Minutes: NMEG meeting **Date:** Tuesday and Wednesday September 9th and 10th, 2025 **Time:** 09:00 – 17:00 and 09:00 – 15:00 **Place:** Svenska kraftnät's offices in Sundbyberg	**NMEG** Nordic Market Expert Group
October 14th, 2025	

Present: Jan (DK), Energinet
Jan (SE), Svenska kraftnät
Jon-Egil, Statnett (convenor)
Mario, Elhub
Ove, Edisys (secretary) (via Teams)
Søren, Nordic RCC (during item 15 on day 2 via Teams)
Teemu H, Fingrid
Teemu K, Fingrid Datahub

To (NMEG): Anne Stine, Elhub
Christian, Energinet
Jan (DK), Energinet
Jan (SE), Svenska kraftnät
Jon-Egil, Statnett (convenor)
Mario, Elhub
Miika, Fingrid
Ove, Edisys (secretary)
Rasmus, Energinet
Teemu H, Fingrid
Teemu K, Fingrid Datahub

CC: Bent Atle, Edisys
Fedder, Energinet
Hans Erik, Elhub
Pamina, Energinet
Tage, Energinet

To (Invited guests): Antti, eSett
Søren, Nordic RCC
Tommy, eSett
Tuomas L, eSett
Tuomas P, eSett

Appendix A: Overview of Nordic memberships in international standardisation bodies
Attachment: None

1 Approval of agenda

The agenda was approved with the following additions:

- Changes to CIM due to new requirements from the Danish DataHub, see item 9.4.
- MarketParticipant vs Customer for the "Final Customer", see item 9.5.

2 Approval of previous meeting minutes

The previous meeting minutes were approved.

3 Alternative to Unicorn Mades (ECP) End Point in the GO language from Energinet

Background: Energinet has developed an alternative to the Unicorn Mades (ECP) End Point in the GO language that is 100 times faster than and uses 100 times less resources than the alternative from Unicorn. Energinet and Statnett will run a pilot project to test it out.

References (links):

What to decide, discuss or inform: Status for finalising and implementation of the new ECP End Point software.

Unicorn Mades (ECP) End Point in the GO language is up and running at Energinet.

4 Nordic Dynamic dimensioning project

Background: The Nordic Dynamic dimensioning project will make an optimisation of the mFRR market. It is a Nordic TSO project based on AI. It should be relevant for NMEG when the project comes to data exchange between the TSOs.

References (links):

What to decide, discuss or inform: Status for the project.

Jon-Egil informed that there is no news for the time being.

5 Status from NEX (Nordic ECP/EDX Group)

Background: NIT has taken over the responsibility for NEX (Nordic ECP/EDX Group), former "ECP/EDX Centre of Excellence". However, NMEG will be kept informed of progress in the group.

Further, NIT has approved the establishment of a short-term secure communication platform and short-term ECP requirements. However we will also have to investigate long-term solutions. It is NEX responsibility to do the work. NMEG will follow up and supervise.

References (links):

What to decide, discuss or inform: Status from NEX.

5.1 How to handle the new NMEG strategic action: "Establish a secure Nordic Communication platform"?

Background: NIT has approved the establishment of a short-term secure communication platform. It is NEX responsibility to do the work. NMEG will follow up and supervise.

References (links): From the NMEG roadmap:

> *NMEG will together with the Nordic TSOs specify and establish a secure Nordic Communication platform for secure information exchange between the Nordic TSO organisations in case of a major IT incident and/or any secure communication need between the Nordic TSOs.*

What to decide, discuss or inform: Status for the project

This is an ongoing task where the actual work is done in NEX. Jon-Egil is following the task as NMEG representative.

Jon-Egil informed that there is no news for the time being.

5.2 How to handle the new NMEG strategic action: "Establish new ECP requirements"?

Background: NIT has approved the establishment of a short-term ECP requirements. However we will also have to investigate long-term solutions. The NEX group is the one who have the knowledge and the one to making the first draft of an ECP recommendation. NMEG will follow up and supervise.

References (links): From the NMEG roadmap:

> *NMEG will establish new ECP requirements to be sure that ECP will be compliant with the future TSO needs.*

This is also a task where the actual work is done in NEX and where Jon-Egil is the NMEG representative.

Jon-Egil informed that NEX is working on these requirements.

6 Support to Nordic RCC

Background: The Nordic RCC is a central body in the Nordic energy market with need for common data exchange standards, hence a natural member of NMEG.

References (links): None.

What to decide, discuss or inform: Update of BRSs, MRs for CIM and/or ESMP, etc. All based on Nordic RCC needs.

Jon-Egil informed that NRCC is migrating to 15 minutes reporting and that they have made a new application that taking over for NOIS, i.e. to handle the Hansa capacity process.

6.1 Status for missing Reason Type Code for availability plans for Nordic RCC

Continued action:

- Rasmus will make a draft MR to ENTSO-E (Ove has sent an example MR as a template to Rasmus).
- The MR will be discussed at a coming NTC meeting, when an MR is available.

Continued action:

- Jan (DK) is asked to find a status for the action item above.

7 Support to the NBM project

Background: The NBM-project (Nordic Balancing Model) is going forward and there is a need for several new CIM based documents.

References (links): http://nordicbalancingmodel.net/

What to decide, discuss or inform: Status for the NBM project and possible task for NMEG.

7.1 Alignment of NMEG BRSs and NBM BRSs/IGs

7.1.1 BRS for Nordic trading system

The item was postponed

Continued action:

- Ove will continue the update of the parts of the BRS for Nordic trading system that are agreed by NMEG.
- All are asked to verify if the Currency exchange rate document is used anymore.

7.1.2 BRS for BRS for Operate

Ove will add ERRP Planned Resource Schedule Document (from BRS for Schedules) as the last arrow 5.4 going from SO to SO (loop) in BRS for Operate to be published ASAP (and added to the latest big update).

The comments in the BRS were reviewed after moving of a set of "pricing-documents" from the BRS for Trade to the BRS for Operate at the previous meeting.

Further, it was agreed to add ERRP Planned Resource Schedule Document (copied from BRS for Schedules) as the last arrow 5.4 going from SO to SO (loop) in BRS for Operate to be published ASAP (and added to the latest big update). Jon-Egil shared the document "Satisfied Demand" as input for the addition of ERRP Planned Resource Schedule Document.

Action:

- Ove will update the BRS according of the remining comments in the BRS.
- Ove will add ERRP Planned Resource Schedule Document (copied from BRS for Schedules) as the last arrow 5.4 going from SO to SO (loop) in BRS for Operate to be published ASAP (and added to the latest big update).
- Jon-Egil will verify if the old dependency matrix for the Balancing Market Document still is in use.

7.2 Status for addition of marketProductType and two new Market Product Type codes to Reserve Allocation Result Market Document, ref. MR NMEG/2024-222.

To remember item:

- We will await update of the BRS for Trade until version 6.5 of the Reserve Allocation Result Market Document is published by ENTSO-E.
- The unofficial version will stay published at the NMEG webpage until an official version is published by ENTSO-E. We include a disclaimer saying that this version of the document is approved by CIM WG but not yet official published by ENTSO-E.

8 Support to NBS (eSett)

Background: NMEG has made a set of BRSs for NBS (Nordic Balance Settlement). NMEG has also drafted a set of documents, both based on older ENTSO-E and ebIX® standards, and newer based on CIM. These BRSs and messages needs to be maintained and extended based on new requirements from the market.

Further, eSett is working on the migration of all exchanges to CIM based documents, however there's a lot to take in and it's not urgent from eSett perspective, the migration is expected to be something like:

1) eSett wait until NMEG has finalised some batch of CIM documents.
2) eSett confirm that they work for our purposes.
3) eSett and TSOs (eSett's SLA group) evaluate together when could be the suitable time to start the implementation in eSett. E.g. is it better timing to start in Q3-Q4 this year or postpone it to 2026. This is heavily dependent on other upcoming market changes.

4) eSett start to migrate the new CIM documents.
5) Once the new CIM documents have been implemented successfully in eSett, there is a minimum of 2-year transition period where we support both current non-CIM and the CIM documents in parallel to give market participants sufficient time to adapt to the change.

References (links): https://ediel.org/nordic-balance-settlement-nbs/
What to decide, discuss or inform: Status for the updates and extensions of/to NBS BRSs and documents.

8.1 CIM for NBS

The comments and questions in the document "Mapping of NBS documents to CIM" were reviewed and agreed.

Action:

- Ove will update the CIM for NBS document and send it to NMEG for comments.
- Ove will update the BRS for master data according to comments in the CIM for NBS document.

8.2 Status for addition of flowCommodityOption to the Activation document (MR NMEG/2025-230)

To remember item:

- We will wait for approval and publication of the Activation document by ENTSO-E before we do any changes to the NBS BRS. The MR is approved by CIM WG but not yet published by ENTSO-E. The reason for awaiting update is that the estimated time schedule for implementation and usage for this change is anyway still quite far in the future. So, there's most likely plenty of time to wait.

9 Status and update of Nordic BRSs and other documents if needed

Background: NMEG is responsible for a set of BRSs and other documents, such as the NMEG code list, which are published at www.ediel.org.
References (links): None.
What to decide, discuss or inform: Update of BRSs and other documents if needed.

9.1 NMEG CIM master data documents

9.1.1 Continue the discussions with Jan (SE)'s colleagues from Svenska kraftnät

The discussions with Jan (SE)'s colleagues from Svenska kraftnät who are working with the future "master data system" continued.

Among others NTC was asked to make MRs for increasing the cardinality of the association from MarketParticipant to MarketRole (Agent Role) and the association from RegisteredResource to MarketParticipant.

