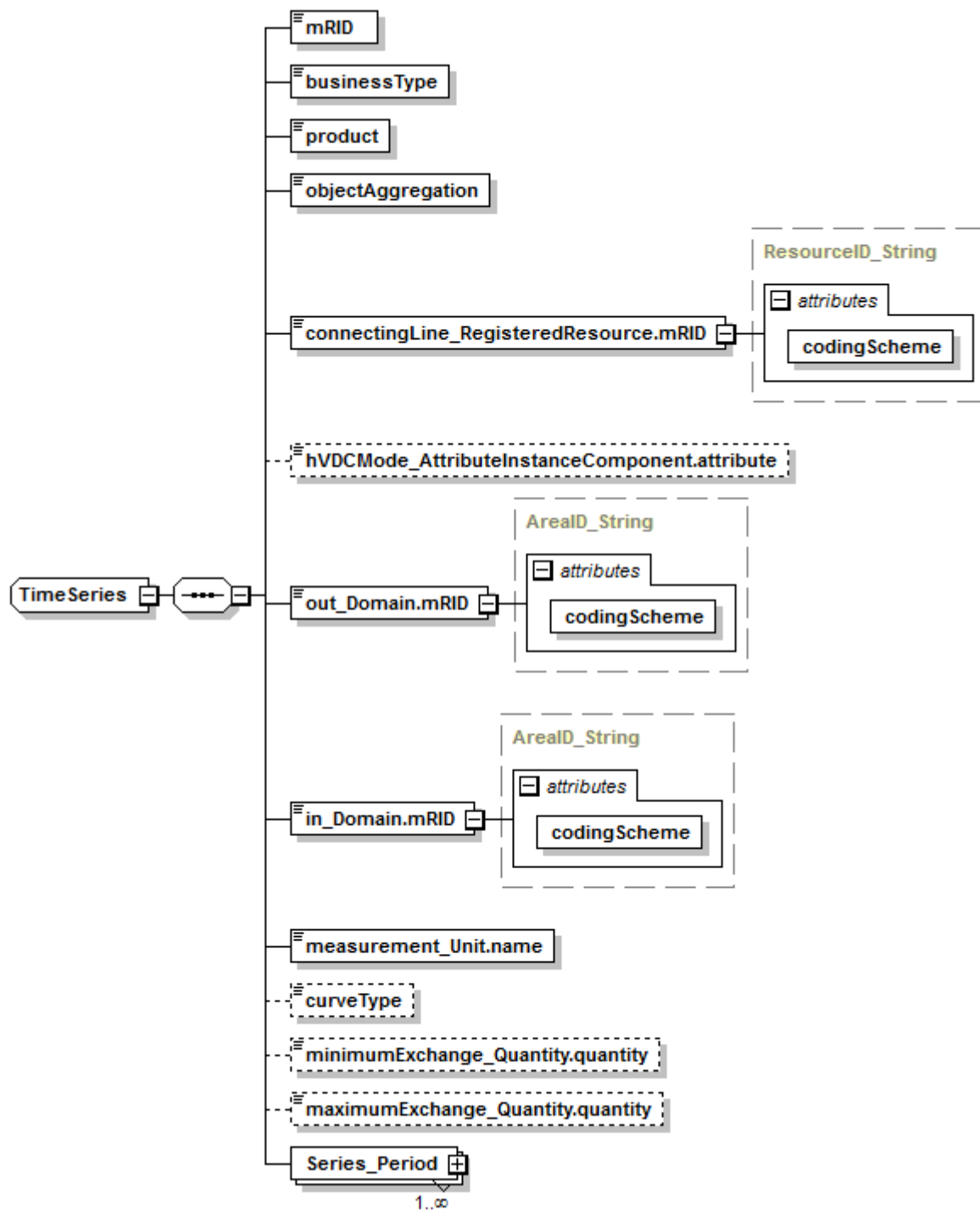
163 Figure 3 to Figure 5 provide the structure of the schema.



