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

Introductory note

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IEC – CENELEC
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The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) for an International Standard is submitted for parallel voting.

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VOTE PARALLÈLE
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Framework for energy market communications –
Part 451-4: Settlement and reconciliation business process, contextual
and assembly models for European market**

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International Standard IEC 62325-451-4 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

The text of this standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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- reconfirmed,

- 188 • withdrawn,
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 190 • amended.

191

192 THE NATIONAL COMMITTEES ARE REQUESTED TO NOTE THAT FOR THIS PUBLICATION THE STABILITY
 193 DATE IS 2017

194 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
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196

Document history

197 Any person intervening in the present document is invited to complete the table below before
 198 sending the document elsewhere. The purpose is to allow all actors to see all changes
 199 introduced and the intervening persons.

200 Any important message to IEC editors should also be included in the table below.

Name of intervening person	Document received		Brief description of the changes introduced	Document sent	
	From	Date		To	Date
Maurizio Monti	Project leader	2013-07-29	From the outlines submitted with the NP, draft the Committee Draft document	IEC Secretary	2013-08-29
Maurizio Monti	Project leader	2013-02-09	Taking into account comments issued on CD	IEC Secretary	2014-02-21
Margareta Nöth	Maurizio Monti	2013-02-21	English CDV version sent to CO for generate the French version	CO	2014-02-21

201 This table will be removed by IEC editors before FDIS circulation (in case of IS) or before final
 202 publication (in case of TS or TR).

203

INTRODUCTION

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

206 The principal objective of the IEC 62325 series of standards is to produce standards which
207 facilitate the integration of market application software developed independently by different
208 vendors into a market management system, between market management systems and
209 market participant systems. This is accomplished by defining message exchanges to enable
210 these applications or systems access to public data and exchange information independent of
211 how such information is represented internally.

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

214 The European style market profile is based on different parts of the CIM IEC standard. The
215 CIM is defined through a series of standard, i.e. IEC 62325-301, IEC 61970-301 and IEC
216 61968-11 standards.

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

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

225 **Framework for energy market communications –**
226 **Part 451-4: Settlement and reconciliation business process, contextual**
227 **and assembly models for European market**

228 **1 Scope**

229 Based on the European style market profile (IEC 62325-351), this particular International
230 Standard specifies a package for the settlement and reconciliation business process and the
231 associated document contextual model, assembly model and XML schema for use within
232 European style markets.

233 The relevant aggregate core components (ACCs) defined in IEC 62325-351 have been
234 contextualised into aggregated business information entities (ABIEs) to satisfy the
235 requirements of this business process. The contextualised ABIEs have been assembled into
236 the relevant document contextual models. Related assembly models and XML schema for the
237 exchange of information between market participants are automatically generated from the
238 assembled document contextual models.

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

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

246 **2 Normative references**

247 The following referenced documents are indispensable for the application of this document.
248 For dated references, only the edition cited applies. For undated references, the latest edition
249 of the referenced document (including any amendments) applies.

250 IEC 62325-301, *Framework for energy market communications - Common information model*
251 *(CIM) Extensions for markets.*

252 IEC 62325-351, *Framework for energy market communications - CIM European market model*
253 *exchange profile.*

254 IEC 62325-450, *Profile and context modeling rules.*

255 IEC-62325-451-1, *Framework for energy market communications - Acknowledgement*
256 *business process and contextual model for CIM European market.*

257 IEC-62325-451-2, *Framework for energy market communications - Scheduling business*
258 *process and contextual model for European market.*

259 IEC 62361-100, *Power systems management and associated information exchange -*
260 *Interoperability in the long term - CIM profiles to XML schema mapping.*

261 **3 Terms and definitions**

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

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

265 **3.1**

266 **aggregate business information entity**

267 **ABIE**

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

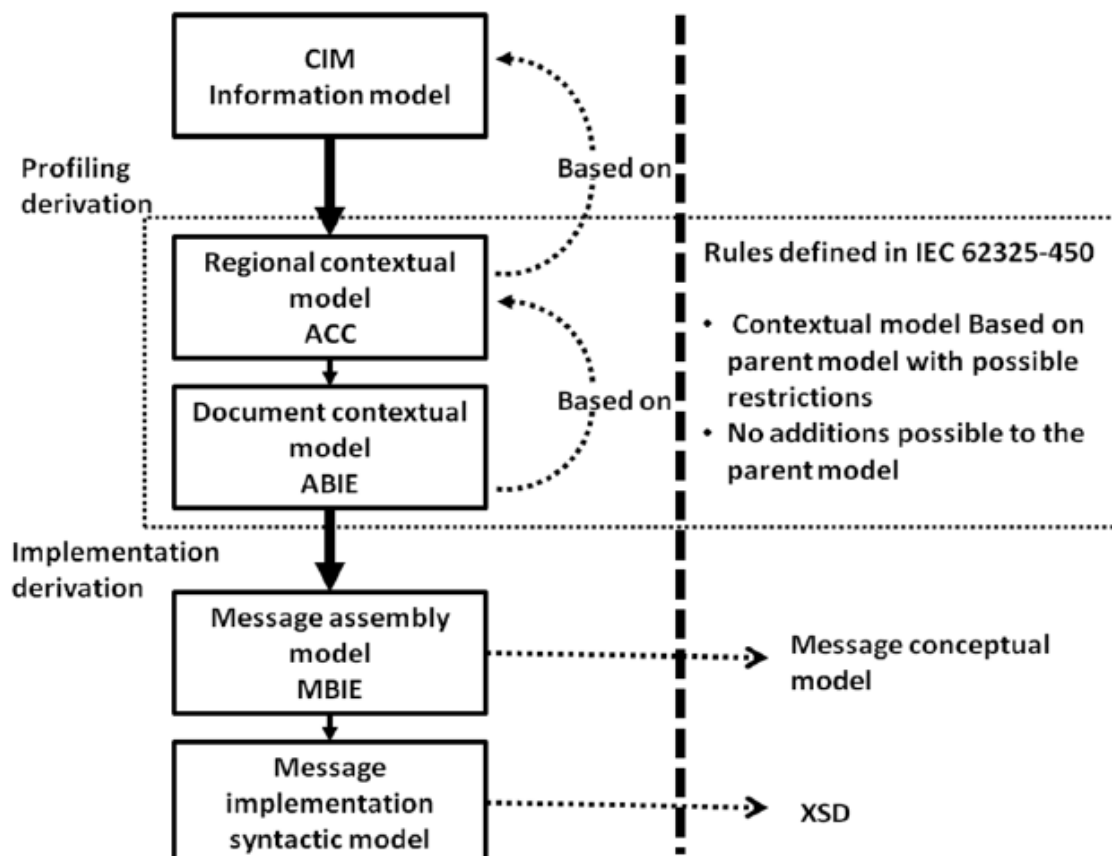
270 [SOURCE: ISO 15000-5]

- 271 **3.2**
272 **aggregate core component**
273 **ACC**
274 collection of related pieces of business information that together convey a distinct business
275 meaning, independent of any specific business context.
- 276 Note 1 to entry: Expressed in modelling terms, this is the representation of an object class, independent of any
277 specific business context.
- 278 [SOURCE: ISO 15000-5]
- 279 **3.3**
280 **application program interface**
281 **API**
282 set of public functions provided by an executable application component for use by other
283 executable application components.
- 284 **3.4**
285 **assembly model**
286 assembly model is a model that prepares information in a business context for assembly into
287 electronic documents for data interchange.
- 288 **3.5**
289 **based on or IsBasedOn**
290 use of an artefact that has been restricted according to the requirements of a specific
291 business context.
- 292 [SOURCE: IEC 62325-450]
- 293 **3.6**
294 **business context**
295 formal description of a specific business circumstance as identified by the values of a set of
296 context categories, allowing different business circumstances to be uniquely distinguished
- 297 [SOURCE: UN/Cefact]
- 298 **3.7**
299 **European style market profile**
300 **ESMP**
301 the European style market profile, the object of this International Standard.
- 302 **3.8**
303 **information model**
304 representation of concepts, relationships, constraints, rules, and operations to specify data
305 semantics for a chosen domain of discourse.
- 306 Note 1 to entry: It can provide shareable, stable, and organized structure of information requirements for the
307 domain context.
- 308 **3.9**
309 **market management system**
310 **MMS**
311 computer system comprised of a software platform providing basic support services and a set
312 of applications providing the functionality needed for the effective management of the
313 electricity market.
- 314 Note 1 to entry: These software systems in an electricity market may include support for capacity allocation,
315 scheduling energy, ancillary or other services, real-time operations and settlements.
- 316 **3.10**
317 **message business information entity**
318 **MBIE**
319 aggregation of a set of ABIEs that respects a define set of assembly rules.

320 4 Document contextual model and message assembly model basic concepts

321 4.1 Overview

322 IEC 62325-450 defines a set of CIM profiles that follows a layered modelling framework as
 323 outlined in Figure 1 going from the common information model (CIM, IEC 61968-11, IEC
 324 61970-301 and IEC 62325-301), to different regional contextual models and their subsequent
 325 contextualized documents for information exchange; the final step being the message
 326 specifications for information interchange.



327

328

Figure 1 - IEC 62325-450 modelling framework

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

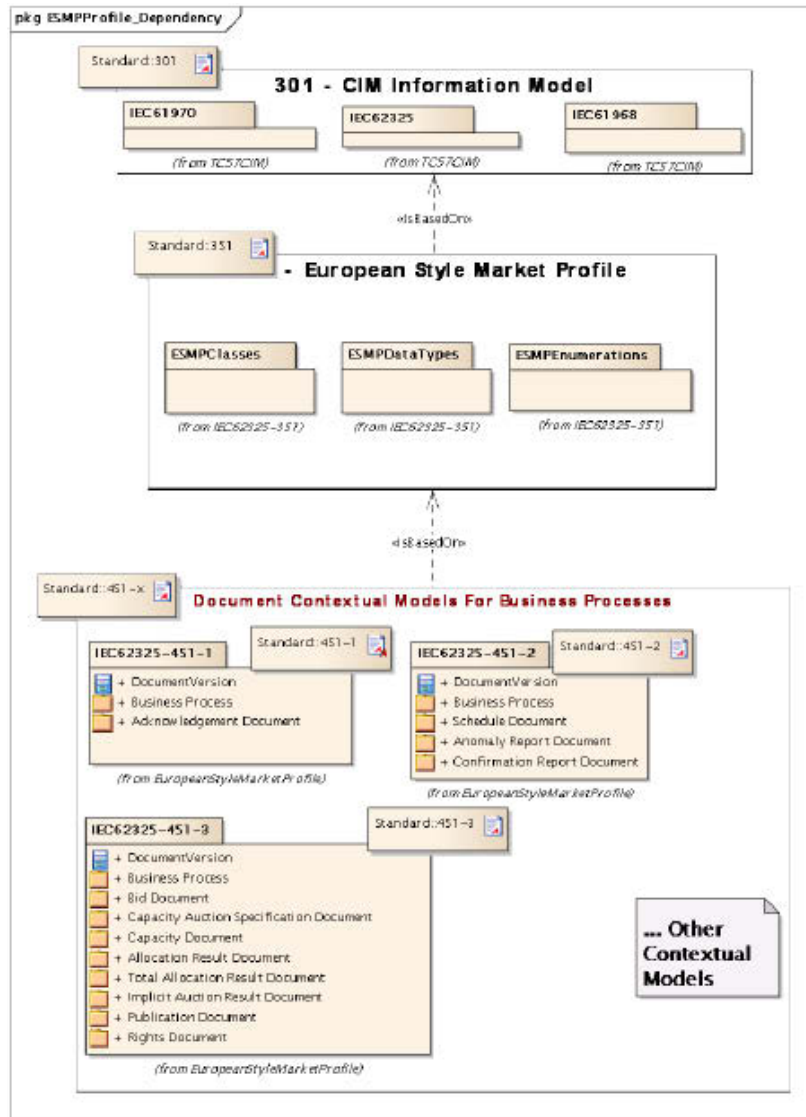
333 A document contextual model is based upon a specific business requirements specification
 334 and is constructed from the contextualisation of the ACCs that can be found in the European
 335 style market contextual model. The contextualised ACCs at this stage are termed aggregate
 336 business information entities (ABIEs) These ABIEs are the constructs that are assembled
 337 together into a specific electronic document to satisfy the information requirements outlined in
 338 the business requirements specification. The transformation from an ACC to an ABIE shall
 339 respect the rules defined in IEC 62325-450.

340 Once a document contextual model has been built that satisfactorily meets the business
 341 requirements, a message assembly model can be automatically generated from it.

342 XML schema then may be automatically generated from the message assembly model. If
 343 necessary specific mapping can take place at this stage to transform the CIM class and
 344 attribute names into more market legacy names.

345 4.2 European style market package structure

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



347

348

Figure 2 - Overview of European style market profile dependency

349

For each business process, a business process package is described in an IEC 62325-451-x (x from 1 to n) standard. A business process package contains:

350

351

- The document contextual model (ABIE) and the automatically generated message assembly model (MBIE) for each electronic document required to enable the completion of the business process. Each document is a sub contextual model derived by restriction from the European style market profile.

352

353

354

355

- The XML schema of the business document that is automatically generated from the message assembly model.

356

357

The European style market profile (ESMP), as defined in the IEC 62325-351, provides the core components permitted for use in an IEC 62325-451-x standard as all ABIEs shall be “based on” the IEC 62325-351 core components:

358

359

360

- ESMPClasses: Defining all the semi-contextual classes of the European style market profile derived by restriction from the CIM model.

361

362

- ESMPDataTypes: Defining all the core datatypes used within the ESMP classes.

363

All the core components that are used in every electronic document structure have been harmonized and centralized in the European style market profile. These core components are consequently the basic building blocks from which all electronic document ABIEs are derived.