Action for NTC:

- NTC is asked to make MRs for increasing the cardinality of the:
  - Association from MarketParticipant to MarketRole (Agent Role)
  - Association from RegisteredResource to MarketParticipant

9.1.2 Update the BRS for master data after agreement of the Area configuration document

Ove had as action to update the BRS for master data after agreement of the Area configuration document in CIM WG (NMEG/2025-224). However, the MR needed a re-discussion in the ESMP SG, hence the approval in CIM WG is postponed until next CIM WG August 20th.

Status:

- The MR was approved at the CIM WG meeting August 20th.

Action:

- Ove will update the BRS for master data, i.e. Area configuration document and the updates related to CIM for NBS, send it on circulation for comments to NMEG for one week and finally publish it.

9.1.3 Status for MR for addition of associations from MarketParticipant to DateAndOrTime and to Process

- MR NMEG 2025 232 - Add association from MarketParticipant to DateAndOrTime in CIM-Market

  Conclusion:
  - We will argue to keep MR NMEG 2025 232 as original suggested

- MR NMEG 2025 233 - Add association from MarketParticipant to Process in CIM-Market and ESMP

  Conclusion:
  - We withdraw MR NMEG 2025 233, since the process attribute is not exchanged by NBM for the time being.

Item closed.

9.2 BRS for Nordic Scheduling and Ancillary Services Processes: ERRP Planned Resource Schedule Document

Continued action:

- Denmark will investigate if Business types **A10** and **A12** still are used for Ancillary services schedules in Denmark.

9.3 Update of NMEG code list (if applicable)

Approval of new Reason code reserved by Statnett:

Code	Name	Description	Conclusion
ZA9	***Reserved by Statnett:*** Planned ramping adjustment	Adjustment caused by ramping production plans.	TBD

Conclusion:

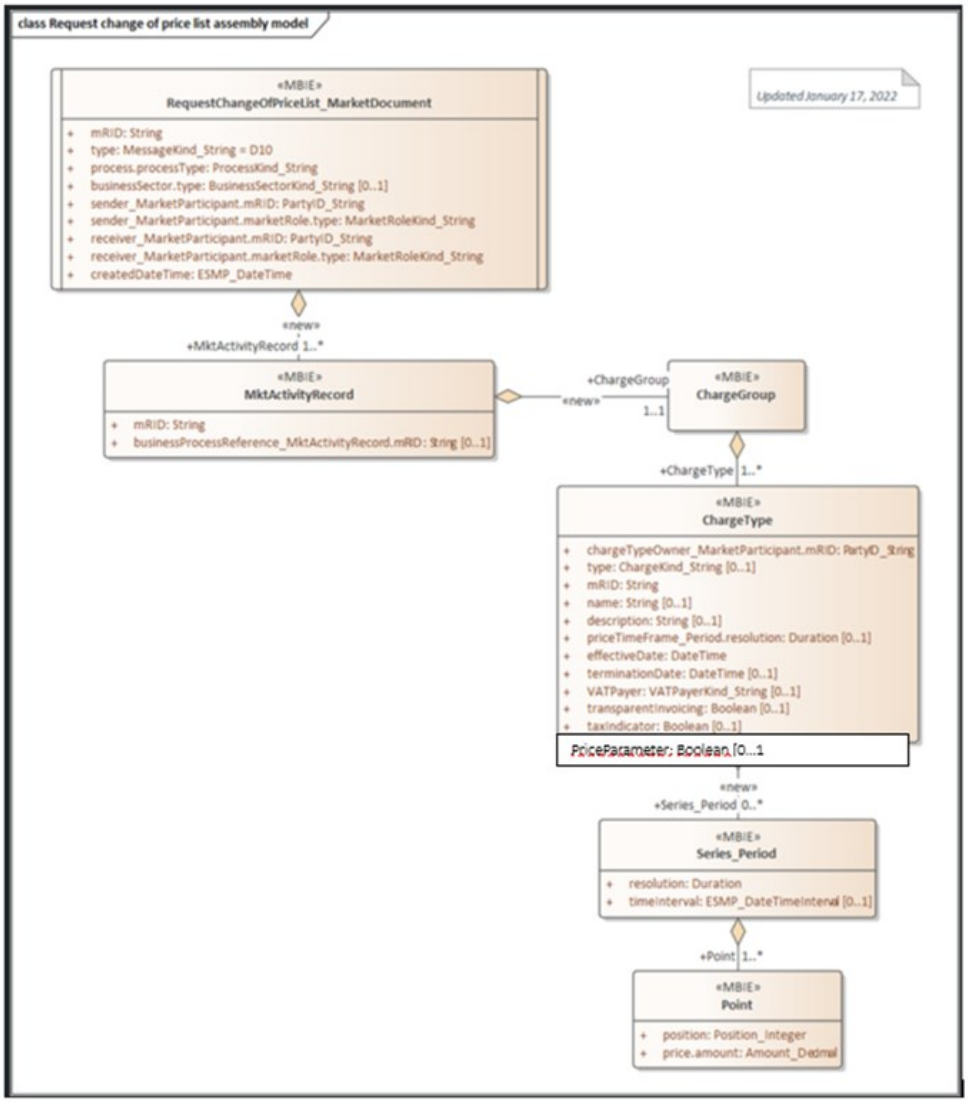
- Approved

Action:

- Ove will update the code list

9.4 Changes to CIM due to new requirements from the Danish DataHub

From Jan (DK):

1. For the schema Request change of price list, we would like to hear if it is possible to add an extra attribute to control whether it is possible to change price back in time
    a. We would like to save information, so we can use it to handle the time parameters:
        i. Prices that are spot price related can be submitted with -7 calendar days
        ii. Prices that are not spot price related can be submitted with +31 days
    b. Could it be built just like a tax-indicator?
    c. 

Conclusion:

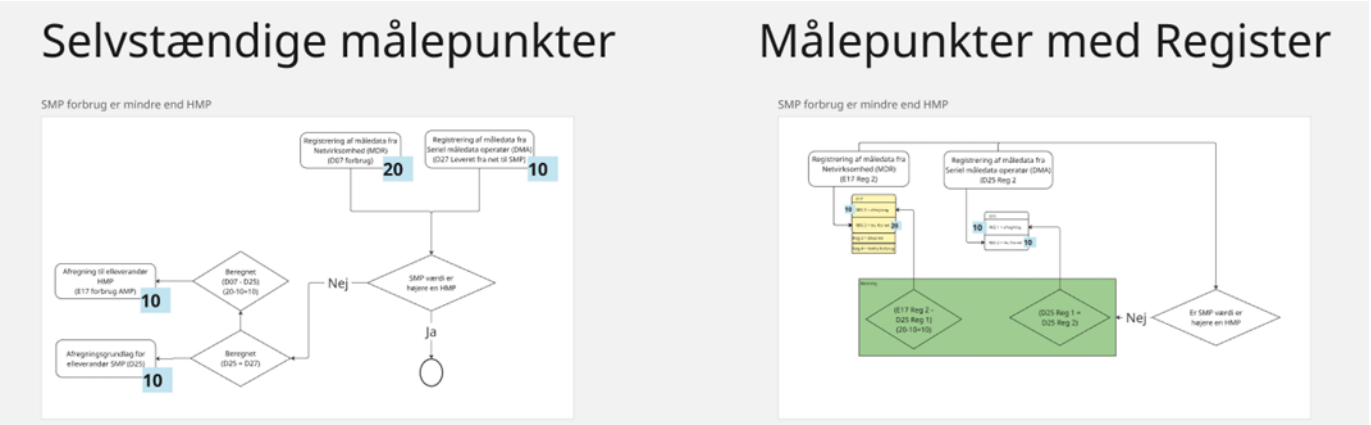
- We suggest adding a “PricingCategory: string” (enumeration)
- For the time being it will be a Danish specialty

Item closed.

***

2. An idea for using a MeteringPoint with more time series then one
    a. In Denmark we are discussion the possibility to use a simpler structure of MeteringPoints then the parent child relation we have today
        i. I have a small presentation I would like to show you.

b. We would like to hear NMEG opinion on this idea?
   i. Is it possible within CIM?
   ii. What do you think?



In short, the proposal is using a register ID for each timeseries that is exchanged (e.g. for each solar panel, car battery etc.) instead of a creating a new MeteringPoint for each of these timeseries. This will simplify the registration in the DataHub, since you don't have to register the address, contact information etc. for each timeseries.

Conclusion:

- NMEG supports the idea, and Denmark is asked to continue the discussion.

Item closed.

9.5 MarketParticipant vs Customer for the "Final Customer"

NTC brought up a discussion if we should continue using the MarketParticipant class (and related classes) also in the downstream market or if we should go for the Customer class (and related classes) from the Enterprise package. The latter seems to be more fit for the downstream market.

Conclusion:

- We will make a presentation showing:
  - Examples of classes under discussion, such as MarketParticipant vs Customer and MarketAgreement vs CustomerAgreement
  - Arguments and consequences for and against
  - Having the alternative of making "Customer classes" in parallel to the "MarketParty classes" under the Market package

  Thereafter we will bring the presentation to ESMP SG, TF16 and for information to CIM WG.

Action:

- Ove will make a draft presentation (discussion basis) for MarketParticipant vs Customer for the "Final Customer" to be first discussed in NTC and thereafter presented to ESMP SG, TF16 and for information to CIM WG.