164

165

Figure 3 - HVDCLink_MarketDocument schema structure 1/3



166

167

Figure 4 - HVDCLink_MarketDocument schema structure 2/3

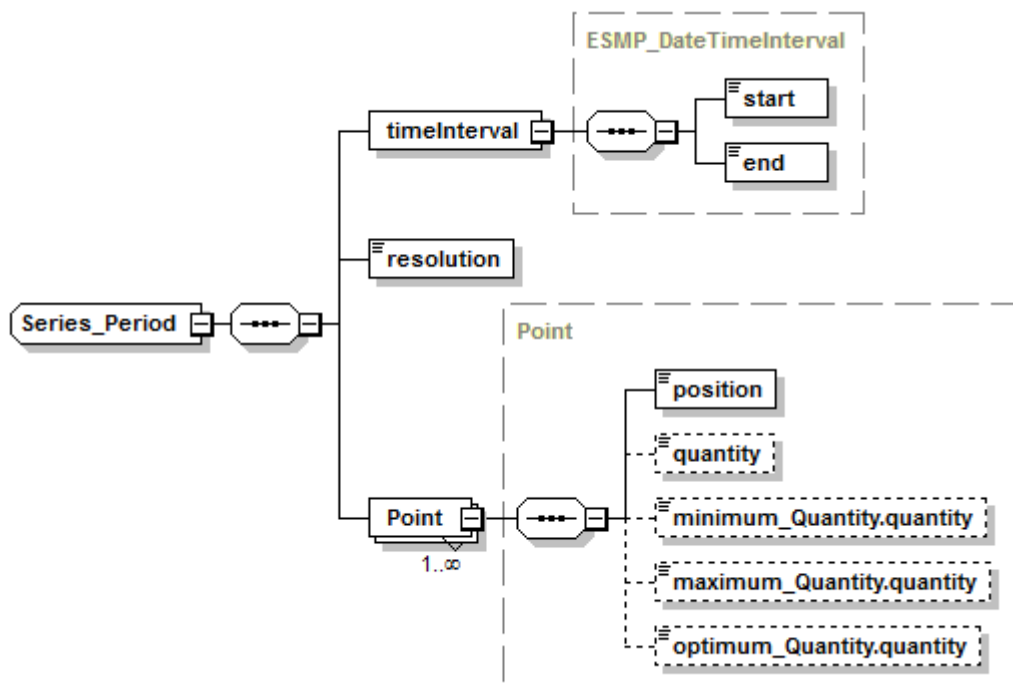


Figure 5 - HVDCLink_MarketDocument schema structure 3/3

2.3.2 HVDCLink_MarketDocument XML schema

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

urn:iec62325.351:tc57wg16:451-8:hvdclinkdocument:1:0

```

173 <?xml version="1.0" encoding="utf-8"?>
174 <xs:schema xmlns:cl="urn:entsoe.eu:wgedi:codelists"
175 xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns="urn:iec62325.351:tc57wg16:451-
176 8:hvdclinkdocument:1:0" xmlns:cimp="http://www.iec.ch/cimprofile"
177 attributeFormDefault="unqualified" elementFormDefault="qualified"
178 targetNamespace="urn:iec62325.351:tc57wg16:451-8:hvdclinkdocument:1:0"
179 xmlns:xs="http://www.w3.org/2001/XMLSchema">
180 <xs:import schemaLocation="urn-entsoe-eu-wgedi-codelists.xsd"
181 namespace="urn:entsoe.eu:wgedi:codelists" />
182 <xs:element name="HVDCLink_MarketDocument" type="HVDCLink_MarketDocument" />
183 <xs:simpleType name="ID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
184 schema-cim16#String">
185 <xs:restriction base="xs:string">
186 <xs:maxLength value="35" />
187 </xs:restriction>
188 </xs:simpleType>
189 <xs:simpleType name="ESMPVersion_String"
190 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
191 <xs:restriction base="xs:string">
192 <xs:pattern value="[1-9]([0-9]){0,2}" />
193 </xs:restriction>
194 </xs:simpleType>
195 <xs:simpleType name="MessageKind_String"
196 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
197 <xs:restriction base="cl:MessageTypeList" />
198 </xs:simpleType>
199 <xs:simpleType name="ProcessKind_String"
200 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
201 <xs:restriction base="cl:ProcessTypeList" />
202 </xs:simpleType>
203 <xs:simpleType name="PartyID_String-base"
204 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
205 <xs:restriction base="xs:string">
206 <xs:maxLength value="16" />