364

365

366 **4.3 From the European style market profile to the document contextual model**

367 The document contextual model for a given business process is constructed by an information
368 analyst who identifies all the information requirements necessary to satisfy the business
369 process.

370 Once the information requirements have been identified the information analyst identifies the
371 related ACCs that are available in the European style market profile and contextualises them
372 to meet the information requirements. This contextualisation step creates a set of aggregate
373 business information entities (ABIEs).

374 In a final step the information analyst assembles together into a specific document contextual
375 model package the ABIEs to form a document model satisfying the business requirements.

376 **4.4 From the document contextual model to the message assembly model**

377 Once the document contextual model has been finalised, the message assembly model may
378 be automatically generated.

379 All document contextual models share the same core components and core datatypes. These
380 are defined in the European style market profile (IEC 62325-351) and are contextualised and
381 refined in all document contextual models (IEC 62325-451-x series) respecting the rules as
382 described in IEC 62325-450.

383 **4.5 From the assembly model to the XML schema**

384 The final modelling step applies a standardized set of criteria in order to generate a uniform
385 XML schema from the assembly model. This transformation process respects the rules
386 defined in IEC 62361-100.

387 **5 The settlement and reconciliation business process**

388 **5.1 Balance responsible party and settlement**

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

- 391
- 392 • A party that has a contract proving financial security and identifying balance
393 responsibility with the imbalance settlement responsible of the market balance
394 area entitling the party to operate in the market. This is the only role allowing a
party to nominate energy on a wholesale level.

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

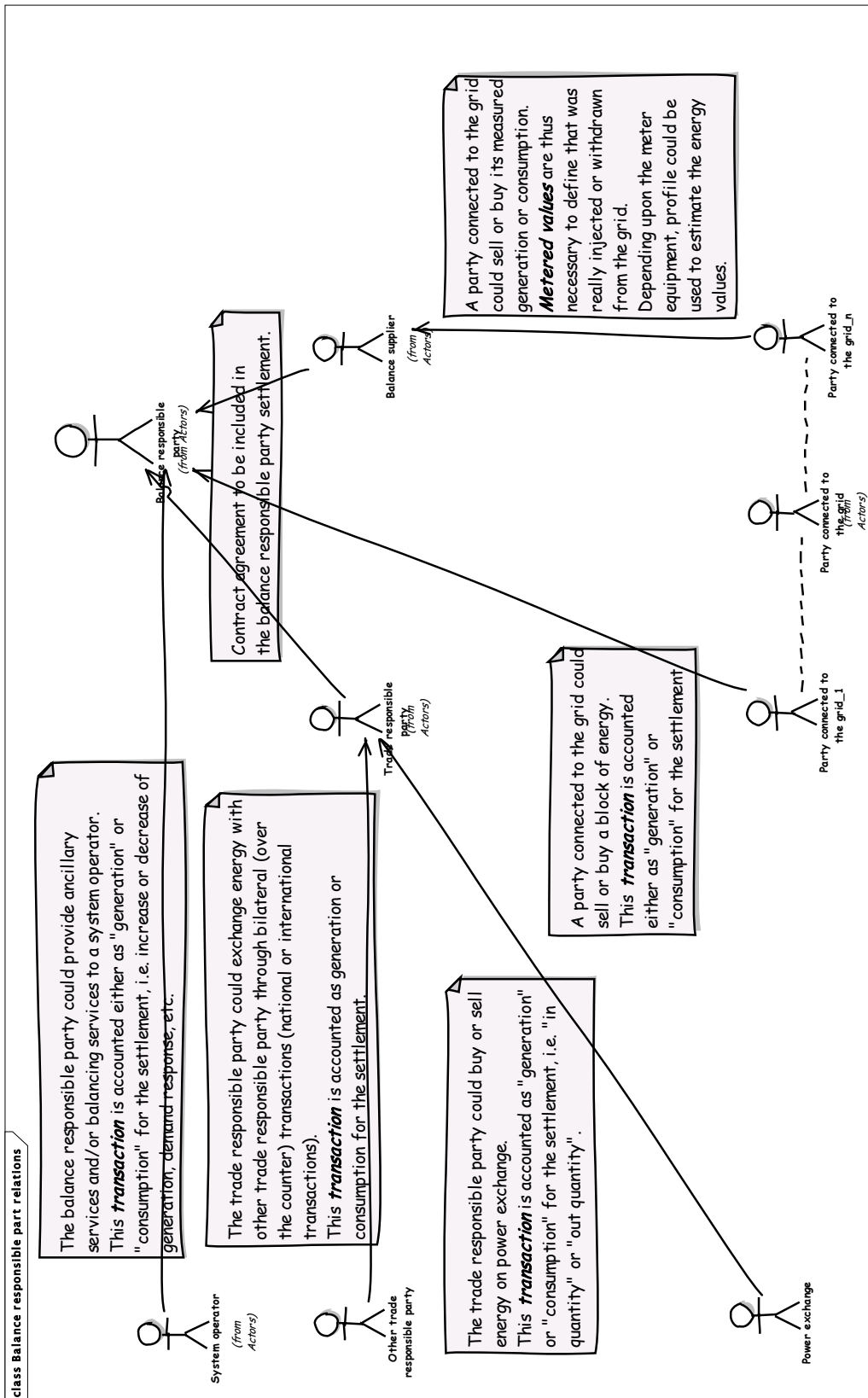
397 The role of balance responsible party is linked to the role of balance supplier, i.e.

- 398
- 399 • A party that markets the difference between actual metered energy consumption
400 and the energy bought with firm energy contracts by the party connected to the
401 grid. In addition the balance supplier markets any difference with the firm energy
402 contract (of the party connected to the grid) and the metered production. There is
one balance supplier for each accounting point.

403 A party connected to the grid could be defined as:

- 404
- 405 • A party that contracts for the right to consume or produce electricity at an
accounting point.

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



408

409

Figure 3 – Balance responsible party relations

410 The settlement process enables thus to reconcile all the “commercial transactions” with the
 411 actual measured values either from meters, estimated values or profiles.

412 The main purpose is thus to assess, after the fact, that the balance responsible party was
 413 balanced and if not to compute the deviations and to settle them.

414 5.2 Overall business context

415 Within an electricity market, actors are buying/selling energy between them as well as selling
416 energy to end users or buying energy from generating units. These activities are carried out
417 from the time of early planning and trading, until the intraday processes.

418 When the market business processes as well as the operational processes (real-time
419 operation) are closed, then comes the time to settle or reconcile the market, i.e. to compute
420 for each balance responsible party what he has injected in a market area and what he has
421 withdrawn from this market area.

422 For proper operation of an European style electricity market, each balance responsible party
423 shall be balanced, i.e. he should have the sufficient “generation” (physical inputs or buying
424 transactions) to cover its “consumption” (physical outputs or selling transactions) at each
425 time.

426 The settlement process is the basic process to compute an imbalance deviation based on
427 commercial transactions and accounting energy values. It should be pointed out that the
428 accounting energy values could be energy meter readings, estimated energy meter readings
429 or profiles (derived from an index value and not based upon a load/generation curve).

430 Settlement and reconciliation processes are often carried out several times, i.e. typically there
431 are one or more re runs of the processes based on more accurate accounting energy values.
432 Typically, the reconciliation process is spread over the period until all metering values have
433 been read.

434 Depending upon local regulation, additional information could be used to compute the kinds of
435 imbalance, or deviation between the planned and the realized schedules.

436 It is not the purpose of this International Standard to state how to collect the energy meter
437 readings, the index values, etc. Only aggregated values per balance responsible party are
438 used for the settlement process; the way to aggregate the data from the energy meter
439 readings is not within the scope of this document.

440 5.3 Use cases

441 The settlement or reconciliation process takes place once the market and operation
442 processes have been completed from the long term planning down to the intraday market and
443 through the day ahead market as well as the real time operations of the bulk power system.

444 The settlement or reconciliation process is composed of three basic activities.

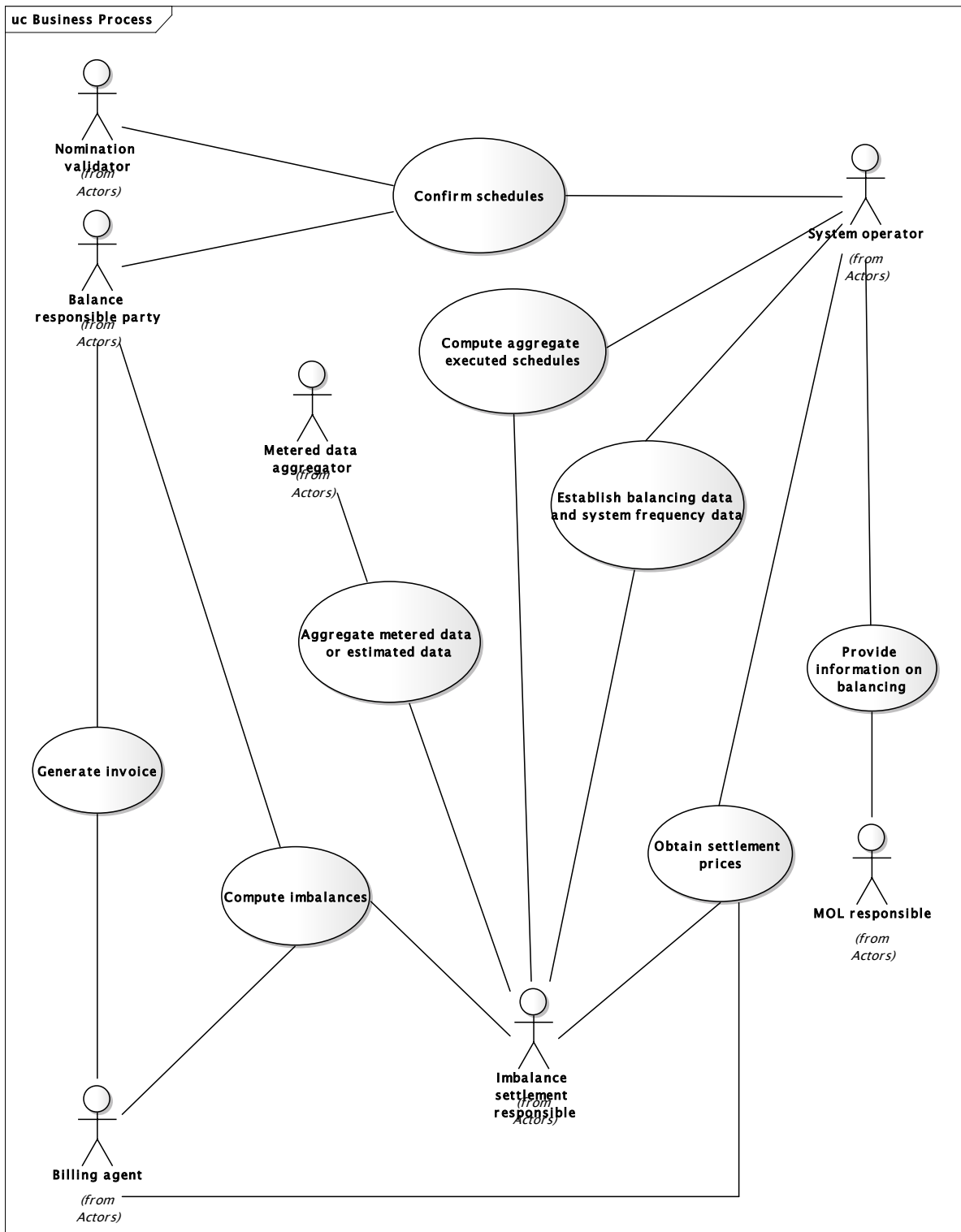
- 445 • The first activity is the computation and aggregation per balance responsible party
446 of all agreed transactions including over the counter transactions, cross-border
447 transactions, power exchange transactions, and balancing transactions.
- 448 • The second activity is the computation and aggregation per balance responsible
449 party of all the accounting energy values, measured, estimated, or profiled for its
450 physical injection or withdrawal.
- 451 • The third activity is the settlement or reconciliation of these values, i.e. computes
452 the imbalances and establishes the imbalance settlement amounts.

453 The Figure 4 describes the actors and main use cases of the settlement or reconciliation
454 process.

455 The roles that take parts in the settlement or reconciliation process are, for example:

- 456 • Balance responsible party, who receives the settlement information.
- 457 • Nomination validator, who provides the cross-border transactions.
- 458 • Merit order list (MOL) responsible, who provides the balancing transactions.
- 459 • System operator, who provides the aggregated schedules, balancing and system
460 frequency data.

- 461 • Metered data aggregator, who provides the aggregated metered information. The
462 metered data aggregator may have local metered data aggregators that provide
463 initial aggregated input for consolidation and validation before being sent to the
464 imbalance settlement responsible
 - 465 • Imbalance settlement responsible, who establishes the imbalances (quantities and
466 amounts).
 - 467 • Billing agent, who invoices the balance responsible party.
- 468 The information necessary to run the settlement or reconciliation process for a given market
469 area is the following:
- 470 • Aggregated executed schedules per balance responsible party that originate at the
471 last stage of the scheduling process; these schedules could be day ahead, or
472 intraday transactions and could originate from a nomination validator for cross
473 border transactions.
 - 474 • Aggregated metered data or estimated data per balance responsible party.
 - 475 • Balancing and system frequency data that originate from the merit order list
476 responsible and from ancillary services activation by the system operator.
 - 477 • Settlement pricing information. This is outside the scope of this document and is
478 dependent on local market rules.