10 Status for MRs to ENTSO-E

Background: NMEG regularly sends Maintenance Requests (MR) to ENTSO-E.
References (links): The MRs can be downloaded from our NMEG Teams Team.
What to decide, discuss or inform: Review and update of statuses for the NMEG MRs

Status:

MR #	Content	Status
NMEG/2024-215	Add association Related_MarketParticipant from TimeSeries class to MarketParticipant class in the Activation Market Document	***20250424***: • Agreed by ESMP SG ***20250604:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG June 11th
NMEG/2024-216	Add settlementMethod, MktPSRType, Reason and flowComodityOption + change cardinality of Market Participant	***20250424***: • Agreed by ESMP SG ***20250604:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG June 11th
NMEG/2024-217 Redmine # 7035	Addition of a Category attribute to EnergyMarket class in IEC/Market and ESMP	***20241023***: • Approved in CIM WG. ***20250128*** • The MR is added to Redmine issue 7035. • Jan (SE) will follow up. ***20250225***: • TF16 suggest adding the Category attribute to TimeSeries instead of EnergyMarket (as originally proposed in NMEG MR 2022/205), which also is OK for NMEG. • Jan (SE) will follow up. • ***The suggested solution is to first add the category attribute to the TimeSeries classes in IEC 62325-301 and in IEC 62325-351 (ESMP).*** ***20250320***: • We will resubmit the MR adding the Category attribute to TimeSeries instead of to the EnergyMarket class, however after having discussed the new proposal with Svein in an NTC. If still agreed after verification by Svein, the MR will be resubmitted to ESMP SG and thereafter to WG16. • Ove will update the MR. ***20250402 (NTC):*** • We will suggest rephrasing the descriptions (notes) of the enumeration CategoryTypeList to remove references to auctions. • Svein also suggest to extend the code list with SuperPeak, MidPeak, Valley, DeepValley.

MR #	Content	Status
		However, these will not be used in market exchanges in the near future, hence not added to our MR. See also https://energy.referencedata.eu/ ***Action:*** ○ Ove will update the MR by changing EnergyMarket to TimeSeries and suggest removing references to "auction" in the definitions of the CategoryTypeList. ***20250403:*** • Submitted to BW for re-review by ESMP SG, UCA TF 16 and finally CIM WG. ***20250424*:** • Agreed by ESMP SG - Jan will resubmit to TF16 Redmine 7035 ***20250604:*** • Jan resubmitted to TF16 Redmine https://redmine.ucaiug.org/issues/7035 ***202509010:*** • Approved by CIM WG June 11th
NMEG/2024-218	Update of Role Type descriptions in the ENTSO-E code list	***20240904, 20241007 and 20241023*:** • Reviewed by NMEG and agreed. ***20250128:*** • Jan (SE) submitted the MR to ENTSO-E September 4th, 2024. ***20250225 and 20250320*:** • The MR is still discussed (ongoing) - Jan (SE) will follow up. ***20250320*:** • Ove will send a reminder to Bhagyashree for bringing the MR to nest ESMP SG meeting. ***20250327*:** • On the ESMP SG meeting agenda for March 27th. • The MR was part of the list of meeting documents, but not mentioned in the agenda nor in the minutes – maybe forgotten? ***20250507:*** • Ove will send a reminder to BW ***20250604:*** • The MR was updated and re-sent to BW.

MR #	Content	Status
		20250703: • Discussed in ESMP SG; The MR will be taken to CIM WG to get feedback on what roles are currently under use and which roles can be removed. ***202509010:*** • Under discussion
NMEG/2024-220	Update of ENTSO-E EDI best practices document	***20241007:*** • Approved by NMEG and will be forwarded to ENTSO-E. ***20241023, 20250128, 20250225, 20250320, 20250507, 20250604 and 20250910*:** • Ongoing, i.e. being discussed withing CIM WG.
NMEG/2024-223 Redmine # 7170	Add the new class CommunicationDetail to CIM_Market and ESMP	***20241216*:** • First review by NMEG • To be submitted to ENTSO-E/IEC early 2025 ***20250108*:** • Reviewed by NTC and agreed. • The MR was sent to Jon-Egil for submission to ENTSO-E/IEC. ***20250114*:** • Reviewed and approved by ENTSO-E ESMP SG ***20250128*:** • Was brought up at the CIM WG meeting January 23rd. • If approved the MR will be sent to IEC WG13/WG14/WG16 as a discussion basis. ***20250225:*** • Approved in CIM WG • Jan (SE) will add the issue to Redmine when asked to – to be continued. ***20250320:*** • Jan (SE) submitted the MR to Redmine and will bring it up in WG16. ***20250507, 20250604 and 20250910:*** • No news
NMEG/2025-224	Add ObjectType to Area Configuration Document in ESMP	***20250403:*** • Submitted to BW for approval by ESMP SG and CIM WG. ***20250424:*** • Agreed in ESMP SG

MR #	Content	Status
		• Ove has renamed MeteringGridAreaKind_String to AreaSubKind_String ***20250604:*** • MGA_Domain renamed to SubArea_Domain • Sent to ESMP SG for approval June 5th and CIM WG June 11th ***20250820:*** • Agreed in CIM WG
NMEG/2025-225	Add SettlementAmount to ERRP Reserve Allocation Result in ESMP 20250402	***20250403:*** • Submitted to BW for approval by ESMP SG and CIM WG. ***20250424:*** • Agreed in ESMP SG • Ove has renamed SettlementAmount_Price to Financial_Price ***20250604:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG June 11th
NMEG/2025-226	Add ObjectType to the MarketParticipant class in ESMP	***20250403:*** • Submitted to BW for approval by ESMP SG and CIM WG. ***20250424:*** • Agreed in ESMP PG ***20250522:*** • Rediscussed in ESMP PG ○ The updated MR will be rediscussed in the next ESMP SG meetings. ○ Use case description must be elaborated for this MR to provide more context on the criteria for the codes Household customer, Deceased household customer, Company customer, Estate company customer. ***20250604:*** • The MR was updated by NMEG and forwarded to ESMP SG for review on June 5th ***202509010:*** • Approved by CIM WG August 20th
NMEG/2025-227	Add SettlementMethodKind and	***20250514:*** • Agreed in NTC and forwarded to BW

MR #	Content	Status
	SettlementMethodTyppeList to the ENTSO-E code list	***20250522:*** • Agreed in ESMP PG ***20250604:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG August 20th
NMEG/2025-228	Add a new quality code for "Temporary" to the QualityTypeList	***20250514:*** • Agreed in NTC and forwarded to BW ***20250522:*** • Agreed in ESMP PG ***202506043:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG August 20th
NMEG/2025-229	Add a new CodingSchemeTypeList code for ISO to the CodingSchemeTypeList	***20250514:*** • Agreed in NTC and forwarded to BW ***20250522:*** • Agreed in ESMP PG ***20250604:*** • Sent for approval by CIM WG on June 11th ***202509010:*** • Approved by CIM WG August 20th
NMEG/2025-230	Add flowCommodityOption to Activation Market Document	***20250703:*** • Discussed in ESMP SG; The MR will be re-discussed in the next meeting with an updated diagram of the Activation document where the Market Participant (instead of TimeSeries) is associated with the Accounting Point with a cardinality 0…*. ***20250828:*** • Approved by ESMP SG ***202509010:*** • Approved by CIM WG August 20th
NMEG/2025-231	Change the cardinality of the association from MktActivityRecord to Process to [0..*] in ESMP	***20250627:*** • NTC suggest skipping this MR for the time being. The reason being that both NBS and NBM seems to use the association from MarketParticipant to Process instead of the association from MktActivityRecord to Process. Yet, it may be a need to specify the process(es)

MR #	Content	Status
		for which the whole set of information (master data) is valid. ***20250819:*** • ***OK*** ***202509010:*** • Withdrawn by NMEG (not used)
NMEG/2025-232	Add association from MarketParticipant to DateAndOrTime in CIM-Market and ESMP	***20250703:*** • Discussed in ESMP SG; The MR will be re-discussed in the next ESMP meeting after evaluating the possibility of introducing the Market Activity Record class and identifying relevant links to it, aiming to simplify the design and align with other ongoing Master Data exchange requirements that utilize this class. ***20250819:*** • ***We want the original suggestion*** ***20250828:*** • 20250828: The MR will be re-discussed in the next ESMP SG meetings. Example of use cases will be provided to clarify requirement for the change request. ***20250904:*** • ***NTC want the original suggestion*** ***202509010:*** • We will argue in ESMP SG to keep the original suggestion.
NMEG/2025-233	Add an association from MarketParticipant to Process in both TC57CIM/Market and in ESMP	***20250703:*** • Discussed in ESMP SG; The MR will be re-discussed in the next ESMP meeting after evaluating the possibility of introducing the Market Activity Record class and identifying relevant links to it, aiming to simplify the design and align with other ongoing Master Data exchange requirements that utilize this class. ***20250819:*** • ***We want the original suggestion*** ***20250828:*** • 20250828: The MR will be re-discussed in the next ESMP SG meetings. Example of use cases will be provided to clarify requirement for the change request.

MR #	Content	Status
		20250904: • *NTC ask if we should withdraw the MR, since it doesn't seem to be used* ***202509010:*** • Withdrawn by NMEG (not used)

11 Status for publication of ESMP v5 and establishing a status log for MRs to ENTSO-E

Bhagyashree is working on it. A draft version of the EA model and the first updated xml schemas are published at the ESMP SG web pages on the ENTSO-E extranet.

12 Review of statistics for usage of ediel.org

The statistics was reviewed, and it was commented that the website is more used than expected.