```



```

207     </xs:restriction>
208 </xs:simpleType>
209 <xs:complexType name="PartyID_String"
210 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
211     <xs:simpleContent>
212         <xs:extension base="PartyID_String-base">
213             <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
214 use="required" />
215         </xs:extension>
216     </xs:simpleContent>
217 </xs:complexType>
218 <xs:simpleType name="MarketRoleKind_String"
219 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
220     <xs:restriction base="cl:RoleTypeList" />
221 </xs:simpleType>
222 <xs:simpleType name="ESMP_DateTime"
223 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
224     <xs:restriction base="xs:dateTime">
225         <xs:pattern value="((([0-9]{4}) [\-] (0[13578]|1[02]) [\-] (0[1-9]| [12] [0-
226 9]|3[01])| ([0-9]{4}) [\-] ((0[469])| (11)) [\-] (0[1-9]| [12] [0-9]|30))T(( [01] [0-9]|2 [0-
227 3)]:[0-5] [0-9]:[0-5] [0-
228 9])Z)| ((([13579] [26] [02468] [048]| [13579] [01345789] (0) [48]| [13579] [01345789] [2468] [048]
229 | [02468] [048] [02468] [048]| [02468] [1235679] (0) [48]| [02468] [1235679] [2468] [048]| [0-
230 9] [0-9] [13579] [26]) [\-] (02) [\-] (0[1-9]|1 [0-9]|2 [0-9])T(( [01] [0-9]|2 [0-3)]:[0-5] [0-
231 9]:[0-5] [0-
232 9])Z)| ((([13579] [26] [02468] [1235679]| [13579] [01345789] (0) [01235679]| [13579] [01345789] [
233 2468] [1235679]| [02468] [048] [02468] [1235679]| [02468] [1235679] (0) [01235679]| [02468] [123
234 5679] [2468] [1235679]| [0-9] [0-9] [13579] [01345789]) [\-] (02) [\-] (0[1-9]|1 [0-9]|2 [0-
235 8])T(( [01] [0-9]|2 [0-3)]:[0-5] [0-9]:[0-5] [0-9])Z)" />
236     </xs:restriction>
237 </xs:simpleType>
238 <xs:simpleType name="AreaID_String-base"
239 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
240     <xs:restriction base="xs:string">
241         <xs:maxLength value="18" />
242     </xs:restriction>
243 </xs:simpleType>
244 <xs:complexType name="AreaID_String"
245 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
246     <xs:simpleContent>
247         <xs:extension base="AreaID_String-base">
248             <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
249 use="required" />
250         </xs:extension>
251     </xs:simpleContent>
252 </xs:complexType>
253 <xs:simpleType name="Status_String"
254 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
255     <xs:restriction base="cl:StatusTypeList" />
256 </xs:simpleType>
257 <xs:complexType name="Action_Status"
258 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status">
259     <xs:sequence>
260         <xs:element minOccurs="1" maxOccurs="1" name="value" type="Status_String"
261 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Status.value">
262             </xs:element>
263         </xs:sequence>
264 </xs:complexType>
265 <xs:simpleType name="YMDHM_DateTime"
266 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTime">
267     <xs:restriction base="xs:string">
268         <xs:pattern value="((([0-9]{4}) [\-] (0[13578]|1[02]) [\-] (0[1-9]| [12] [0-
269 9]|3[01])| ([0-9]{4}) [\-] ((0[469])| (11)) [\-] (0[1-9]| [12] [0-9]|30))T(( [01] [0-9]|2 [0-
270 3)]:[0-5] [0-
271 9])Z)| ((([13579] [26] [02468] [048]| [13579] [01345789] (0) [48]| [13579] [01345789] [2468] [048]
272 | [02468] [048] [02468] [048]| [02468] [1235679] (0) [48]| [02468] [1235679] [2468] [048]| [0-
273 9] [0-9] [13579] [26]) [\-] (02) [\-] (0[1-9]|1 [0-9]|2 [0-9])T(( [01] [0-9]|2 [0-3)]:[0-5] [0-
274 9])Z)| ((([13579] [26] [02468] [1235679]| [13579] [01345789] (0) [01235679]| [13579] [01345789] [
275 2468] [1235679]| [02468] [048] [02468] [1235679]| [02468] [1235679] (0) [01235679]| [02468] [123

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276 5679] [2468] [1235679] | [0-9] [0-9] [13579] [01345789]) [\-] (02) [\-] (0[1-9] | 1[0-9] | 2[0-
277 8]) T(( [01] [0-9] | 2[0-3]) : [0-5] [0-9]) Z) " />
278 </xs:restriction>
279 </xs:simpleType>
280 <xs:complexType name="ESMP_DateTimeInterval"
281 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#DateTimeInterval">
282 <xs:sequence>
283 <xs:element minOccurs="1" maxOccurs="1" name="start" type="YMDHM_DateTime"
284 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
285 cim16#DateTimeInterval.start">
286 </xs:element>
287 <xs:element minOccurs="1" maxOccurs="1" name="end" type="YMDHM_DateTime"
288 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
289 cim16#DateTimeInterval.end">
290 </xs:element>
291 </xs:sequence>
292 </xs:complexType>
293 <xs:complexType name="HVDCLink_MarketDocument"
294 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketDocument">
295 <xs:sequence>
296 <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
297 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
298 cim16#IdentifiedObject.mRID">
299 </xs:element>
300 <xs:element minOccurs="1" maxOccurs="1" name="revisionNumber"