479

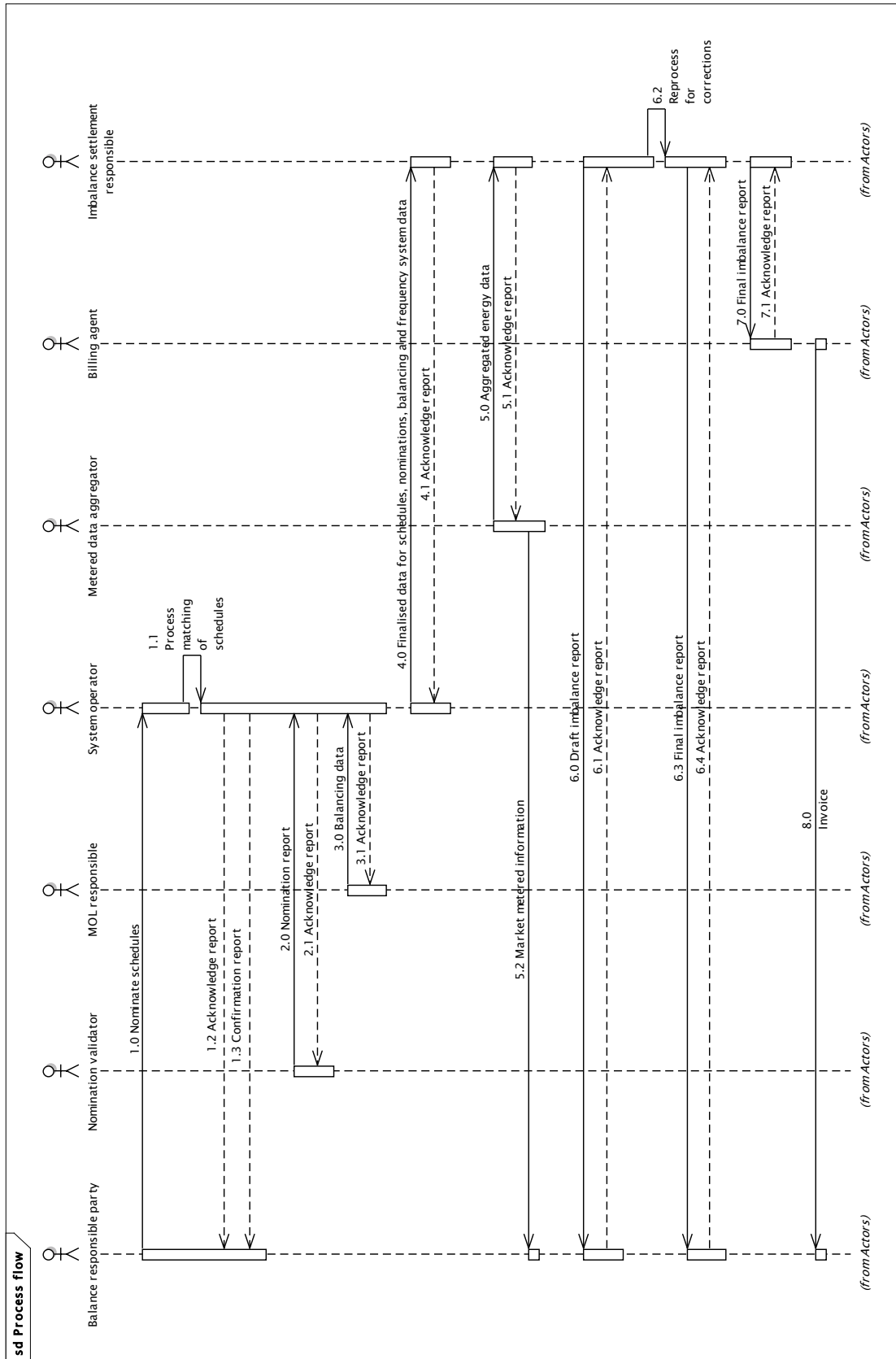
480

Figure 4 - Settlement/reconciliation use case

481 The settlement or reconciliation cycle could be daily, weekly, monthly or yearly.

482 5.4 Process flow

483 The sequence diagram in Figure 5 outlines the information that is exchanged between the
484 different actors in the settlement or reconciliation process.



485

486

Figure 5 – Sequence diagram of the information flow

487

Note: in some markets, bilateral trades between balance responsible parties are sent directly to the imbalance settlement responsible.

488

489

Note: As concerns the flow 4.0, the market operator may also send the trades on their platform to the imbalance settlement responsible.

490

491 The following flows are handled through electronic document described in other IEC
492 document and mainly IEC 62325-451-1 and IEC 62325-451-2.

- 493 • Flows 1.0 to 1.3 are related to over the counter transactions, i.e. mainly bilateral
494 exchanges between balance responsible parties.
- 495 • Flows 2.0 and 2.1 are related to cross-border transactions.
- 496 • Flows 3.0 and 3.1 are related to the balancing data.

497 Once the system operator has received this information, aggregation per balance responsible
498 party of the finalised data could be carried out.

499 Flow 4.0 could include several energy account reports for the various kind of information to be
500 provided by the system operator to the imbalance settlement responsible; these data being
501 the aggregated schedules, the balancing data, the frequency system data, etc.

502 In a similar way, the involved metered data aggregators provide for their respective areas the
503 aggregated information per party, e.g. balance responsible party or balance supplier, flow 5.0,
504 to the imbalance settlement responsible party using the energy account report. This information may be
505 also provided to each balance responsible party, flow 5.2, for verification.

506 Based on these inputs as well as pricing information (that may be provided by different actors
507 depending upon the market design), the imbalance settlement responsible computes the draft
508 imbalance report per balance responsible party. The draft imbalance report, flow 6, contains
509 the values calculated by the imbalance settlement responsible on the basis of aggregated
510 metered data, finalised schedules and regulation data.

511 The energy account report is the document to be used for the exchanges (flows 6.0, 6.3, and
512 7.0) together with the acknowledgement document.

513 Each balance responsible party could check its imbalance deviation and acknowledge or not
514 the settlement.

515 There may be a number of iteration, loop 6.2, of the draft imbalance report up to the final
516 settlement.

517 The final imbalance report is sent to each balance responsible party, flow 6.3, but also to the
518 billing agent, flow 7.0. The docStatus attribute shall have the value "Final". The
519 marketParticipant.mRID attribute in the TimeSeries class shall identify the party to be
520 invoiced.

521 Then, the billing agent issues the invoice to the balance responsible party (flow 8.0).

522 The reconciliation process involves that the metered data aggregators provide a new set of
523 aggregated data when the accounting energy values are available in a better quality (profiling
524 and reading of index). Thus the operation 5.0 to 7.0 could be iterated a number of times
525 depending upon the local market rules.

526 **5.5 Business rules for the settlement and reconciliation process**

527 **5.5.1 General**

528 All the business rules described in IEC 62325-351 are also valid for this standard. Additional
529 rules are provided hereafter.

530 As shown in Figure 5, an acknowledgement document, as defined in IEC 62325-451-1, should
531 be generated either accepting the received document or rejecting it.

532 A received document, for which a positive acknowledgement document was issued, and
533 having a revisionNumber greater than the previous received document shall completely
534 replace it.

535 **5.5.2 Attributes area_Domain.mRID and domain.mRID and quantity**

536 The quantity and secondaryQuantity attributes are related to the area_Domain.mRID.

537 The value of the quantity attribute indicates the amount of product that enters the area
 538 identified by the area_Domain.mRID; the value of the secondaryQuantity attribute is the
 539 amount of product that leaves the area identified by the area_Domain.mRID. The value of
 540 each of these attributes shall be positive.

541 The area_Domain.mRID could be either the area of the settlement or a “subarea”.

542 As an example, in a market area composed of several distribution areas each one with a
 543 different metered data aggregator, each metered data aggregator should provide for its own
 544 area_Domain.mRID the quantity and secondaryQuantity of each balance responsible party
 545 active on its own area. In such a case, the domain_mRID should identify the market area.

546 **5.5.3 Dependency matrix for type, processType and businessType**

547 The Table 1 provides the recommended categorization for the type of document, the process
 548 type and the associated business type.

549 Depending upon the implementation and the way the settlement is computed additional types
 550 of processes or businesses could be added.

551 **Table 1 – Dependency table for type, processType and businessType**

type (Document)	processType	businessType (TimeSeries)
A09 - Finalised schedule	A04 - System operation closure	A02 - Internal trade A03- External trade explicit capacity A06 – External trade without explicit capacity A09 - Independent power producer
A10 - Regulation data report	A04 - System operation closure	A10 – Tertiary control A11 - Primary control A12 - Secondary control
A11 – Aggregated energy data report	A05 - Metered data aggregation	A13 - Load profile A14 - Aggregated energy data A15 - Losses A16 - Transits
A12 - Imbalance report	A06 - Imbalance settlement	A02 - Internal trade A03- External trade explicit capacity A06 – External trade without explicit capacity A09 - Independent power producer A10 – Tertiary control A11 - Primary control A12 - Secondary control A13 - Load profile A14 - Aggregated energy data A15 - Losses A16 - Transits A17 - Settlement deviation A18 - Technical constraint deviation A19 – Balance energy deviation A20 – Imbalance volume A21 - Inadvertent deviation A22 - Frequency control A23 - Balance management A24 – Total trade A30 - Internal inter-area trade

552 **5.5.4 Dependency of attributes of the TimeSeries**

553 There are four attributes of the TimeSeries class that are dependent. The conditions to use
 554 these depending attributes are provided in the Table 2.

555

Table 2 – Dependency table for TimeSeries attributes

Dependent attribute	Set of conditions to use the depending attribute
marketParticipant.mRID	The process_classificationType attribute shall be "Detail". The objectAggregation attribute shall be "Party".
marketAgreement.mRID	The type attribute shall have one of the following values "A09 – Finalised schedule", "A11 – Aggregated energy data", or "A12 – Imbalance report". The process.processType shall have one of the following values "A04 – System operation closure", "A05 – Metered data aggregation", or "A06 – Imbalance settlement". The process_classificationType attribute shall be "Detail". The businessType attribute shall have one of the following values "A02 – Internal trade", "A03 – External trade", "A06 – External trade without explicit capacity", "A09 – Independent power producer", "A10 – Tertiary control", or "A16 – Transits".
currency_Unit.name	The type attribute shall be "A12 – Imbalance report". The process.processType attribute shall be "A06 – Imbalance settlement". The businessType attribute shall have one of the following values "A17 – Settlement deviation", "A18 – technical constraint deviation", "A19 – Balance energy deviation", or "A20 – Imbalance volume".
marketEvaluationPoint.mRID	The type attribute shall have one of the following values "A11 – Aggregated energy data", or "A12 – Imbalance report". The process.processType shall have one of the following values "A05 – Metered data aggregation", or "A06 – Imbalance settlement". The process_classificationType attribute shall be "Detail". The objectAggregation attribute shall be "Party".

556 Depending upon the local market rules, additional values can be included in this set of
557 conditions.

558 5.5.5 Rules governing the Point class

559 The Point class contains the relative position within a time interval period, as defined in the
560 timeInterval attribute, the quantities associated with that position, quantity and
561 secondaryQuantity attributes, and eventually the total monetary amount of the cost of any
562 eventual imbalance, price.amount.

563 5.5.6 Attribute price.amount

564 The price.amount attribute could have positive or negative values (see **Erreur ! Source du**
565 **renvoi introuvable.**).

566 The price.amount attribute is dependent. The conditions to use these depending attributes are
567 provided in the Table 3.

568

Table 3 – Dependency table for price.amount attribute

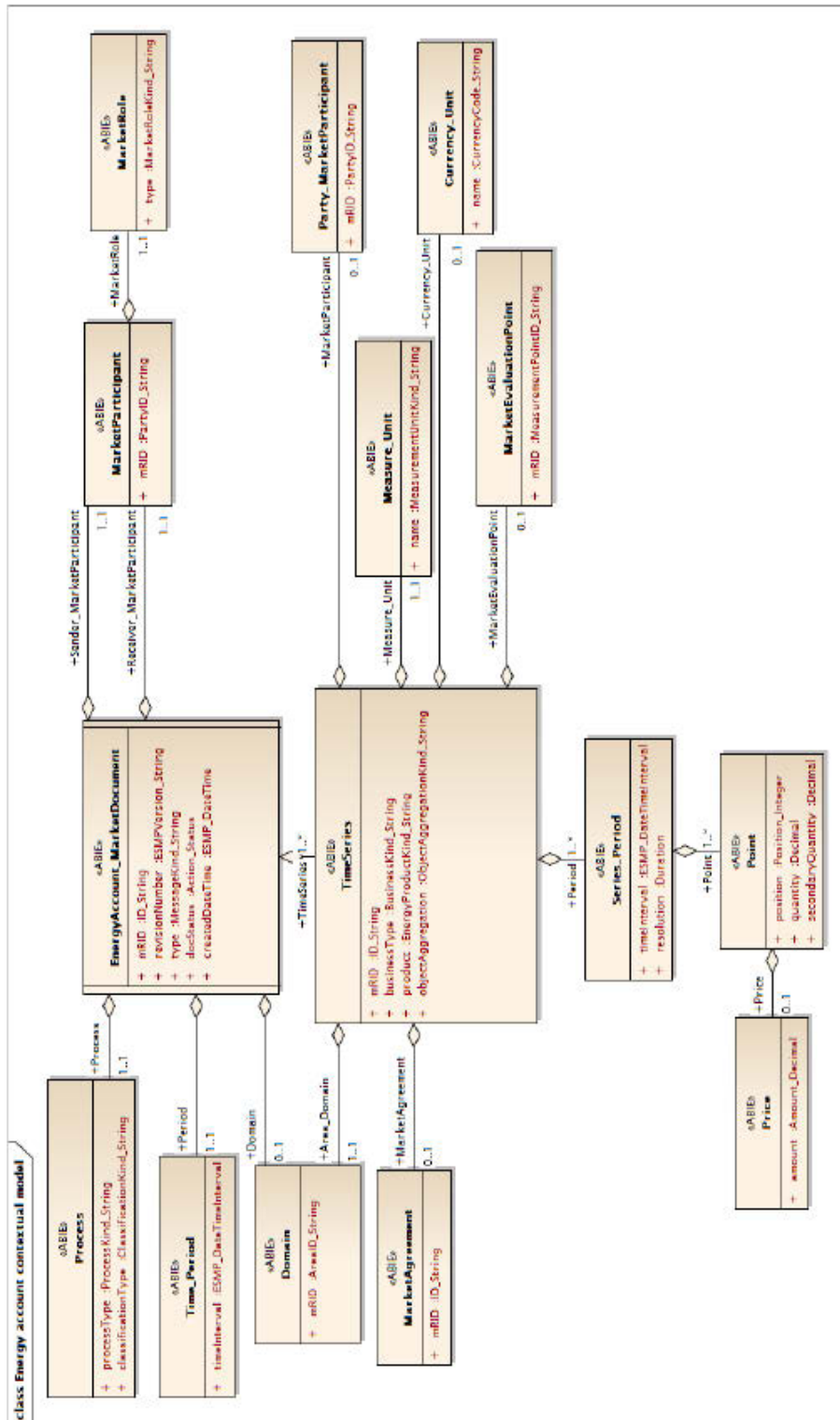
Dependent attribute	Set of conditions to use the depending attribute
Price.amount	The type attribute shall have the following value "A12 – Imbalance report". The process.processType shall have the following value "A06 – Imbalance settlement". The businessType attribute shall have one of the following values "A17 – Settlement deviation", "A18 – Technical constraint deviation", "A19 – Balance energy deviation" or "A20 – Imbalance volume".