13 Report from JWG, with a special focus on datahub topics (fixed item on the agenda)

Background: The Joint Working Group (JWG) is formed from experts being nominated by the DSO Entity and ENTSO-E. In addition to those experts, three different Task Forces (TFs) with nominated representatives from both organisations have been created with the aim of supporting the goals of the JWG. The main tasks of these TFs are:

TF1: *"Monitoring Implementing Regulations (MIR)"*
- Develop guidance to assist Member States in reporting national practices concerning access to metering data.
- Collect and monitor national practices on the implementation of the reference models for this access.

TF2: *"Developing Implementing Regulations (DIR)"*
- Contributing to developing future implementing acts: customer switching [change of supplier] and demand response.

TF3: *"Data Interoperability Modelling (DIM)"*
- Keep a repository (roles, use cases and information objects) and ensure consistency of the reference models in the Implementing Acts.
- Map the reference model to standard models and, when necessary, propose amendments, extensions, and profiles for these standard models.
- Interact and collaborate with standardization organizations.

References (links):
What to decide, discuss or inform: Status in the TFs.

There was a TF3 physical meeting in Hannover September 2nd and 3rd.

14 NMEG Technical Committee (NTC)

Background: At the NMEG meeting November 2019, it was agreed to establish a NMEG CIM-XML Subgroup that will make Nordic CIM based XML documents. The following tasks are prioritised (updated at NMEG meeting February 2025):

a) Review of needed MRs in Appendix A and (at least) submit MRs that are needed for more than one country.
b) Finalise BRS for change of supplier, i.e. addition of new document for "End of supply"
c) Start on new BRS for exchange of Accounting Point characteristics
d) Continue CIM model of the grid part of the Elhub Information Model (EIM)

The members of NMEG CIM-XML Subgroup are Bent Atle, Christian, Jan (DK), Jan (SE), Jon-Egil, Mario, Rasmus, Svein, Teemu H, Teemu K and Ove.

References (links):
What to decide, discuss or inform: Status for replacing older ebIX® and ENTSO-E xml documents by CIM based documents.

14.1 Report from NTC meeting Wednesday September 4th, 2025

Present: Jan (SE), Jan (DK), Mario, Ove, Svein and Teemu K.

Svein informed that he is participating in the "Comodas project" that among others is working on extending the Scheduling Area structure. He presented the part of the outcome from the project that is relevant for the Nordic data hubs, see "**Appendix B** Status for CIM objects that can be used within a datahub".

Actions:

- Svein will distribute the CIM Extension packages containing the new CIM object from the "Comodas project".
- Mario and Svein will do a first mapping from Elhub BIM to CIM.

***

Ove had made a set of MRs based on the BRS for change of supplier and the first of them was reviewed:

NMEG/2025 234: Add Customer and CustomerNotification classes to ESMP + association MarketParticipant – Customer

- The original suggestion was adding preferredContactMethod to MarketAgreement and add an association from MarketAgreement to MarketParticipant + Adding the protectedInformation attribute to the MarketParticipant class.
- However, Ove has suggested a new solution, i.e. using the Customer class from the CIM/Enterprise/Common package instead of the MarketParticipant class for the Final Customer.
- Is the protectedInformation used by anyone?

Action 20250904:

- Jan (SE) will discuss in TF16 if we should introduce the Customer class for the Final Customer.

Conclusion:

- TBD

***

To do - downstream:

- Review of the new BRS for Alignment of downstream market master data.

- We will make a dependency table in the BRS for Change of Supplier showing how to implement the documents in each Nordic country. Thereafter we publish it.

Actions:

- Svein will continue investigate if the grid loss parameters already are present in the CIM/Grid package
    - If not, we will find a better description of how the grid loss attributes are calculated and used, and finally bring the topic to IEC, i.e. how the UseCase is used.
- Ove will make MRs based on appendix B1 to B19. B4 until B9, addition of new attributes to the MarketAgreement class, will be merged into one MR.
- Ove will continue making the first draft of a BRS for Alignment of downstream market master data.

To do - CGMES:

- We will discuss (add) the attributes Elhub needs in the modelled classes.
- We will discuss further how to map Market Evaluation Point/Accounting Point to Equipment/Terminal.

To do - downstream:

- Review of the new BRS for Alignment of downstream market master data.
- We will make a dependency table in the BRS for Change of Supplier showing how to implement the documents in each Nordic country. Thereafter we publish it.

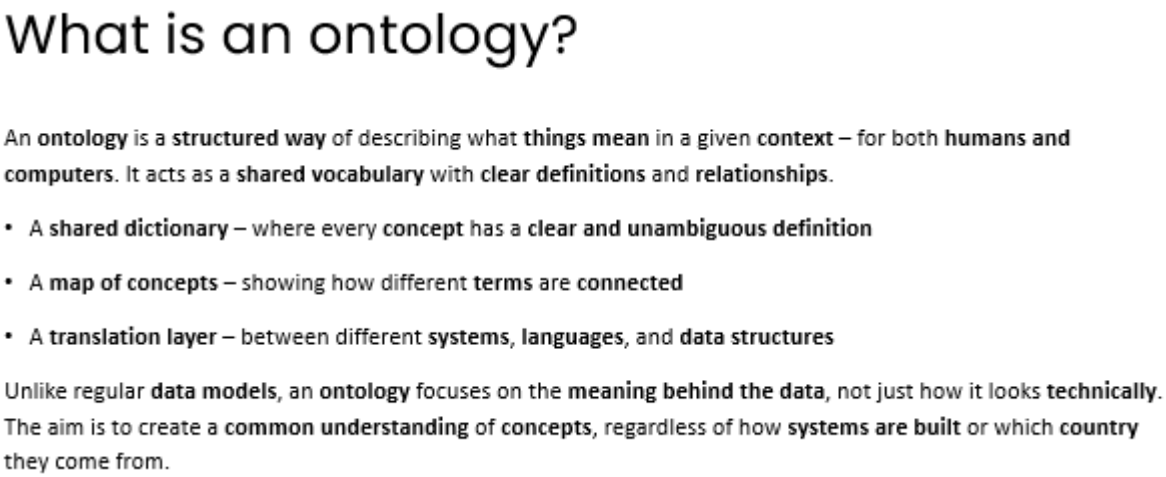
15 CIM as "an open ontology" (Item for NMEG meeting September 9th and 10th at Svenska kraftnät)

Anders Fransson (Anders.Fransson@svk.se) from Svenska kraftnät presented the following two documents, both originating from Svenska kraftnät, suggesting CIM as "an open ontology":

CIM as an Open Ontology.pptx

Data platform solution eng v3.ppt:

According to Anders, an ontology is:



And the solution is:

Solution

This is not about **rebuilding from scratch**, but about:

- **Converting CIM** into an **open format** (**RDF/OWL**)
- **Assigning** each concept a **unique identifier** (**URI**)
- **Publishing the ontology openly**, so that it becomes accessible to both **humans and machines**

Each actor can then continue to use their own **technical solutions** – while still referring to the **same meanings**. This enables **efficient collaboration**, **simplified integration and data exchange**, and **future-proofed solutions**.

Conclusion:

- We think this is a good approach and we are looking forward to the see the next steps.

16 Review of documents from CIM WG subgroups and IEC groups

Background: At the NMEG meeting August 2020 it was agreed that NMEG needs to be more proactive regarding commenting on new ENTSO-E and IEC documents. Hence it is added a fixed item on the NMEG agenda for review of documents from CIM WG subgroups and IEC groups that is of interest for the Nordic market.

References (links):

What to decide, discuss or inform: Review of documents from CIM WG subgroups that is of interest for the Nordic market.

16.1 Prepare Nordic positions before coming CIM WG meetings

Nothing to prepare.

17 Information (if any)

No information outside of what informed during the other items.

18 Next meetings

NMEG:

- Tuesday October 14th , 10:00 – 13:00, Teams
- Tuesday December 2nd and Wednesday December 3rd at Fingrid's offices in Helsinki

NTC:

- Tuesday September 16th, 2025, 14:00 – 15:30
- Thursday September 25th, 2025, 12:30 – 14:00
- Tuesday September 30th, 2025, 10:00 – 11:30
- Monday October 13th, 2025, 13:00 – 14:30

19 AOB

No items.

Appendix A Overview of Nordic memberships in international standardisation bodies

Name	Member of
Anne Stine (NO)	NMEG
Christian (SE)	NMEG
Edel (SE)	DIA, TF3
Fedder (DK)	NMEG, CIM WG, IEC/WG16, CSSG, EEAT, ENTSO-E CIM tools, CIO/LIO
Jan (DK)	DIA, NMEG, IEC/WG16, TF2, TF3, DSS/557
Jan (SE)	DIA, NMEG, IEC/WG16+14, ESMP, TK57, TF2, TF3
Jon-Egil (NO)	DIA, NMEG, CIM WG, IEC/WG16, ESMP, CCC, CIO/LIO, NK57, TPC, TF3
Mario (NO)	DIA, NMEG, NK57, TF2
Oscar (SE)	CIO/LIO, CIM WG, TK57
Ove (NO)	NMEG, IEC/WG16, NK57, (TF3)
Svein (NO)	IEC/WG14+13, CGMES
Teemu H (FI)	NMEG, CIM WG, CIO/LIO
Teemu K (FI)	DIA, NMEG, TF2