301 type="ESMPVersion_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
302 cim16#Document.revisionNumber">
303 </xs:element>
304 <xs:element minOccurs="1" maxOccurs="1" name="type" type="MessageKind_String"
305 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Document.type">
306 </xs:element>
307 <xs:element minOccurs="1" maxOccurs="1" name="process.processType"
308 type="ProcessKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
309 cim16#Process.processType">
310 </xs:element>
311 <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.mRID"
312 type="PartyID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
313 cim16#IdentifiedObject.mRID">
314 </xs:element>
315 <xs:element minOccurs="1" maxOccurs="1"
316 name="sender_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
317 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type">
318 </xs:element>
319 <xs:element minOccurs="1" maxOccurs="1" name="receiver_MarketParticipant.mRID"
320 type="PartyID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
321 cim16#IdentifiedObject.mRID">
322 </xs:element>
323 <xs:element minOccurs="1" maxOccurs="1"
324 name="receiver_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
325 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#MarketRole.type">
326 </xs:element>
327 <xs:element minOccurs="1" maxOccurs="1" name="createdDateTime"
328 type="ESMP_DateTime" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
329 cim16#Document.createdDateTime">
330 </xs:element>
331 <xs:element minOccurs="1" maxOccurs="1" name="schedule_Period.timeInterval"
332 type="ESMP_DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
333 schema-cim16#Period.timeInterval">
334 </xs:element>
335 <xs:element minOccurs="1" maxOccurs="1" name="docStatus" type="Action_Status"
336 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Document.docStatus">
337 </xs:element>
338 <xs:element minOccurs="1" maxOccurs="1" name="domain.mRID" type="AreaID_String"
339 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
340 cim16#IdentifiedObject.mRID">
341 </xs:element>
342 <xs:element minOccurs="1" maxOccurs="unbounded" name="TimeSeries"
343 type="TimeSeries" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
344 cim16#MarketDocument.TimeSeries">

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345         </xs:element>
346     </xs:sequence>
347 </xs:complexType>
348 <xs:simpleType name="Position_Integer"
349 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Integer">
350     <xs:restriction base="xs:integer">
351         <xs:minInclusive value="1" />
352         <xs:maxInclusive value="999999" />
353     </xs:restriction>
354 </xs:simpleType>
355 <xs:complexType name="Point" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
356 schema-cim16#Point">
357     <xs:sequence>
358         <xs:element minOccurs="1" maxOccurs="1" name="position" type="Position_Integer"
359 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point.position">
360             </xs:element>
361         <xs:element minOccurs="0" maxOccurs="1" name="quantity" type="xs:decimal"
362 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Point.quantity">
363             </xs:element>
364         <xs:element minOccurs="0" maxOccurs="1" name="minimum_Quantity.quantity"
365 type="xs:decimal" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
366 cim16#Quantity.quantity">
367             </xs:element>
368         <xs:element minOccurs="0" maxOccurs="1" name="maximum_Quantity.quantity"
369 type="xs:decimal" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
370 cim16#Quantity.quantity">
371             </xs:element>
372         <xs:element minOccurs="0" maxOccurs="1" name="optimum_Quantity.quantity"
373 type="xs:decimal" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
374 cim16#Quantity.quantity">
375             </xs:element>
376     </xs:sequence>
377 </xs:complexType>
378 <xs:complexType name="Series_Period"
379 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period">
380     <xs:sequence>
381         <xs:element minOccurs="1" maxOccurs="1" name="timeInterval"
382 type="ESMP_DateTimeInterval" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
383 schema-cim16#Period.timeInterval">
384             </xs:element>
385         <xs:element minOccurs="1" maxOccurs="1" name="resolution" type="xs:duration"
386 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period.resolution">
387             </xs:element>
388         <xs:element minOccurs="1" maxOccurs="unbounded" name="Point" type="Point"
389 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Period.Point">
390             </xs:element>
391     </xs:sequence>
392 </xs:complexType>
393 <xs:simpleType name="BusinessKind_String"
394 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