569 **6 Contextual and assembly models**

570 **6.1 Energy account contextual model**

571 **6.1.1 Overview of the model**

572 Figure 6 shows the model.



573

574

Figure 6 - Energy account contextual model

575 **6.1.2 IsBasedOn relationships from the European style market profile**

576 Table 4 shows the traceability dependency of the classes used in this package towards the
577 upper level.

578 **Table 4 - IsBasedOn dependency**

Name	Is BasedOn Class	Complete IsBasedOn Path
Currency_Unit	MarketManagement::Unit	IEC62325/MarketManagement
Domain	MarketManagement::Domain	IEC62325/MarketManagement
EnergyAccount_MarketDocument	MarketManagement::MarketDocument	IEC62325/MarketManagement
MarketAgreement	MarketManagement::MarketAgreement	IEC62325/MarketManagement
MarketEvaluationPoint	MarketManagement::MarketEvaluationPoint	IEC62325/MarketManagement
MarketParticipant	MarketCommon::MarketParticipant	IEC62325/MarketCommon
MarketRole	MarketCommon::MarketRole	IEC62325/MarketCommon
Measure_Unit	MarketManagement::Unit	IEC62325/MarketManagement
Party_MarketParticipant	MarketCommon::MarketParticipant	IEC62325/MarketCommon
Point	MarketManagement::Point	IEC62325/MarketManagement
Price	MarketManagement::Price	IEC62325/MarketManagement
Process	MarketManagement::Process	IEC62325/MarketManagement
Series_Period	MarketManagement::Period	IEC62325/MarketManagement
Time_Period	MarketManagement::Period	IEC62325/MarketManagement
TimeSeries	MarketManagement::TimeSeries	IEC62325/MarketManagement

579 **6.1.3 Detailed Energy account contextual model**580 **6.1.3.1 EnergyAccount_MarketDocument root class**

581 An energy account report for a given set of time series and a given accounting period
582 (Time_Period class, period.timeInterval attribute) shall have a unique identification assigned
583 by the sender of the document for all transmissions to the receiver.

584 All additions, modifications, or suppressions for the time series and accounting period shall
585 use the same identification.

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

588 IsBasedOn: ESMPClasses::MarketDocument

589 Table 5 shows all attributes of EnergyAccount_MarketDocument.

590 **Table 5 - Attributes of Energy account contextual**
591 **model::EnergyAccount_MarketDocument**

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	docStatus	Action_Status	The identification of the condition or position of the document with regard to its standing.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.

mult.	Attribute name	Attribute type	Description
[1..1]	revisionNumber	ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
[1..1]	type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.

592 Table 6 shows all association ends of EnergyAccount_MarketDocument with other classes.

593
594

Table 6 - Association ends of Energy account contextual model::EnergyAccount_MarketDocument with other classes

mult.	Role	Class type name	Description
[0..1]	Domain	Domain	The identification of the domain that is covered in the energy account report. This will frequently be the market balance area that is the subject of the report. However, other domains may also be used as defined by local market rules to enable the particular balancing markets to be identified. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Domain.Domain[0..1]
[1..1]	Period	Time_Period	This information provides the start and end date and time of the accounting period. The receiver shall completely reject documents with any time intervals outside the accounting period. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Time_Period.Period[0..*]
[1..1]	Process	Process	Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::Process.Process[0..*]
[1..1]	Receiver_MarketParticipant	MarketParticipant	Document recipient. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[1..1]	Sender_MarketParticipant	MarketParticipant	Document owner. Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]
[1..*]	TimeSeries	TimeSeries	Association Based On : ESMPClasses::MarketDocument.[] ----- ESMPClasses::TimeSeries.TimeSeries[0..*]

595 **6.1.3.2 Currency_Unit**

596 The code specifying a monetary unit.

597 IsBasedOn: ESMPClasses::Currency_Unit

598 Table 7 shows all attributes of Currency_Unit.

599 **Table 7 - Attributes of Energy account contextual model::Currency_Unit**

mult.	Attribute name	Attribute type	Description
[1..1]	name	CurrencyCode_String	The identification of the formal code for a currency (ISO 4217).

600 **6.1.3.3 Domain**

601 A domain covering a number of related objects, such as market balance area, grid area,
602 borders etc.

603 IsBasedOn: ESMPClasses::Domain

604 Table 8 shows all attributes of Domain.

605 **Table 8 - Attributes of Energy account contextual model::Domain**

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

606 **6.1.3.4 MarketAgreement**

607 A formal agreement between two parties defining the terms and conditions for a set of
608 services. The specifics of the services are, in turn, defined via one or more service
609 agreements.

610 IsBasedOn: ESMPClasses::MarketAgreement

611 Table 9 shows all attributes of MarketAgreement.

612 **Table 9 - Attributes of Energy account contextual model::MarketAgreement**

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	ID_String	The unique identification of the agreement.

613 **6.1.3.5 MarketEvaluationPoint**

614 The location where one or more products are measured. This may be a physical or virtual
615 location.

616 IsBasedOn: ESMPClasses::MarketEvaluationPoint

617 Table 10 shows all attributes of MarketEvaluationPoint.

618 **Table 10 - Attributes of Energy account contextual model::MarketEvaluationPoint**

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	MeasurementPointID_String	A unique identification of the measurement point.

619 **6.1.3.6 MarketParticipant**

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

621 IsBasedOn: ESMPClasses::MarketParticipant

622 Table 11 shows all attributes of MarketParticipant.

623 **Table 11 - Attributes of Energy account contextual model::MarketParticipant**

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	PartyID_String	The identification of a party in the energy market.

624 Table 12 shows all association ends of MarketParticipant with other classes.

625 **Table 12 - Association ends of Energy account contextual model::MarketParticipant**
626 **with other classes**

mult.	Role	Class type name	Description
[1..1]	MarketRole	MarketRole	Association Based On : ESMPClasses::MarketParticipant.[] ----- ESMPClasses::MarketRole.MarketRole[0..1]

627 **6.1.3.7 MarketRole**

628 The identification of the intended behaviour of a market participant played within a given
629 business process.

630 IsBasedOn: ESMPClasses::MarketRole

631 Table 13 shows all attributes of MarketRole.

632 **Table 13 - Attributes of Energy account contextual model::MarketRole**

mult.	Attribute name	Attribute type	Description
[1..1]	type	MarketRoleKind_String	The identification of the role played by a market player.

633 **6.1.3.8 Measure_Unit**

634 A particular quantity, defined and adopted by convention, with which other quantities of the
635 same kind are compared in order to express their magnitudes relative to that quantity.

636 IsBasedOn: ESMPClasses::Measure_Unit

637 Table 14 shows all attributes of Measure_Unit.

638 **Table 14 - Attributes of Energy account contextual model::Measure_Unit**

mult.	Attribute name	Attribute type	Description
[1..1]	name	MeasurementUnitKind_String	The identification of the formal code for a measurement unit (UN/ECE Recommendation 20).

639 **6.1.3.9 Party_MarketParticipant**

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

641 IsBasedOn: ESMPClasses::MarketParticipant

642 Table 15 shows all attributes of Party_MarketParticipant.

643 **Table 15 - Attributes of Energy account contextual model::Party_MarketParticipant**

mult.	Attribute name	Attribute type	Description
[1..1]	mRID	PartyID_String	The identification of a party in the energy market.

644 **6.1.3.10 Point**

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

646 IsBasedOn: ESMPClasses::Point

647 Table 16 shows all attributes of Point.

648 **Table 16 - Attributes of Energy account contextual model::Point**

mult.	Attribute name	Attribute type	Description
[1..1]	position	Position_Integer	A sequential value representing the relative position within a given time interval.
[1..1]	quantity	Decimal	This quantity is also called the in quantity, i.e. the quantity of the product that enters the area (area_Domain.mRID) for the position within the account interval in question. The principal quantity identified for a point.
[1..1]	secondaryQuantity	Decimal	This quantity is also called the out quantity, i.e. the quantity of the product that leaves the area (area_Domain.mRID) for the position within the account interval in question. The secondary quantity identified for a point.

649 Table 17 shows all association ends of Point with other classes.

650 **Table 17 - Association ends of Energy account contextual model::Point with other classes**

mult.	Role	Class type name	Description
[0..1]	Price	Price	The amount due for the account interval in question. This information defines the settlement amount taking into consideration the in and out quantities and the pricing scheme based on local market rules. A negative value indicates that the settlement amount is due by the party in question (party to be debited). If the amount is positive it is due by the imbalance settlement responsible (party to be credited). Association Based On : ESMPClasses::Point.[] ----- ESMPClasses::Price.Price[0..*]

652 **6.1.3.11 Price**

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

654 IsBasedOn: ESMPClasses::Price

655 Table 18 shows all attributes of Price.

656

Table 18 - Attributes of Energy account contextual model::Price

mult.	Attribute name	Attribute type	Description
[1..1]	amount	Amount_Decimal	A number of monetary units specified in a unit of currency.

657 **6.1.3.12 Process**

658 A formal identification of the business process in which a flow of information is exchanged.

659 IsBasedOn: ESMPClasses::Process

660 Table 19 shows all attributes of Process.

661

Table 19 - Attributes of Energy account contextual model::Process

mult.	Attribute name	Attribute type	Description
[1..1]	classificationType	ClassificationKind_String	The classification mechanism used to group a set of objects together within a business process. The grouping may be of a detailed or a summary nature.
[1..1]	processType	ProcessKind_String	The identification of the nature of process that the document addresses.

662 **6.1.3.13 Series_Period**

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

664 IsBasedOn: ESMPClasses::Series_Period

665 Table 20 shows all attributes of Series_Period.

666

Table 20 - Attributes of Energy account contextual model::Series_Period

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

667 Table 21 shows all association ends of Series_Period with other classes.

668 **Table 21 - Association ends of Energy account contextual model::Series_Period with**
669 **other classes**

mult.	Role	Class type name	Description
[1..*]	Point	Point	Association Based On : ESMPClasses::Series_Period.[] ----- ESMPClasses::Point.Point[1..*]

670 **6.1.3.14 Time_Period**

671 The identification of the accounting period.

672 The identification of a time interval.

673 IsBasedOn: ESMPClasses::Time_Period

674 Table 22 shows all attributes of Time_Period.

675 **Table 22 - Attributes of Energy account contextual model::Time_Period**

mult.	Attribute name	Attribute type	Description
[1..1]	timeInterval	ESMP_DateTimeInterval	The start and end date and time for a given interval.

676 **6.1.3.15 TimeSeries**

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

678 IsBasedOn: ESMPClasses::TimeSeries

679 Table 23 shows all attributes of TimeSeries.

680 **Table 23 - Attributes of Energy account contextual model::TimeSeries**

mult.	Attribute name	Attribute type	Description
[1..1]	businessType	BusinessKind_String	The identification of the nature of the time series.
[1..1]	mRID	ID_String	A unique identification of the time series.
[1..1]	objectAggregation	ObjectAggregationKind_String	The identification of the domain that is the common denominator used to aggregate a time series.
[1..1]	product	EnergyProductKind_String	The identification of the nature of an energy product such as power, energy, reactive power, etc.