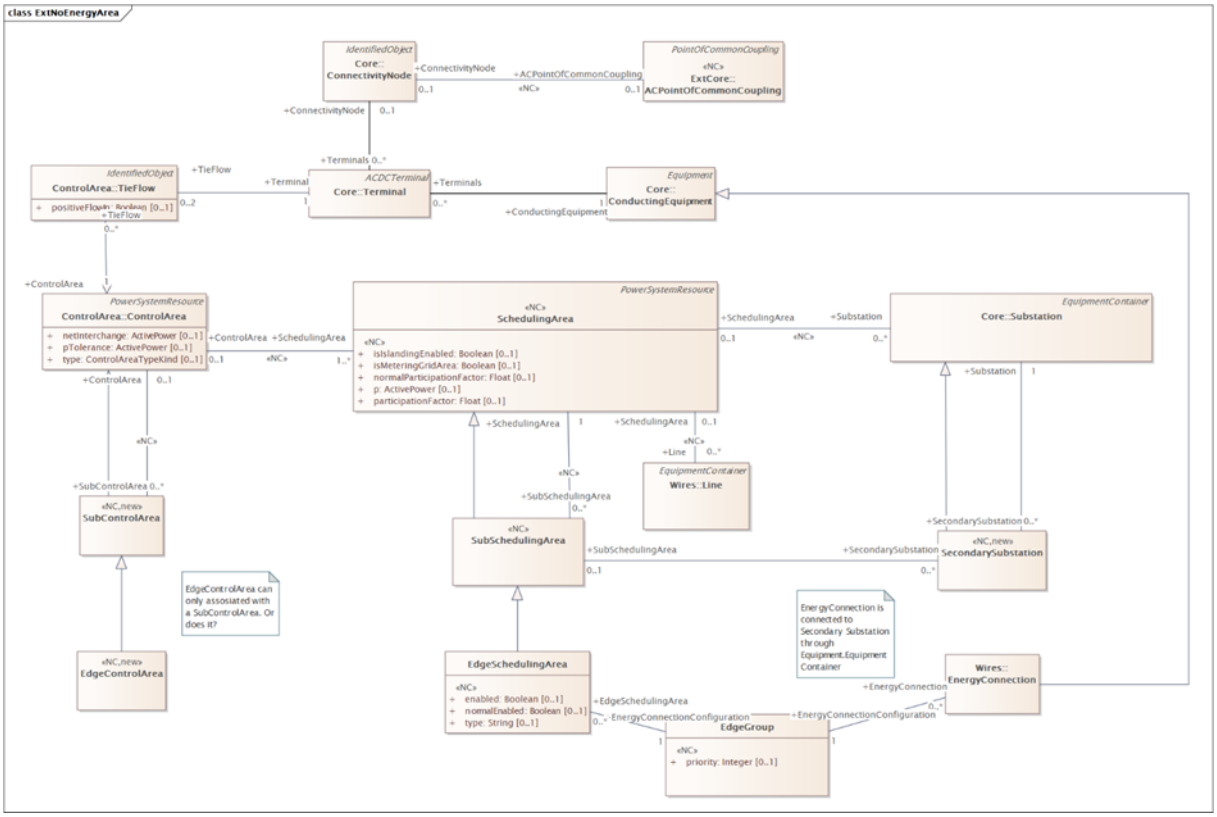
Abbreviations:

CCC	Coordinated Capacity Calculation (project under CIM WG)
CGMES	Common Grid Model Exchange Standard (subgroup under CIM WG)
CIO/LIO	Central Issuing Office / Local Issuing Office
CSSG	Communication Standards (subgroup under CIM WG)
Dc	ENTSO-E Digital committee
DIA	ENTSO-E WG Data Interoperability & Access
DS S-557	Danish national IEC committee
EEAT	ENTSO-E Enterprise Architecture Team (subgroup under Dc)
ESMP	European Style Market Profile (subgroup under CIM WG)
MC	ENTSO-E Market Committee
MIT	Market Integration and Transparency (subgroup under MC)
NK57	Norsk Elektroteknisk Komite (Norsk Komité 57)
NEX	Nordic ECP/EDX Group
TF2	JWG, Task Force for the Development of the Implementing Regulations foreseen in Article 24 of the Directive (EU) 2019/944 and Reference Models (DIR)
TF3	JWG, Task Force for Data Interoperability Modelling (DIM)
TK57	Teknisk Kommitté 57
TPC	Transparency Platform Coordinators (subgroup under MIT)

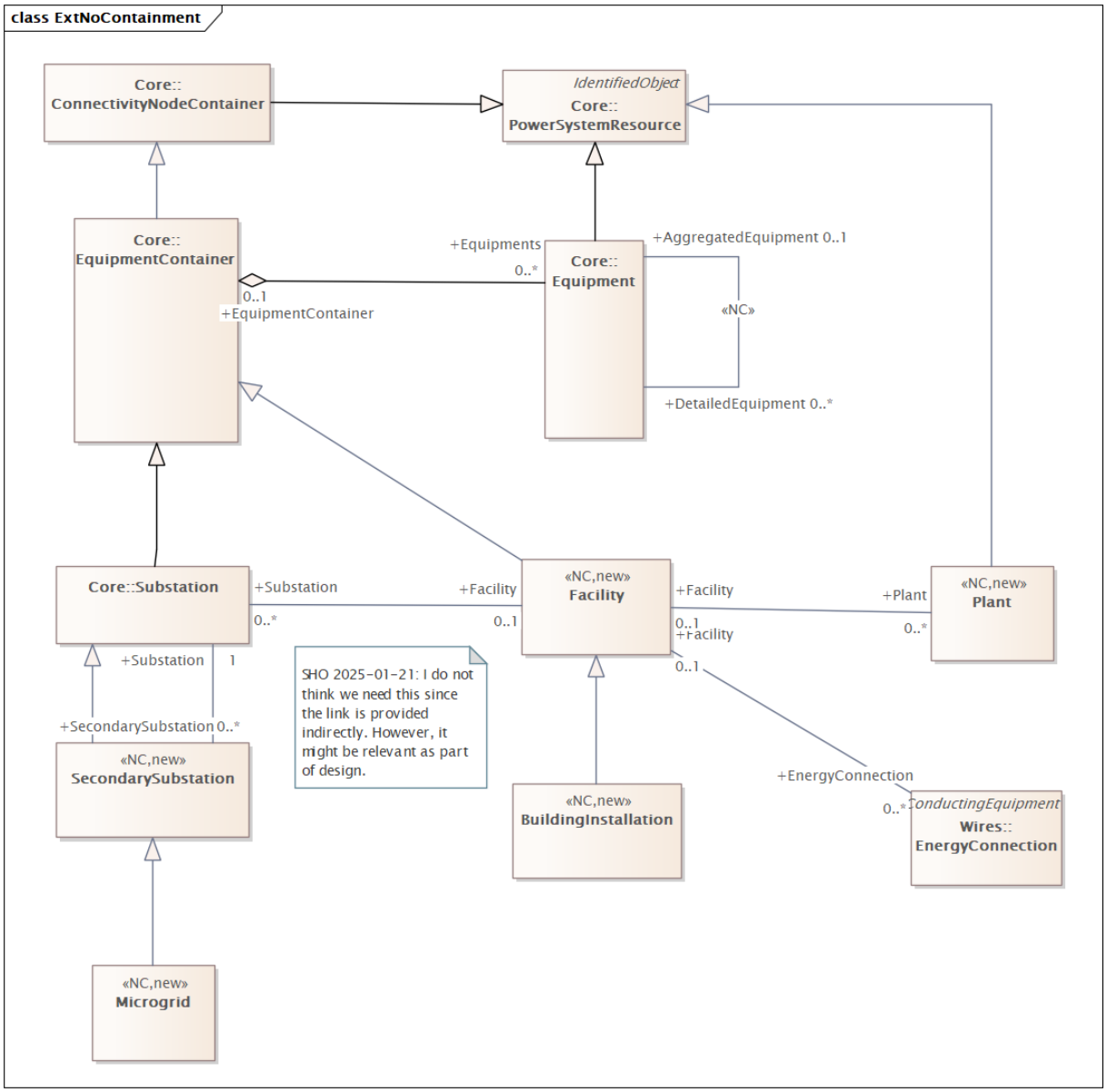
Appendix B Status for CIM objects that can be used within a datahub