395     <xs:restriction base="cl:BusinessTypeList" />
396 </xs:simpleType>
397 <xs:simpleType name="EnergyProductKind_String"
398 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
399     <xs:restriction base="cl:EnergyProductTypeList" />
400 </xs:simpleType>
401 <xs:simpleType name="ObjectAggregationKind_String"
402 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
403     <xs:restriction base="cl:ObjectAggregationTypeList" />
404 </xs:simpleType>
405 <xs:simpleType name="ResourceID_String-base"
406 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
407     <xs:restriction base="xs:string">
408         <xs:maxLength value="18" />
409     </xs:restriction>
410 </xs:simpleType>
411 <xs:complexType name="ResourceID_String"
412 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
413     <xs:simpleContent>

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414         <xs:extension base="ResourceID_String-base">
415             <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
416 use="required" />
417         </xs:extension>
418     </xs:simpleContent>
419 </xs:complexType>
420 <xs:simpleType name="HVDCMode_String"
421 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
422     <xs:restriction base="cl:HVDCModeTypeList" />
423 </xs:simpleType>
424 <xs:simpleType name="MeasurementUnitKind_String"
425 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
426     <xs:restriction base="cl:UnitOfMeasureTypeList" />
427 </xs:simpleType>
428 <xs:simpleType name="CurveType_String"
429 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#String">
430     <xs:restriction base="cl:CurveTypeList" />
431 </xs:simpleType>
432 <xs:complexType name="TimeSeries"
433 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#TimeSeries">
434     <xs:sequence>
435         <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
436 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
437 cim16#IdentifiedObject.mRID">
438             </xs:element>
439         <xs:element minOccurs="1" maxOccurs="1" name="businessType"
440 type="BusinessKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
441 cim16#TimeSeries.businessType">
442             </xs:element>
443         <xs:element minOccurs="1" maxOccurs="1" name="product"
444 type="EnergyProductKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
445 schema-cim16#TimeSeries.product">
446             </xs:element>
447         <xs:element minOccurs="1" maxOccurs="1" name="objectAggregation"
448 type="ObjectAggregationKind_String"
449 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
450 cim16#TimeSeries.objectAggregation">
451             </xs:element>
452         <xs:element minOccurs="1" maxOccurs="1"
453 name="connectingLine_RegisteredResource.mRID" type="ResourceID_String"
454 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
455 cim16#IdentifiedObject.mRID">
456             </xs:element>
457         <xs:element minOccurs="0" maxOccurs="1"
458 name="hVDCMode_AttributeInstanceComponent.attribute" type="HVDCMode_String"
459 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
460 cim16#AttributeInstanceComponent.attribute">
461             </xs:element>
462         <xs:element minOccurs="1" maxOccurs="1" name="out_Domain.mRID"
463 type="AreaID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
464 cim16#IdentifiedObject.mRID">
465             </xs:element>
466         <xs:element minOccurs="1" maxOccurs="1" name="in_Domain.mRID"
467 type="AreaID_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
468 cim16#IdentifiedObject.mRID">
469             </xs:element>
470         <xs:element minOccurs="1" maxOccurs="1" name="measurement_Unit.name"
471 type="MeasurementUnitKind_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-
472 schema-cim16#Unit.name">
473             </xs:element>
474         <xs:element minOccurs="0" maxOccurs="1" name="curveType"
475 type="CurveType_String" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
476 cim16#TimeSeries.curveType">
477             </xs:element>
478         <xs:element minOccurs="0" maxOccurs="1"
479 name="minimumExchange_Quantity.quantity" type="xs:decimal"
480 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Quantity.quantity">
481             </xs:element>

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482         <xs:element minOccurs="0" maxOccurs="1"
483 name="maximumExchange_Quantity.quantity" type="xs:decimal"
484 sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-cim16#Quantity.quantity">
485     </xs:element>
486     <xs:element minOccurs="1" maxOccurs="unbounded" name="Series_Period"
487 type="Series_Period" sawsdl:modelReference="http://iec.ch/TC57/2013/CIM-schema-
488 cim16#TimeSeries.Series_Period">
489     </xs:element>
490 </xs:sequence>
491 </xs:complexType>
492 </xs:schema>
```