681 Table 24 shows all association ends of TimeSeries with other classes.

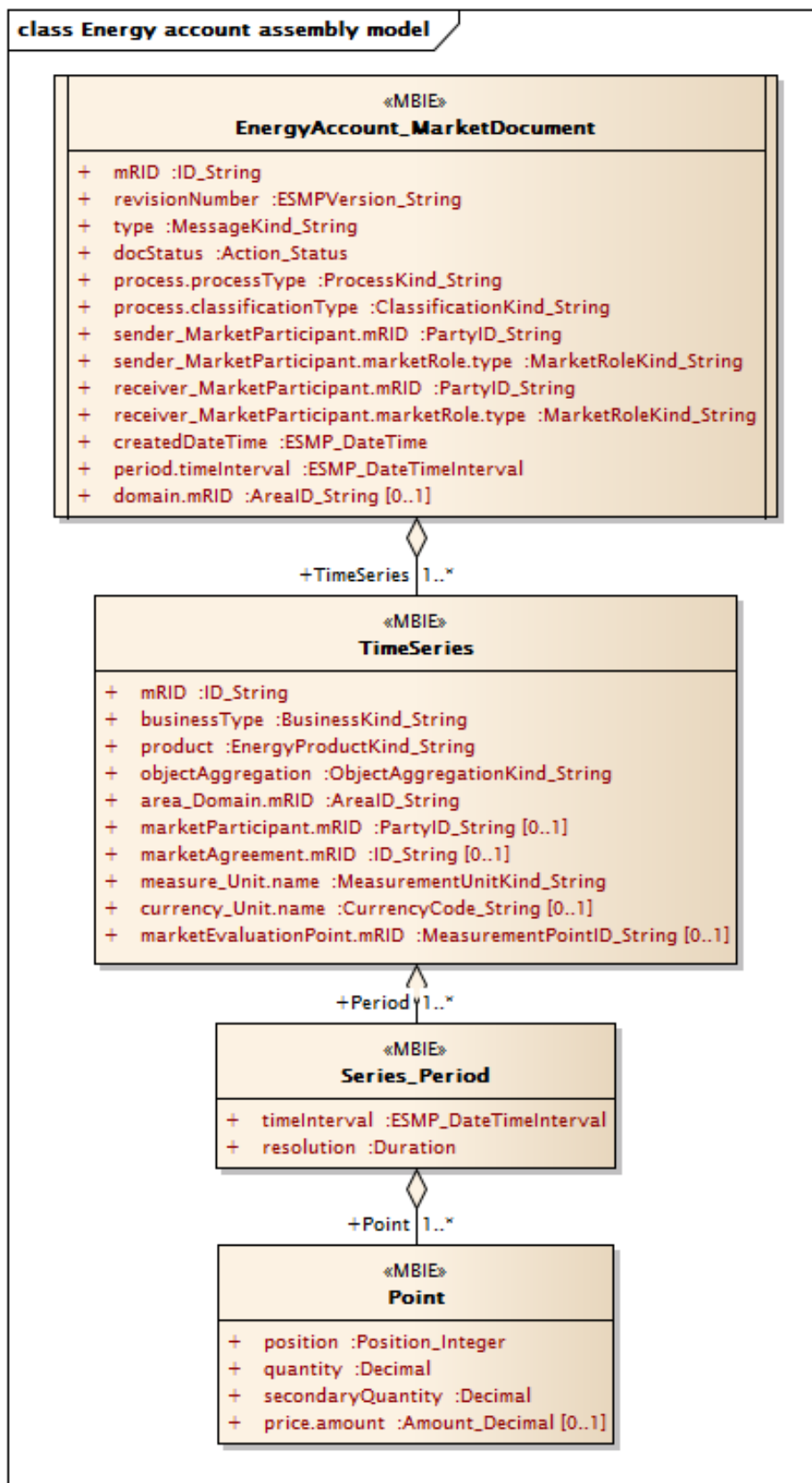
682 **Table 24 - Association ends of Energy account contextual model::TimeSeries with other classes**
683

mult.	Role	Class type name	Description
[1..1]	Area_Domain	Domain	The area of concern for the imbalance settlement responsible that the time series addresses. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::Domain.Domain[0..*]
[0..1]	Currency_Unit	Currency_Unit	The currency used for the monetary amount expressed within the time series. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::Currency_Unit.Currency_Unit[0..1]
[0..1]	MarketAgreement	MarketAgreement	This provides the identification of the agreement, such as a capacity agreement, that is relative to the time series. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::MarketAgreement.MarketAgreement[0..*]
[0..1]	MarketEvaluationPoint	MarketEvaluationPoint	The identification of the accounting point where the settlement information has been aggregated. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::MarketEvaluationPoint.MarketEvaluationPoint[0..1]
[0..1]	MarketParticipant	Party_MarketParticipant	The identification of the party of concern for the time series. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::MarketParticipant.MarketParticipant[0..*]

mult.	Role	Class type name	Description
[1..1]	Measure_Unit	Measure_Unit	The unit if measurement is used for the quantities (quantity and secondaryQuantity attributes) expressed within the time series. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::Measure_Unit.Measurement_Unit[0..*]
[1..*]	Period	Series_Period	The receiver shall completely reject documents with any time intervals outside the accounting period. Association Based On : ESMPClasses::TimeSeries.[] ----- ESMPClasses::Series_Period.Period[0..*]

684 **6.2 Energy account assembly model**685 **6.2.1 Overview of the model**

686 Figure 7 shows the model.



687

688

Figure 7 - Energy account assembly model

689 **6.2.2 IsBasedOn relationships from the European style market profile**

690 Table 25 shows the traceability dependency of the classes used in this package towards the
691 upper level.

692 **Table 25 - IsBasedOn dependency**

Name	Is BasedOn Class	Complete IsBasedOn Path
EnergyAccount_MarketDocument	MarketManagement::MarketDocument	IEC62325/MarketManagement
Point	MarketManagement::Point	IEC62325/MarketManagement
Series_Period	MarketManagement::Period	IEC62325/MarketManagement
TimeSeries	MarketManagement::TimeSeries	IEC62325/MarketManagement

693 **6.2.3 Detailed Energy account assembly model**

694 **6.2.3.1 EnergyAccount_MarketDocument root class**

695 An energy account report for a given set of time series and a given accounting period
696 (Time_Period class, period.timeInterval attribute) shall have a unique identification assigned
697 by the sender of the document for all transmissions to the receiver.

698 All additions, modifications, or suppressions for the time series and accounting period shall
699 use the same identification.

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

702 IsBasedOn: Energy account contextual model::EnergyAccount_MarketDocument

703 Table 26 shows all attributes of EnergyAccount_MarketDocument.

704 **Table 26 - Attributes of Energy account assembly
705 model::EnergyAccount_MarketDocument**

mult.	Attribute name	Attribute type	Description
[1..1]	createdDateTime	ESMP_DateTime	The date and time of the creation of the document.
[1..1]	docStatus	Action_Status	The identification of the condition or position of the document with regard to its standing.
[0..1]	domain.mRID	AreaID_String	The unique identification of the domain. --- The identification of the domain that is covered in the energy account report. This will frequently be the market balance area that is the subject of the report. However, other domains may also be used as defined by local market rules to enable the particular balancing markets to be identified.
[1..1]	mRID	ID_String	The unique identification of the document being exchanged within a business process flow.
[1..1]	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 accounting period. The receiver shall completely reject documents with any time intervals outside the accounting period.

mult.	Attribute name	Attribute type	Description
[1..1]	process.classificationType	ClassificationKind_String	The classification mechanism used to group a set of objects together within a business process. The grouping may be of a detailed or a summary nature.
[1..1]	process.processType	ProcessKind_String	The identification of the nature of process that the document addresses.
[1..1]	receiver_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- Document recipient.
[1..1]	receiver_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- Document recipient.
[1..1]	revisionNumber	ESMPVersion_String	The identification of the version that distinguishes one evolution of a document from another.
[1..1]	sender_MarketParticipant.marketRole.type	MarketRoleKind_String	The identification of the role played by a market player. --- Document owner.
[1..1]	sender_MarketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- Document owner.
[1..1]	type	MessageKind_String	The coded type of a document. The document type describes the principal characteristic of the document.

706 Table 27 shows all association ends of EnergyAccount_MarketDocument with other classes.

707
708

Table 27 - Association ends of Energy account assembly model::EnergyAccount_MarketDocument with other classes

mult.	Role	Class type name	Description
[1..*]	TimeSeries	TimeSeries	Association Based On : Energy account contextual model::TimeSeries.TimeSeries[1..*] ----- Energy account contextual model::EnergyAccount_MarketDocument.[]

709 6.2.3.2 Point

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

711 IsBasedOn: Energy account contextual model::Point

712 Table 28 shows all attributes of Point.

713 **Table 28 - Attributes of Energy account assembly model::Point**

mult.	Attribute name	Attribute type	Description
[1..1]	position	Position_Integer	A sequential value representing the relative position within a given time interval.

mult.	Attribute name	Attribute type	Description
[0..1]	price.amount	Amount_Decimal	A number of monetary units specified in a unit of currency. --- The amount due for the account interval in question. This information defines the settlement amount taking into consideration the in and out quantities and the pricing scheme based on local market rules. A negative value indicates that the settlement amount is due by the party in question (party to be debited). If the amount is positive it is due by the imbalance settlement responsible (party to be credited).
[1..1]	quantity	Decimal	This quantity is also called the in quantity, i.e. the quantity of the product that enters the area (area_Domain.mRID) for the position within the account interval in question. The principal quantity identified for a point.
[1..1]	secondaryQuantity	Decimal	This quantity is also called the out quantity, i.e. the quantity of the product that leaves the area (area_Domain.mRID) for the position within the account interval in question. The secondary quantity identified for a point.

714 **6.2.3.3 Series_Period**

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

716 IsBasedOn: Energy account contextual model::Series_Period

717 Table 29 shows all attributes of Series_Period.

718 **Table 29 - Attributes of Energy account assembly model::Series_Period**

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

719 Table 30 shows all association ends of Series_Period with other classes.

720 **Table 30 - Association ends of Energy account assembly model::Series_Period with**
721 **other classes**

mult.	Role	Class type name	Description
[1..*]	Point	Point	Association Based On : Energy account contextual model::Point.Point[1..*] ----- Energy account contextual model::Series_Period.[]

722 **6.2.3.4 TimeSeries**

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

724 IsBasedOn: Energy account contextual model::TimeSeries

725 Table 31 shows all attributes of TimeSeries.

726 **Table 31 - Attributes of Energy account assembly model::TimeSeries**

mult.	Attribute name	Attribute type	Description
[1..1]	area_Domain.mRID	AreaID_String	The unique identification of the domain. --- The area of concern for the imbalance settlement responsible that the time series addresses.

mult.	Attribute name	Attribute type	Description
[1..1]	businessType	BusinessKind_String	The identification of the nature of the time series.
[0..1]	currency_Unit.name	CurrencyCode_String	The identification of the formal code for a currency (ISO 4217). --- The currency used for the monetary amount expressed within the time series.
[0..1]	marketAgreement.mRID	ID_String	The unique identification of the agreement. --- This provides the identification of the agreement, such as a capacity agreement, that is relative to the time series.
[0..1]	marketEvaluationPoint.mRID	MeasurementPointID_String	A unique identification of the measurement point. --- The identification of the accounting point where the settlement information has been aggregated.
[0..1]	marketParticipant.mRID	PartyID_String	The identification of a party in the energy market. --- The identification of the party of concern for the time series.
[1..1]	measure_Unit.name	MeasurementUnitKind_String	The identification of the formal code for a measurement unit (UN/ECE Recommendation 20). --- The unit if measurement is used for the quantities (quantity and secondaryQuantity attributes) expressed within the time series.
[1..1]	mRID	ID_String	A unique identification of the time series.
[1..1]	objectAggregation	ObjectAggregationKind_String	The identification of the domain that is the common denominator used to aggregate a time series.
[1..1]	product	EnergyProductKind_String	The identification of the nature of an energy product such as power, energy, reactive power, etc.

727 Table 32 shows all association ends of TimeSeries with other classes.

728 **Table 32 - Association ends of Energy account assembly model::TimeSeries with other**
729 **classes**

mult.	Role	Class type name	Description
[1..*]	Period	Series_Period	The receiver shall completely reject documents with any time intervals outside the accounting period. Association Based On : Energy account contextual model::Series_Period.Period[1..*] ----- Energy account contextual model::TimeSeries.[]

730 6.2.4 Datatypes

731 6.2.4.1 Action_Status compound

732 The coded identification of the status of an object.

733 Table 33 shows all attributes of Action_Status.

734 **Table 33 - Attributes of ESMPDataTypes::Action_Status**

mult.	Attribute name	Attribute type	Description
[1..1]	value	Status_String	Main Core value Space.

735 **6.2.4.2 ESMP_DateTimeInterval compound**

736 This datatype enables to express the start date and time, and the end date and time of a time
737 interval with a specific pattern. This pattern is the YYYY-MM-DDThh:mmZ.

738 Table 34 shows all attributes of ESMP_DateTimeInterval.

739 **Table 34 - Attributes of ESMPDataTypes::ESMP_DateTimeInterval**

mult.	Attribute name	Attribute type	Description
[1..1]	start	YMDHM_DateTime	The start date and time of the interval with a minute resolution.
[1..1]	end	YMDHM_DateTime	The end date and time of the interval with a minute resolution.

740 **6.2.4.3 Amount_Decimal datatype**

741 The coded identification of a monetary value.

742 Table 35 shows all attributes of Amount_Decimal.

743 **Table 35 - Attributes of ESMPDataTypes::Amount_Decimal**

mult.	Attribute name	Attribute type	Description
[1..1]	value	Decimal	Main Core value Space.

744 Table 36 shows all restrictions applied to the attributes of Amount_Decimal.

745 **Table 36 - Restrictions of attributes for ESMPDataTypes::Amount_Decimal**

Name	Constraint	Type	Expression of constraint
value	totalDigits	OCL	inv: self->TotalDigits(17)

746 **6.2.4.4 AreaID_String datatype**

747 The coded identification of a domain, i.e. balance area, grid area, etc.

748 In the ESMP context, it is an authorized issuing office that provides an agreed identification
749 coding scheme for domain identification.

750 Table 37 shows all attributes of AreaID_String.

751 **Table 37 - Attributes of ESMPDataTypes::AreaID_String**

mult.	Attribute name	Attribute type	Description
[1..1]	codingScheme	CodingSchemeTypeList	DomainQualification.
[1..1]	value	String	Main Core value Space.