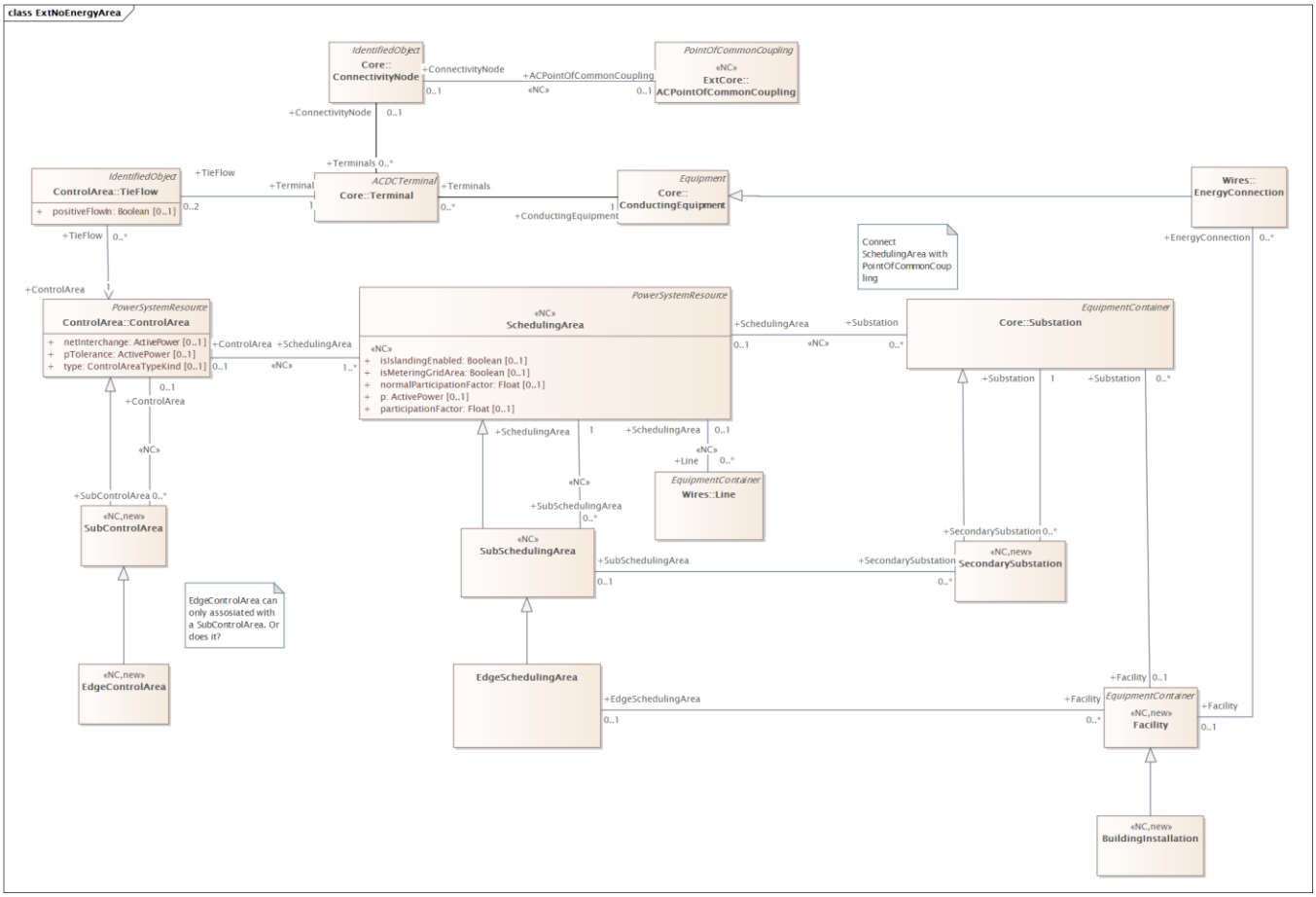
[CIM model of the grid part of the Elhub Information Model (EIM)]

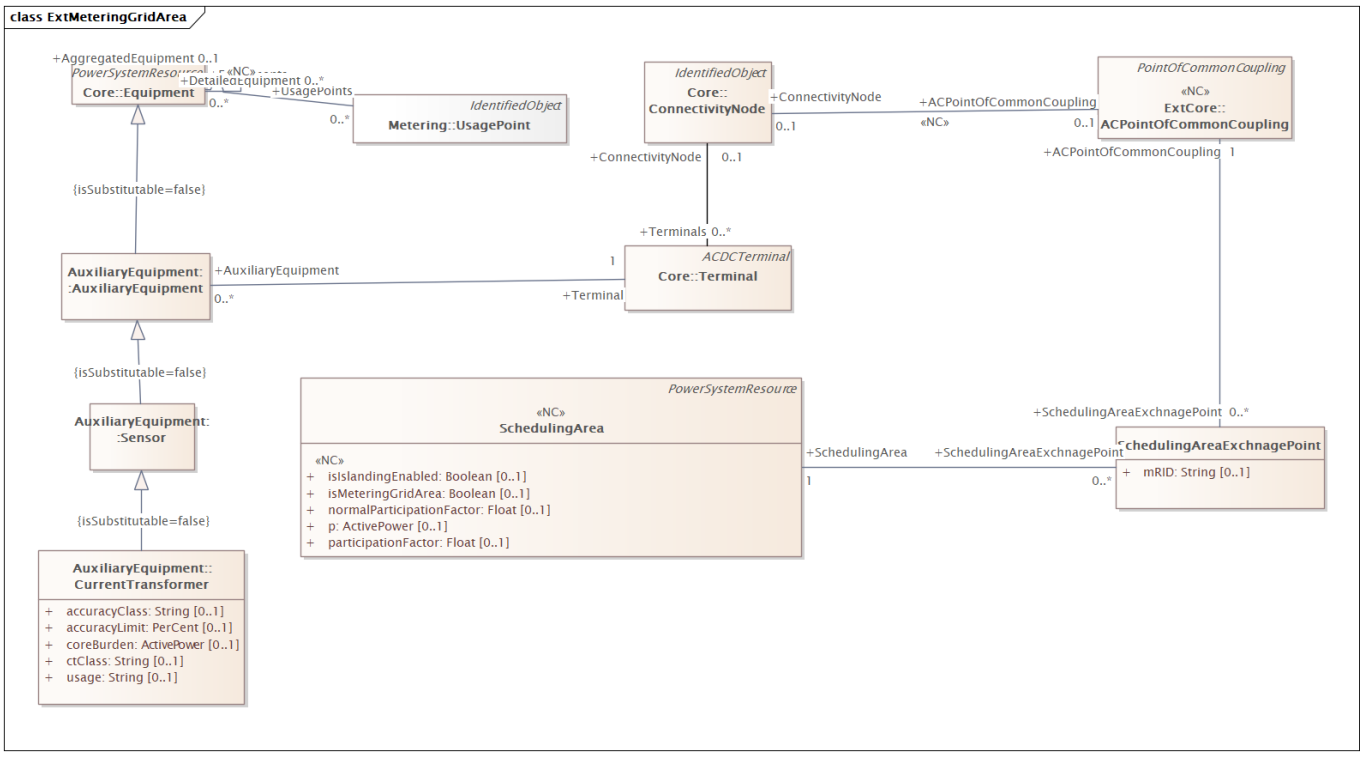
Svein explained the intention of the class diagram shown below. For instance, the left side of the diagram represent the upstream market, the middle side represents the market in general, and the right side represent the grid.

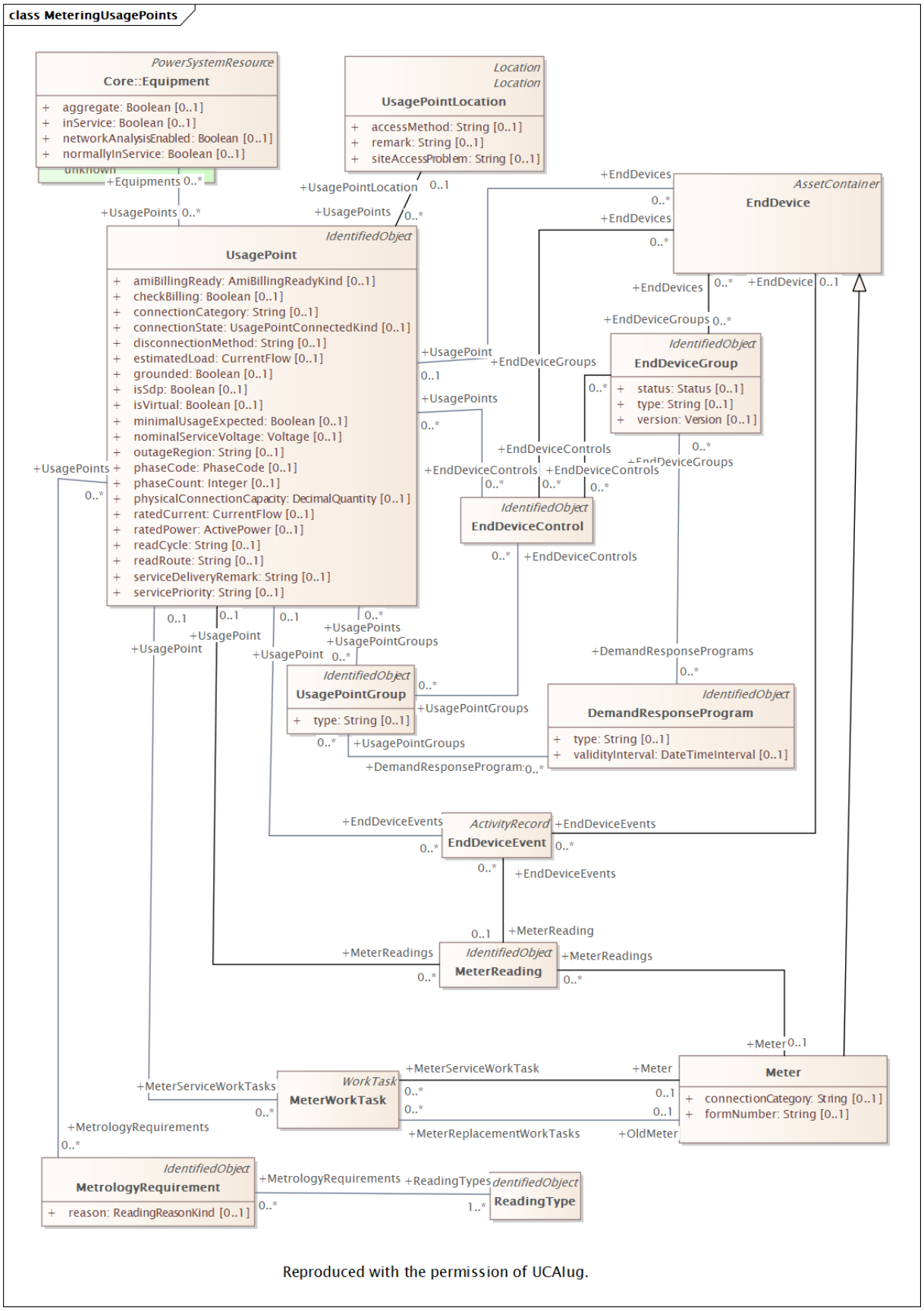


Update 2025-01-21:


class ExtNoContainment
Core::
ConnectivityNodeContainer
IdentifiedObject
Core::
PowerSystemResource
Core::
EquipmentContainer
+Equipments
0..*
Core::
Equipment
+AggregatedEquipment 0..1
«NC»
+DetailedEquipment 0..*
0..1
+EquipmentContainer
Core::Substation
+Substation
0..*
+Facility
0..1
«NC,new»
Facility
+Facility
0..1
+Facility
0..1
+Plant
0..*
«NC,new»
Plant
+Substation
1
+SecondarySubstation 0..*
«NC,new»
SecondarySubstation
SHO 2025-01-21: I do not think we need this since the link is provided indirectly. However, it might be relevant as part of design.
«NC,new»
BuildingInstallation
+EnergyConnection
0..*
ConductingEquipment
Wires::
EnergyConnection
«NC,new»
Microgrid

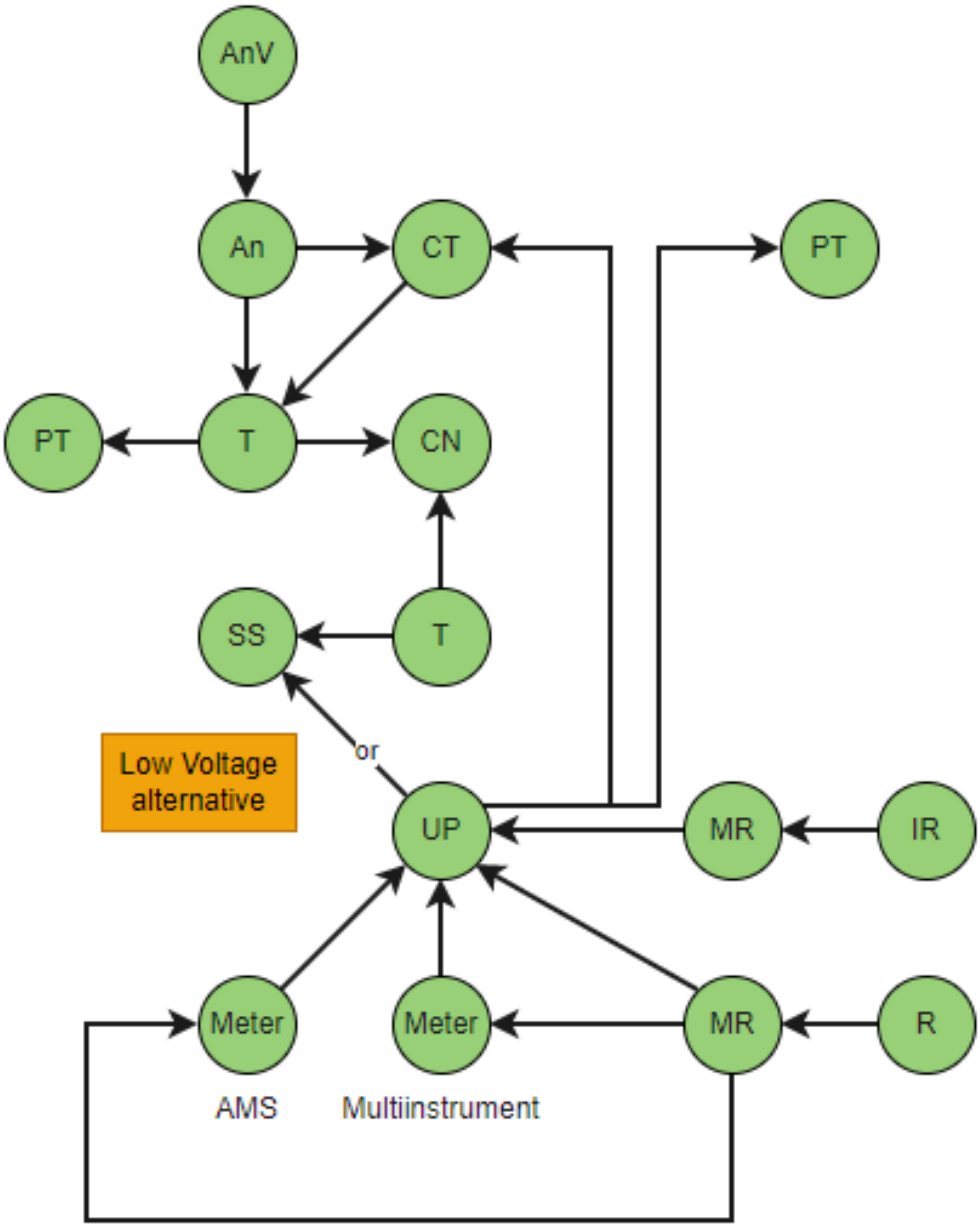

class ExtNoEnergyArea
IdentifiedObject
Core::
ConnectivityNode
+ConnectivityNode
+ACPointOfCommonCoupling
PointOfCommonCoupling
«NC»
ExtCore::
ACPointOfCommonCoupling
+Terminals 0..*
IdentifiedObject
ControlArea::TieFlow
+ positiveFlowIn: Boolean [0..1]
+TieFlow
+Terminal
ACDCTerminal
Core::Terminal
+Terminals
Equipment
Core::
ConductingEquipment
+ConductingEquipment
Wires::
EnergyConnection
+EnergyConnection
Connect SchedulingArea with PointOfCommonCoupling
+ControlArea
PowerSystemResource
ControlArea::ControlArea
+ netInterchange: ActivePower [0..1]
+ pTolerance: ActivePower [0..1]
+ type: ControlAreaTypeKind [0..1]
PowerSystemResource
«NC»
SchedulingArea
«NC»
+ isIslandingEnabled: Boolean [0..1]
+ isMeteringGridArea: Boolean [0..1]
+ normalParticipationFactor: Float [0..1]
+ p: ActivePower [0..1]
+ participationFactor: Float [0..1]
+SchedulingArea
+Substation
EquipmentContainer
Core::Substation
+Line
EquipmentContainer
Wires::Line
+SubControlArea
«NC,new»
SubControlArea
«NC»
SubSchedulingArea
+SubSchedulingArea
+SecondarySubstation
«NC,new»
SecondarySubstation
EdgeControlArea can only assosiated with a SubControlArea. Or does it?
«NC,new»
EdgeControlArea
EdgeSchedulingArea
+EdgeSchedulingArea
+Facility
EquipmentContainer
«NC,new»
Facility
«NC,new»
BuildingInstallation