752 Table 38 shows all restrictions applied to the attributes of AreaID_String.

753 **Table 38 - Restrictions of attributes for ESMPDataTypes::AreaID_String**

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(18)

754 **6.2.4.5 BusinessKind_String datatype**

755 The coded identification of the business type.

756 Table 39 shows all attributes of BusinessKind_String.

757 **Table 39 - Attributes of ESMPDataTypes::BusinessKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	BusinessTypeList	Main Core value Space.

758 **6.2.4.6 ClassificationKind_String datatype**

759 The coded identification of the classification mechanism used to group a set of objects
760 together. The grouping may be of a detailed or a summary nature.

761 Table 40 shows all attributes of ClassificationKind_String.

762 **Table 40 - Attributes of ESMPDataTypes::ClassificationKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	ClassificationTypeList	Main Core value Space.

763 **6.2.4.7 CurrencyCode_String datatype**

764 The coded identification of legal tender using ISO 4217 3 alpha codes.

765 Table 41 shows all attributes of CurrencyCode_String.

766 **Table 41 - Attributes of ESMPDataTypes::CurrencyCode_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	CurrencyTypeList	Main Core value Space.

767 **6.2.4.8 EnergyProductKind_String datatype**

768 The identification of the nature of an energy product such as power, energy, reactive power,
769 etc.

770 Table 42 shows all attributes of EnergyProductKind_String.

771 **Table 42 - Attributes of ESMPDataTypes::EnergyProductKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	EnergyProductTypeList	Main Core value Space.

772 **6.2.4.9 ESMP_DateTime datatype**

773 In ESMP, the dateTime shall be expressed in UTC as YYYY-MM-DDThh:mm:ssZ.

774 Table 43 shows all attributes of ESMP_DateTime.

775 **Table 43 - Attributes of ESMPDataTypes::ESMP_DateTime**

mult.	Attribute name	Attribute type	Description
[1..1]	value	DateTime	Main Core value Space.

776 Table 44 shows all restrictions applied to the attributes of ESMP_DateTime.

777 **Table 44 - Restrictions of attributes for ESMPDataTypes::ESMP_DateTime**

Name	Constraint	Type	Expression of constraint
value	pattern	OCL	inv: self->Pattern((((([0-9]{4})[\-](0[13578] 1[02])[\-](0[1-9] 12 [0-9]3[01]) ([0-9]{4})[\-]((0[469]) (11))[\-](0[1-9] 12 [0-9]30))T(((0[1][0-9] 2[0-3]):[0-5][0-9]:[0-5][0-9])Z) (((13579 [26][02468][048]) [13579][01345789](0)[48] 13579 [01345789][2468][048] 02468 [048][02468][048] 02468 [1235679](0)[48] 02468 [1235679][2468][048] [0-9][0-9][13579][26])[\-](02)[\-](0[1-9] 1[0-9] 2[0-9])T(((0[1][0-9] 2[0-3]):[0-5][0-9]:[0-5][0-9])Z) (((13579 [26][02468][1235679] 13579 [01345789](0)[01235679] 13579 [01345789][2468][1235679] 02468 [048][02468][1235679] 02468 [1235679](0)[01235679] 02468 [1235679][2468][1235679] [0-9][0-9][13579][01345789])[\-](02)[\-](0[1-9] 1[0-9] 2[0-8])T(((0[1][0-9] 2[0-3]):[0-5][0-9]:[0-5][0-9])Z))

778 **6.2.4.10 ESMPVersion_String datatype**

779 In ESMP, the coded value is restricted to digits.

780 A code that distinguishes one evolution of an identified object from another. Information about
781 a specific object may be sent several times, each transmission being identified by a different
782 version number.

783 Table 45 shows all attributes of ESMPVersion_String.

784 **Table 45 - Attributes of ESMPDataTypes::ESMPVersion_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

785 Table 46 shows all restrictions applied to the attributes of ESMPVersion_String.

786 **Table 46 - Restrictions of attributes for ESMPDataTypes::ESMPVersion_String**

Name	Constraint	Type	Expression of constraint
value	pattern	OCL	inv: self->Pattern([1-9]([0-9]){0,2})

787 **6.2.4.11 ID_String datatype**

788 A code to uniquely distinguish one occurrence of an entity from another.

789 In the ESMP context, the code is defined either by:

790 - an authorized issuing office that provides an agreed identification coding scheme for market
791 participant, domain, measurement point, resources (generator, lines, substations, etc.)
792 identification

793 - an emitting company that provides an agreed identification unique within a business context
794 such as capacity auction identification, market agreement identification, etc.

795 - a party (originator of the exchange) that provides a unique identification in the framework of
796 a business exchange such as document identification, time series identification, bid
797 identification, ...

798 Table 47 shows all attributes of ID_String.

799 **Table 47 - Attributes of ESMPDataTypes::ID_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	String	Main Core value Space.

800 Table 48 shows all restrictions applied to the attributes of ID_String.

801 **Table 48 - Restrictions of attributes for ESMPDataTypes::ID_String**

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(35)

802 **6.2.4.12 MarketRoleKind_String datatype**

803 The identification of the role played by a party.

804 Table 49 shows all attributes of MarketRoleKind_String.

805 **Table 49 - Attributes of ESMPDataTypes::MarketRoleKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	RoleTypeList	Main Core value Space.

806 **6.2.4.13 MeasurementPointID_String datatype**

807 The coded identification of a domain covering a number of related objects, such as metering point, accounting point, etc.

809 In the ESMP context, it is an authorized issuing office that provides an agreed identification coding scheme for measurement point identification.

811 Table 50 shows all attributes of MeasurementPointID_String.

812 **Table 50 - Attributes of ESMPDataTypes::MeasurementPointID_String**

mult.	Attribute name	Attribute type	Description
[1..1]	codingScheme	CodingSchemeTypeList	DomainQualification.
[1..1]	value	String	Main Core value Space.

813 Table 51 shows all restrictions applied to the attributes of MeasurementPointID_String.

814 **Table 51 - Restrictions of attributes for ESMPDataTypes::MeasurementPointID_String**

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(35)

815 **6.2.4.14 MeasurementUnitKind_String datatype**

816 The coded identification of a unit of measure that is applied to a quantity. The measurement units shall be in compliance with UN/ECE Recommendation 20.

818 Table 52 shows all attributes of MeasurementUnitKind_String.

819 **Table 52 - Attributes of ESMPDataTypes::MeasurementUnitKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	UnitOfMeasureTypeList	Main Core value Space.

820 **6.2.4.15 MessageKind_String datatype**

821 The coded type of a document.

822 Table 53 shows all attributes of MessageKind_String.

823 **Table 53 - Attributes of ESMPDataTypes::MessageKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	MessageTypeList	Main Core value Space.

824 **6.2.4.16 ObjectAggregationKind_String datatype**

825 The coded identification of the aggregation object.

826 Table 54 shows all attributes of ObjectAggregationKind_String.

827 **Table 54 - Attributes of ESMPDataTypes::ObjectAggregationKind_String**

mult.	Attribute name	Attribute type	Description
[1..1]	value	ObjectAggregationTypeList	Main Core value Space.

828 **6.2.4.17 PartyID_String datatype**

829 The identification of an actor in the energy market.

830 In the ESMP context, it is an authorized issuing office that provides an agreed identification
831 coding scheme for market participant identification.

832 Table 55 shows all attributes of PartyID_String.

833 **Table 55 - Attributes of ESMPDataTypes::PartyID_String**

mult.	Attribute name	Attribute type	Description
[1..1]	codingScheme	CodingSchemeTypeList	DomainQualification.
[1..1]	value	String	Main Core value Space.

834 Table 56 shows all restrictions applied to the attributes of PartyID_String.

835 **Table 56 - Restrictions of attributes for ESMPDataTypes::PartyID_String**

Name	Constraint	Type	Expression of constraint
value	maxLength	OCL	inv: self->MaxLength(16)

836 **6.2.4.18 Position_Integer datatype**

837 An integer value, this value is used as a sequential value representing the relative position of
838 an entity within a space such as a time interval.

839 Table 57 shows all attributes of Position_Integer.

840 **Table 57 - Attributes of ESMPDataTypes::Position_Integer**

mult.	Attribute name	Attribute type	Description
[1..1]	value	Integer	Main Core value Space.

841 Table 58 shows all restrictions applied to the attributes of Position_Integer.

842 **Table 58 - Restrictions of attributes for ESMPDataTypes::Position_Integer**

Name	Constraint	Type	Expression of constraint
value	maxInclusive	OCL	inv: self->maxInclusive(999999)
value	minInclusive	OCL	inv: self->minInclusive(1)

843 **6.2.4.19 ProcessKind_String datatype**

844 The coded identification of the nature of process.

845 Table 59 shows all attributes of ProcessKind_String.

846

Table 59 - Attributes of ESMPDataTypes::ProcessKind_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	ProcessTypeList	Main Core value Space.

847 **6.2.4.20 Status_String datatype**

848 The identification of the status of an object.

849 Table 60 shows all attributes of Status_String.

850

Table 60 - Attributes of ESMPDataTypes::Status_String

mult.	Attribute name	Attribute type	Description
[1..1]	value	StatusTypeList	Main Core value Space.

851 **6.2.4.21 YMDHM_DateTime datatype**852 In ESMP, the date and time as "YYYY-MM-DDThh:mmZ", which conforms with the ISO 8601
853 UTC time zone. This date and time is without the seconds.

854 Table 61 shows all attributes of YMDHM_DateTime.

855

Table 61 - Attributes of ESMPDataTypes::YMDHM_DateTime

mult.	Attribute name	Attribute type	Description
[1..1]	value	DateTime	The date and time as "YYYY-MM-DDThh:mmZ", which conforms with the ISO 8601 UTC time zone.

856 Table 62 shows all restrictions applied to the attributes of YMDHM_DateTime.

857

Table 62 - Restrictions of attributes for ESMPDataTypes::YMDHM_DateTime

Name	Constraint	Type	Expression of constraint
value	pattern	OCL	inv: self->Pattern((((([0-9]{4})[\\-])(0[13578] 1[02])[\\-])(0[1-9] 12 [0-9] 3[01])((([0-9]{4})[\\-])(([0469]) (11))[\\-])(0[1-9] 12 [0-9] 30))T(((0[1][0-9] 2[0-3]):[0-5][0-9])Z)((([13579][26][02468][048] 13579][01345789](0)[48] 13579][01345789][2468][048] 02468][048] 02468][1235679](0)[48] 02468][1235679][2468][048])[0-9][0-9][13579][26])[\\-](02)[\\-])(0[1-9] 1[0-9] 2[0-9])T(((0[1][0-9] 2[0-3]):[0-5][0-9])Z)((([13579][26][02468][1235679] 13579][01345789](0)[01235679] 13579][01345789][2468][1235679] 02468][048][02468][1235679] 02468][1235679](0)[01235679] 02468][1235679][2468][1235679])[0-9][0-9][13579][01345789])[\\-](02)[\\-](0[1-9] 1[0-9] 2[0-8])T(((0[1][0-9] 2[0-3]):[0-5][0-9])Z))
value	TruncationOrReduced	INV	choice=gYearMonthDayHourMinute

858 **6.2.5 Enumerations**

859 The list of enumerations used for the Energy account assembly model is as follows:

- 860 • BusinessTypeList
- 861 • ClassificationTypeList
- 862 • CodingSchemeTypeList
- 863 • CurrencyTypeList
- 864 • EnergyProductTypeList
- 865 • MessageTypeList
- 866 • ObjectAggregationTypeList
- 867 • ProcessTypeList
- 868 • RoleTypeList
- 869 • StatusTypeList

- 870 • UnitOfMeasureTypeList

871 7 XML schema

872 7.1 XML schema URN namespace rules

873 In order to provide a generic and stable means of declaring a URN for the European style
874 market profile XML schemas, the namespace will be composed in the following manner:

875 **urn:iec62325.351:tc57wg16:<process>:<document>:<version>:<release>**

876 where:

- 877 • iec62325.351 shall be the stem of all European style market profile XML schema
878 namespaces.
- 879 • tc57wg16 identifies the organisation or group of organisations within IEC that owns the
880 object being referenced. In the case of TC57 this shall be the WG16.
- 881 • <process> identifies the specific process where the object is situated, e.g. the part of the
882 IEC 62325 standards in which the XML schema is defined, e.g. 451-1, 451-2, 451-3, etc.
- 883 • <document> identifies the electronic document schema.
- 884 • <version> identifies the version of the document schema.
- 885 • <release> identifies the release of the document schema.

886 Every XML schema representing an electronic document shall have a default namespace
887 corresponding to the namespace that identifies the document and respects the above URI
888 namespace construction.

889 Every XML schema representing an electronic document shall have a targetNamespace
890 corresponding to the default namespace.

891 Every XML schema shall have an elementFormDefault as “qualified”.

892 Every XML schema shall have an attributeFormDefault as “unqualified”.

893 7.2 Code list URN namespace rules

894 In the case of the codelist library that shall be used for the European style market profile the
895 URN shall be as follows **urn:entsoe.eu:wgedi:codelists**.

896 7.3 URI rules for model documentation

897 7.3.1 Datatype

898 All the datatypes are documented in IEC 62325-351.

899 In the case of the base datatype library that shall be used for the European style market
900 profile, the URI shall use the sawsdl:modelReference as follows:

901 **http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[datatype-name]**

902 where:

- 903 • <CIM-version-year> is the year of the released CIM version used for generating market
904 profile.
- 905 • <cimxx> is the CIM version name.
- 906 • [datatype-name] is the name of the CIM datatype or primitive.

907 Examples:

908 <http://iec.ch/TC57/2012/CIM-schema-cim16#String>

909 <http://iec.ch/TC57/2012/CIM-schema-cim16#Money>

910 7.3.2 Class

911 In the case of the base class library that shall be used for the European style market profile,
912 the URI shall use the sawsdl:modelReference as follows:

913 **[http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#\[class-name\]](http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name])**

914 where:

915 • <CIM-version-year> is the year of the released CIM version used for generating market
916 profile

917 • <cimxx> is the CIM version name

918 • [class-name] is the name of the CIM class

919 Example: <http://iec.ch/TC57/2012/CIM-schema-cim16#TimeSeries>

920 **7.3.3 Attribute**

921 In the case of the base attribute library that shall be used for the European style market
922 profile, the URI shall use the sawsdl:modelReference as follows:

923 **[http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#\[class-name\].\[attribute-
924 name\]](http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name].[attribute-
924 name])**

925 where:

926 • <CIM-version-year> is the year of the released CIM version used for generating market
927 profile

928 • <cimxx> is the CIM version name

929 • [class-name] is the name of the CIM class

930 • [attribute-name] is the name of a class attribute

931 Example: <http://iec.ch/TC57/2012/CIM-schema-cim16#TimeSeries.product>

932 **7.3.4 Association end role name**

933 In the case of the base association library that shall be used for the European style market
934 profile, the URI shall use the sawsdl:modelReference as follows:

935 **[http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#\[class-name\].\[association-
936 end-role-name\]](http://iec.ch/TC57/<CIM-version-year>/CIM-schema-<cimxx>#[class-name].[association-
936 end-role-name])**

937 where:

938 • <CIM-version-year> is the year of the released CIM version used for generating market
939 profile

940 • <cimxx> is the CIM version name

941 • [class-name] is the name of the CIM class

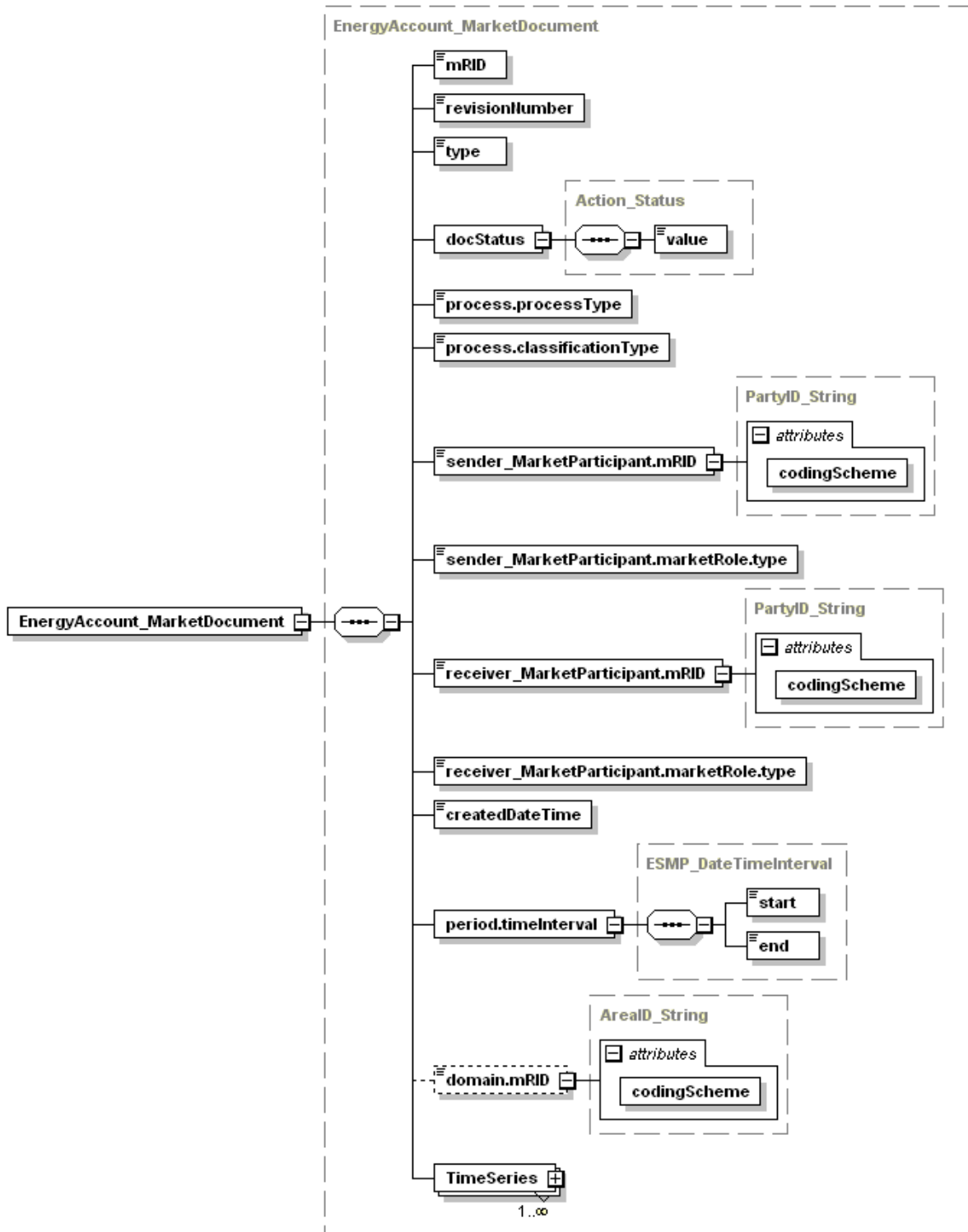
942 • [association-end-role-name]

943 Example: <http://iec.ch/TC57/2012/CIM-schema-cim16#MarketDocument.TimeSeries>

944 **7.4 EnergyAccount_MarketDocument schema**

945 **7.4.1 Schema Structure**

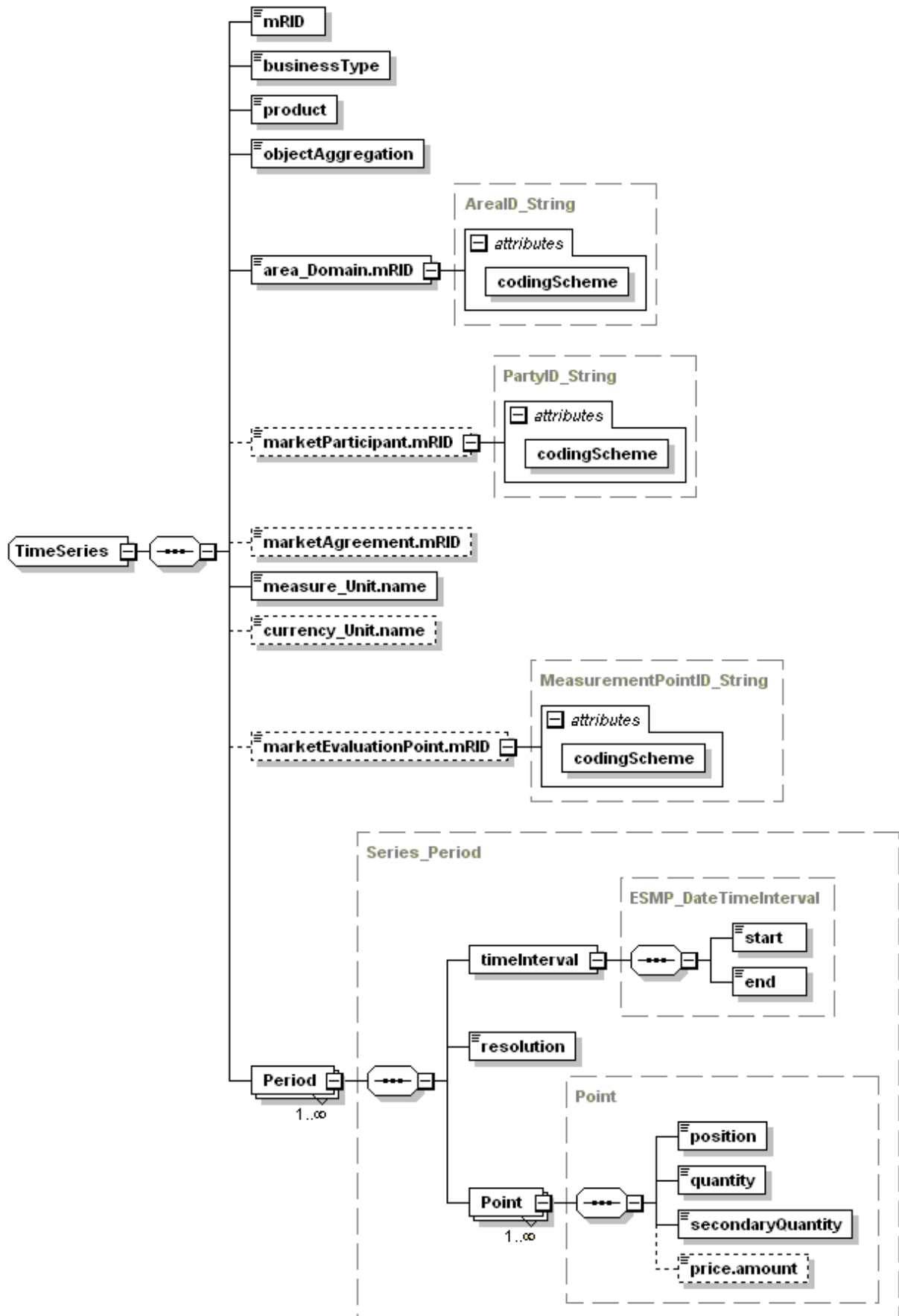
946 Figure 8 and Figure 9 provide the structure of the schema.



947

948

Figure 8 – EnergyAccount_MarketDocument XML schema structure 1/2



949

950

Figure 9 – EnergyAccount_MarketDocument XML schema structure 2/2

951 **7.4.2 Schema description**

```

952 <?xml version="1.0" encoding="utf-8"?>
953 <xs:schema xmlns:cl="urn:entsoe.eu:wgedi:codelists"
954 xmlns:sawsdl="http://www.w3.org/ns/sawsdl" xmlns="urn:iec62325.351:tc57wg16:451-
955 4:energyaccountdocument:3:0" xmlns:cimp="http://www.iec.ch/cimprofile"
956 attributeFormDefault="unqualified" elementFormDefault="qualified"
957 targetNamespace="urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:3:0"
958 xmlns:xs="http://www.w3.org/2001/XMLSchema">
959   <xs:import schemaLocation="urn-entsoe-eu-wgedi-codelists.xsd"
960 namespace="urn:entsoe.eu:wgedi:codelists" />
961   <xs:element name="EnergyAccount_MarketDocument" type="EnergyAccount_MarketDocument"
962 />
963   <xs:simpleType name="ID_String" sawsdl:modelReference="http://iec.ch/tc57#String">
964     <xs:restriction base="xs:string">
965       <xs:maxLength value="35" />
966     </xs:restriction>
967   </xs:simpleType>
968   <xs:simpleType name="ESMPVersion_String"
969 sawsdl:modelReference="http://iec.ch/tc57#String">
970     <xs:restriction base="xs:string">
971       <xs:pattern value="[1-9]([0-9]){0,2}" />
972     </xs:restriction>
973   </xs:simpleType>
974   <xs:simpleType name="MessageKind_String"
975 sawsdl:modelReference="http://iec.ch/tc57#String">
976     <xs:restriction base="cl:MessageTypeList" />
977   </xs:simpleType>
978   <xs:simpleType name="ProcessKind_String"
979 sawsdl:modelReference="http://iec.ch/tc57#String">
980     <xs:restriction base="cl:ProcessTypeList" />
981   </xs:simpleType>
982   <xs:simpleType name="ClassificationKind_String"
983 sawsdl:modelReference="http://iec.ch/tc57#String">
984     <xs:restriction base="cl:ClassificationTypeList" />
985   </xs:simpleType>
986   <xs:simpleType name="PartyID_String-base"
987 sawsdl:modelReference="http://iec.ch/tc57#String">
988     <xs:restriction base="xs:string">
989       <xs:maxLength value="16" />
990     </xs:restriction>
991   </xs:simpleType>
992   <xs:complexType name="PartyID_String"
993 sawsdl:modelReference="http://iec.ch/tc57#String">
994     <xs:simpleContent>
995       <xs:extension base="PartyID_String-base">
996         <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
997 use="required" />
998       </xs:extension>
999     </xs:simpleContent>
1000   </xs:complexType>
1001   <xs:simpleType name="MarketRoleKind_String"
1002 sawsdl:modelReference="http://iec.ch/tc57#String">
1003     <xs:restriction base="cl:RoleTypeList" />
1004   </xs:simpleType>
1005   <xs:simpleType name="ESMP_DateTime"
1006 sawsdl:modelReference="http://iec.ch/tc57#DateTime">
1007     <xs:restriction base="xs:dateTime">
1008       <xs:pattern value="((( [0-9]{4} ) [ - ] ( 0 [13578] | 1 [02] ) [ \ - ] ( 0 [1-9] | [12] [0-
1009 9] | 3 [01] ) | ( [0-9]{4} ) [ \ - ] ( ( 0 [469] ) | ( 11 ) ) [ \ - ] ( 0 [1-9] | [12] [0-9] | 30 ) ) T ( ( [01] [0-9] | 2 [0-
1010 3] ) : [0-5] [0-9] : [0-5] [0-
1011 9] ) Z ) | ( ( [13579] [26] [02468] [048] | [13579] [01345789] ( 0 ) [48] | [13579] [01345789] [2468] [048]
1012 | [02468] [048] [02468] [048] | [02468] [1235679] ( 0 ) [48] | [02468] [1235679] [2468] [048] | [0-
1013 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-
1014 9] : [0-5] [0-
1015 9] ) Z ) | ( ( [13579] [26] [02468] [1235679] | [13579] [01345789] ( 0 ) [01235679] | [13579] [01345789] [
1016 2468] [1235679] | [02468] [048] [02468] [1235679] | [02468] [1235679] ( 0 ) [01235679] | [02468] [123
1017 5679] [2468] [1235679] | [0-9] [0-9] [13579] [01345789] ) [ \ - ] ( 02 ) [ \ - ] ( 0 [1-9] | 1 [0-9] | 2 [0-
1018 8] ) T ( ( [01] [0-9] | 2 [0-3] ) : [0-5] [0-9] : [0-5] [0-9] ) Z ) " />
1019   </xs:restriction>

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1020     </xs:simpleType>
1021     <xs:simpleType name="AreaID_String-base"
1022     sawsdl:modelReference="http://iec.ch/tc57#String">
1023         <xs:restriction base="xs:string">
1024             <xs:maxLength value="18" />
1025         </xs:restriction>
1026     </xs:simpleType>
1027     <xs:complexType name="AreaID_String"
1028     sawsdl:modelReference="http://iec.ch/tc57#String">
1029         <xs:simpleContent>
1030             <xs:extension base="AreaID_String-base">
1031                 <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
1032                 use="required" />
1033             </xs:extension>
1034         </xs:simpleContent>
1035     </xs:complexType>
1036     <xs:simpleType name="Status_String"
1037     sawsdl:modelReference="http://iec.ch/tc57#String">
1038         <xs:restriction base="cl:StatusTypeList" />
1039     </xs:simpleType>
1040     <xs:complexType name="Action_Status"
1041     sawsdl:modelReference="http://iec.ch/tc57#Status">
1042         <xs:sequence>
1043             <xs:element minOccurs="1" maxOccurs="1" name="value" type="Status_String"
1044             sawsdl:modelReference="http://iec.ch/tc57#Action_Status.value">
1045                 </xs:element>
1046             </xs:sequence>
1047         </xs:complexType>
1048     <xs:simpleType name="YMDHM_DateTime"
1049     sawsdl:modelReference="http://iec.ch/tc57#DateTime">
1050         <xs:restriction base="xs:string">
1051             <xs:pattern value="((([0-9]{4}) [\-] (0[13578]|1[02]) [\-] (0[1-9]|12)[0-
1052 9]|3[01])|([0-9]{4}) [\-] ((0[469])|(11)) [\-] (0[1-9]|12)[0-9]|30))T((([01][0-9]|2[0-
1053 3]):[0-5][0-
1054 9])Z)|(((13579)[26][02468][048]|13579)[01345789](0)[48]|13579)[01345789][2468][048]
1055 |102468][048][02468][048]|02468][1235679](0)[48]|02468][1235679][2468][048]|0-
1056 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-
1057 9])Z)|(((13579)[26][02468][1235679]|13579)[01345789](0)[01235679]|13579)[01345789][
1058 2468][1235679]|02468][048][02468][1235679]|02468][1235679](0)[01235679]|02468][123
1059 5679][2468][1235679]|0-9][0-9][13579][01345789]) [\-] (02) [\-] (0[1-9]|1[0-9]|2[0-
1060 8])T((([01][0-9]|2[0-3]):[0-5][0-9])Z)" />
1061         </xs:restriction>
1062     </xs:simpleType>
1063     <xs:complexType name="ESMP_DateTimeInterval"
1064     sawsdl:modelReference="http://iec.ch/tc57#DateTimeInterval">
1065         <xs:sequence>
1066             <xs:element minOccurs="1" maxOccurs="1" name="start" type="YMDHM_DateTime"
1067             sawsdl:modelReference="http://iec.ch/tc57#ESMP_DateTimeInterval.start">
1068                 </xs:element>
1069             <xs:element minOccurs="1" maxOccurs="1" name="end" type="YMDHM_DateTime"
1070             sawsdl:modelReference="http://iec.ch/tc57#ESMP_DateTimeInterval.end">
1071                 </xs:element>
1072             </xs:sequence>
1073         </xs:complexType>
1074     <xs:complexType name="EnergyAccount_MarketDocument"
1075     sawsdl:modelReference="http://iec.ch/tc57#MarketDocument">
1076         <xs:sequence>
1077             <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
1078             sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1079                 </xs:element>
1080             <xs:element minOccurs="1" maxOccurs="1" name="revisionNumber"
1081             type="ESMPVersion_String"
1082             sawsdl:modelReference="http://iec.ch/tc57#Document.revisionNumber">
1083                 </xs:element>
1084             <xs:element minOccurs="1" maxOccurs="1" name="type" type="MessageKind_String"
1085             sawsdl:modelReference="http://iec.ch/tc57#Document.type">
1086                 </xs:element>
1087             <xs:element minOccurs="1" maxOccurs="1" name="docStatus" type="Action_Status"
1088             sawsdl:modelReference="http://iec.ch/tc57#Document.docStatus">
1089                 </xs:element>

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1090     <xs:element minOccurs="1" maxOccurs="1" name="process.processType"
1091 type="ProcessKind_String"
1092 sawsdl:modelReference="http://iec.ch/tc57#Process.processType">
1093     </xs:element>
1094     <xs:element minOccurs="1" maxOccurs="1" name="process.classificationType"
1095 type="ClassificationKind_String"
1096 sawsdl:modelReference="http://iec.ch/tc57#Process.classificationType">
1097     </xs:element>
1098     <xs:element minOccurs="1" maxOccurs="1" name="sender_MarketParticipant.mRID"
1099 type="PartyID_String"
1100 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1101     </xs:element>
1102     <xs:element minOccurs="1" maxOccurs="1"
1103 name="sender_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
1104 sawsdl:modelReference="http://iec.ch/tc57#MarketRole.type">
1105     </xs:element>
1106     <xs:element minOccurs="1" maxOccurs="1" name="receiver_MarketParticipant.mRID"
1107 type="PartyID_String"
1108 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1109     </xs:element>
1110     <xs:element minOccurs="1" maxOccurs="1"
1111 name="receiver_MarketParticipant.marketRole.type" type="MarketRoleKind_String"
1112 sawsdl:modelReference="http://iec.ch/tc57#MarketRole.type">
1113     </xs:element>
1114     <xs:element minOccurs="1" maxOccurs="1" name="createdDateTime"
1115 type="ESMP_DateTime"
1116 sawsdl:modelReference="http://iec.ch/tc57#Document.createdDateTime">
1117     </xs:element>
1118     <xs:element minOccurs="1" maxOccurs="1" name="period.timeInterval"
1119 type="ESMP_DateTimeInterval"
1120 sawsdl:modelReference="http://iec.ch/tc57#Period.timeInterval">
1121     </xs:element>
1122     <xs:element minOccurs="0" maxOccurs="1" name="domain.mRID" type="AreaID_String"
1123 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1124     </xs:element>
1125     <xs:element minOccurs="1" maxOccurs="unbounded" name="TimeSeries"
1126 type="TimeSeries"
1127 sawsdl:modelReference="http://iec.ch/tc57#MarketDocument.TimeSeries">
1128     </xs:element>
1129 </xs:sequence>
1130 </xs:complexType>
1131 <xs:simpleType name="Position_Integer"
1132 sawsdl:modelReference="http://iec.ch/tc57#Integer">
1133     <xs:restriction base="xs:integer">
1134         <xs:minInclusive value="1" />
1135         <xs:maxInclusive value="999999" />
1136     </xs:restriction>
1137 </xs:simpleType>
1138 <xs:simpleType name="Amount_Decimal"
1139 sawsdl:modelReference="http://iec.ch/tc57#Decimal">
1140     <xs:restriction base="xs:decimal">
1141         <xs:totalDigits value="17" />
1142     </xs:restriction>
1143 </xs:simpleType>
1144 <xs:complexType name="Point" sawsdl:modelReference="http://iec.ch/tc57#Point">
1145     <xs:sequence>
1146         <xs:element minOccurs="1" maxOccurs="1" name="position" type="Position_Integer"
1147 sawsdl:modelReference="http://iec.ch/tc57#Point.position">
1148         </xs:element>
1149         <xs:element minOccurs="1" maxOccurs="1" name="quantity" type="xs:decimal"
1150 sawsdl:modelReference="http://iec.ch/tc57#Point.quantity">
1151         </xs:element>
1152         <xs:element minOccurs="1" maxOccurs="1" name="secondaryQuantity"
1153 type="xs:decimal" sawsdl:modelReference="http://iec.ch/tc57#Point.secondaryQuantity">
1154         </xs:element>
1155         <xs:element minOccurs="0" maxOccurs="1" name="price.amount"
1156 type="Amount_Decimal" sawsdl:modelReference="http://iec.ch/tc57#Price.amount">
1157         </xs:element>
1158     </xs:sequence>
1159 </xs:complexType>
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1160     <xs:complexType name="Series_Period"
1161 sawsdl:modelReference="http://iec.ch/tc57#Period">
1162     <xs:sequence>
1163         <xs:element minOccurs="1" maxOccurs="1" name="timeInterval"
1164 type="ESMP_DateTimeInterval"
1165 sawsdl:modelReference="http://iec.ch/tc57#Period.timeInterval">
1166         </xs:element>
1167         <xs:element minOccurs="1" maxOccurs="1" name="resolution" type="xs:duration"
1168 sawsdl:modelReference="http://iec.ch/tc57#Period.resolution">
1169         </xs:element>
1170         <xs:element minOccurs="1" maxOccurs="unbounded" name="Point" type="Point"
1171 sawsdl:modelReference="http://iec.ch/tc57#Period.Point">
1172         </xs:element>
1173     </xs:sequence>
1174 </xs:complexType>
1175 <xs:simpleType name="BusinessKind_String"
1176 sawsdl:modelReference="http://iec.ch/tc57#String">
1177     <xs:restriction base="cl:BusinessTypeList" />
1178 </xs:simpleType>
1179 <xs:simpleType name="EnergyProductKind_String"
1180 sawsdl:modelReference="http://iec.ch/tc57#String">
1181     <xs:restriction base="cl:EnergyProductTypeList" />
1182 </xs:simpleType>
1183 <xs:simpleType name="ObjectAggregationKind_String"
1184 sawsdl:modelReference="http://iec.ch/tc57#String">
1185     <xs:restriction base="cl:ObjectAggregationTypeList" />
1186 </xs:simpleType>
1187 <xs:simpleType name="MeasurementUnitKind_String"
1188 sawsdl:modelReference="http://iec.ch/tc57#String">
1189     <xs:restriction base="cl:UnitOfMeasureTypeList" />
1190 </xs:simpleType>
1191 <xs:simpleType name="CurrencyCode_String"
1192 sawsdl:modelReference="http://iec.ch/tc57#String">
1193     <xs:restriction base="cl:CurrencyTypeList" />
1194 </xs:simpleType>
1195 <xs:simpleType name="MeasurementPointID_String-base"
1196 sawsdl:modelReference="http://iec.ch/tc57#String">
1197     <xs:restriction base="xs:string">
1198         <xs:maxLength value="35" />
1199     </xs:restriction>
1200 </xs:simpleType>
1201 <xs:complexType name="MeasurementPointID_String"
1202 sawsdl:modelReference="http://iec.ch/tc57#String">
1203     <xs:simpleContent>
1204         <xs:extension base="MeasurementPointID_String-base">
1205             <xs:attribute name="codingScheme" type="cl:CodingSchemeTypeList"
1206 use="required" />
1207         </xs:extension>
1208     </xs:simpleContent>
1209 </xs:complexType>
1210 <xs:complexType name="TimeSeries"
1211 sawsdl:modelReference="http://iec.ch/tc57#TimeSeries">
1212     <xs:sequence>
1213         <xs:element minOccurs="1" maxOccurs="1" name="mRID" type="ID_String"
1214 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1215         </xs:element>
1216         <xs:element minOccurs="1" maxOccurs="1" name="businessType"
1217 type="BusinessKind_String"
1218 sawsdl:modelReference="http://iec.ch/tc57#TimeSeries.businessType">
1219         </xs:element>
1220         <xs:element minOccurs="1" maxOccurs="1" name="product"
1221 type="EnergyProductKind_String"
1222 sawsdl:modelReference="http://iec.ch/tc57#TimeSeries.product">
1223         </xs:element>
1224         <xs:element minOccurs="1" maxOccurs="1" name="objectAggregation"
1225 type="ObjectAggregationKind_String"
1226 sawsdl:modelReference="http://iec.ch/tc57#TimeSeries.objectAggregation">
1227         </xs:element>

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1228     <xs:element minOccurs="1" maxOccurs="1" name="area_Domain.mRID"
1229 type="AreaID_String"
1230 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1231     </xs:element>
1232     <xs:element minOccurs="0" maxOccurs="1" name="marketParticipant.mRID"
1233 type="PartyID_String"
1234 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1235     </xs:element>
1236     <xs:element minOccurs="0" maxOccurs="1" name="marketAgreement.mRID"
1237 type="ID_String" sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1238     </xs:element>
1239     <xs:element minOccurs="1" maxOccurs="1" name="measure_Unit.name"
1240 type="MeasurementUnitKind_String"
1241 sawsdl:modelReference="http://iec.ch/tc57#Unit.name">
1242     </xs:element>
1243     <xs:element minOccurs="0" maxOccurs="1" name="currency_Unit.name"
1244 type="CurrencyCode_String" sawsdl:modelReference="http://iec.ch/tc57#Unit.name">
1245     </xs:element>
1246     <xs:element minOccurs="0" maxOccurs="1" name="marketEvaluationPoint.mRID"
1247 type="MeasurementPointID_String"
1248 sawsdl:modelReference="http://iec.ch/tc57#IdentifiedObject.mRID">
1249     </xs:element>
1250     <xs:element minOccurs="1" maxOccurs="unbounded" name="Period"
1251 type="Series_Period" sawsdl:modelReference="http://iec.ch/tc57#TimeSeries.Period">
1252     </xs:element>
1253 </xs:sequence>
1254 </xs:complexType>
1255 </xs:schema>
```