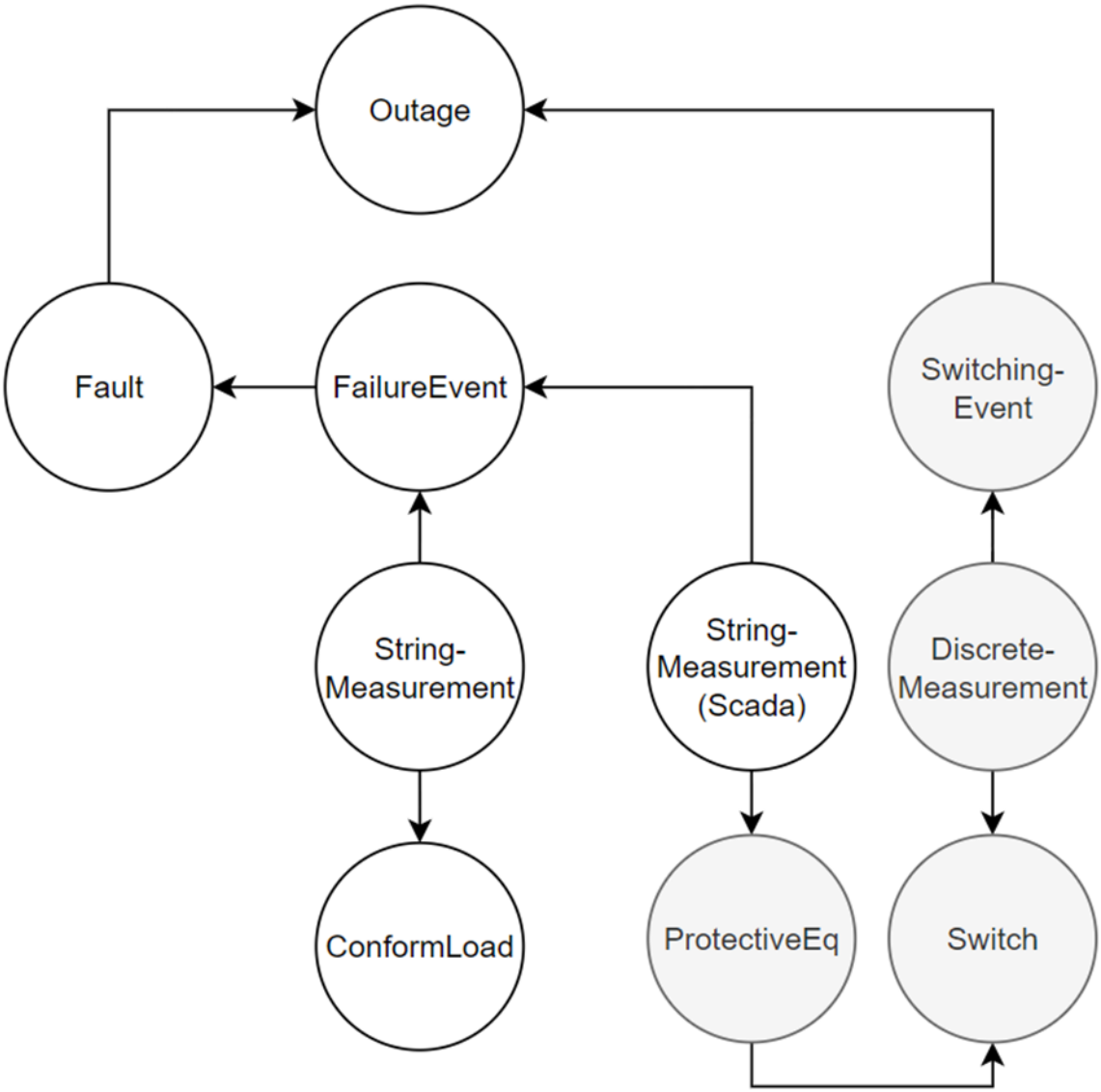

class ExtMeteringGridArea
+AggregatedEquipment 0..1
Core::Equipment
+DetailedEquipment 0..*
+UsagePoints
IdentifiedObject
Metering::UsagePoint
IdentifiedObject
Core::
ConnectivityNode
+ConnectivityNode
+ACPointOfCommonCoupling
PointOfCommonCoupling
«NC»
ExtCore::
ACPointOfCommonCoupling
{isSubstitutable=false}
AuxiliaryEquipment::
AuxiliaryEquipment
+AuxiliaryEquipment
+Terminals 0..*
ACDCTerminal
Core::Terminal
+Terminal
{isSubstitutable=false}
AuxiliaryEquipment::
Sensor
{isSubstitutable=false}
AuxiliaryEquipment::
CurrentTransformer
+ accuracyClass: String [0..1]
+ accuracyLimit: PerCent [0..1]
+ coreBurden: ActivePower [0..1]
+ ctClass: String [0..1]
+ usage: String [0..1]
PowerSystemResource
«NC»
SchedulingArea
«NC»
+ isIslandingEnabled: Boolean [0..1]
+ isMeteringGridArea: Boolean [0..1]
+ normalParticipationFactor: Float [0..1]
+ p: ActivePower [0..1]
+ participationFactor: Float [0..1]
+SchedulingArea
+SchedulingAreaExchnagePoint
+SchedulingAreaExchnagePoint
+ mRID: String [0..1]

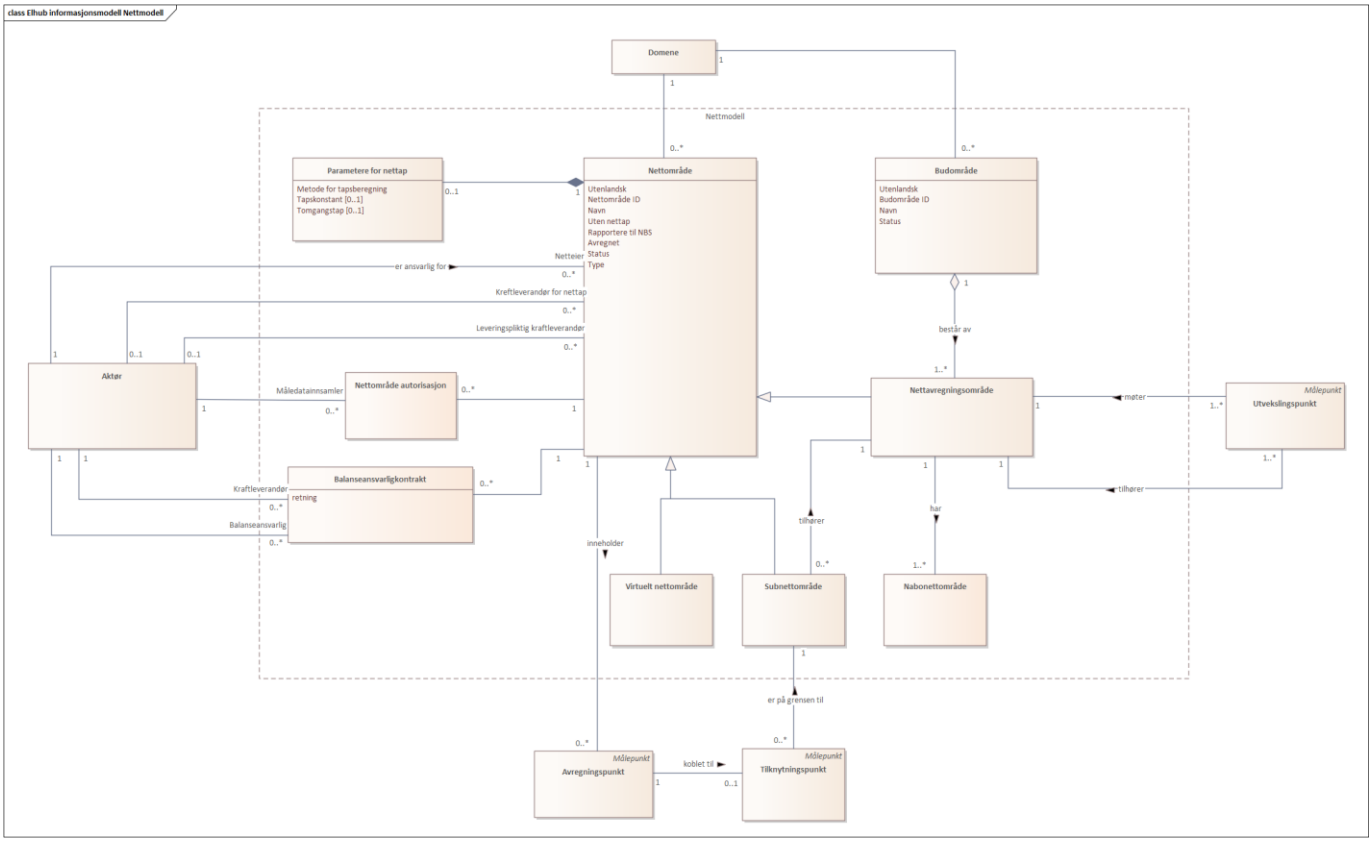


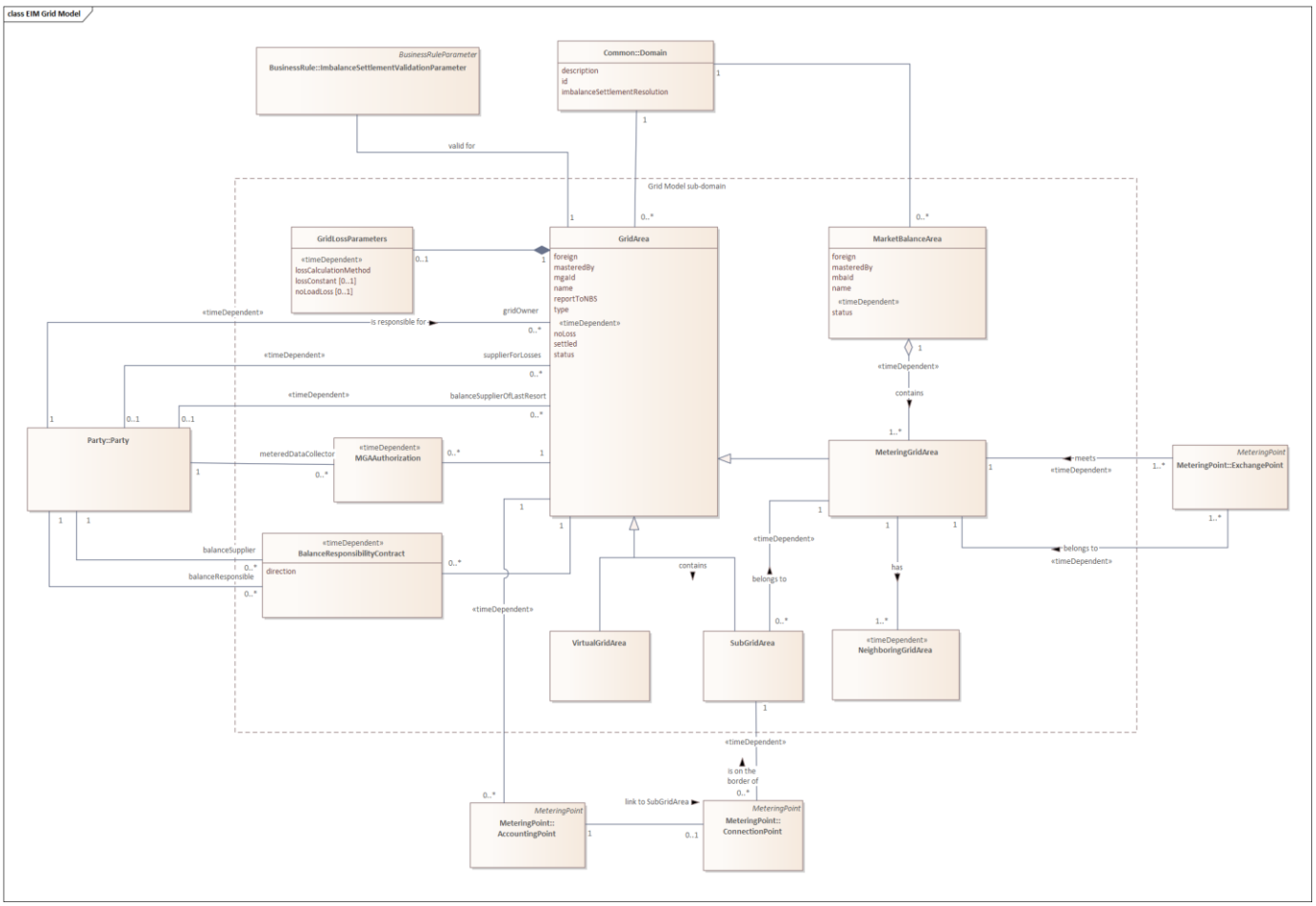
Reproduced with the permission of UCAIug.

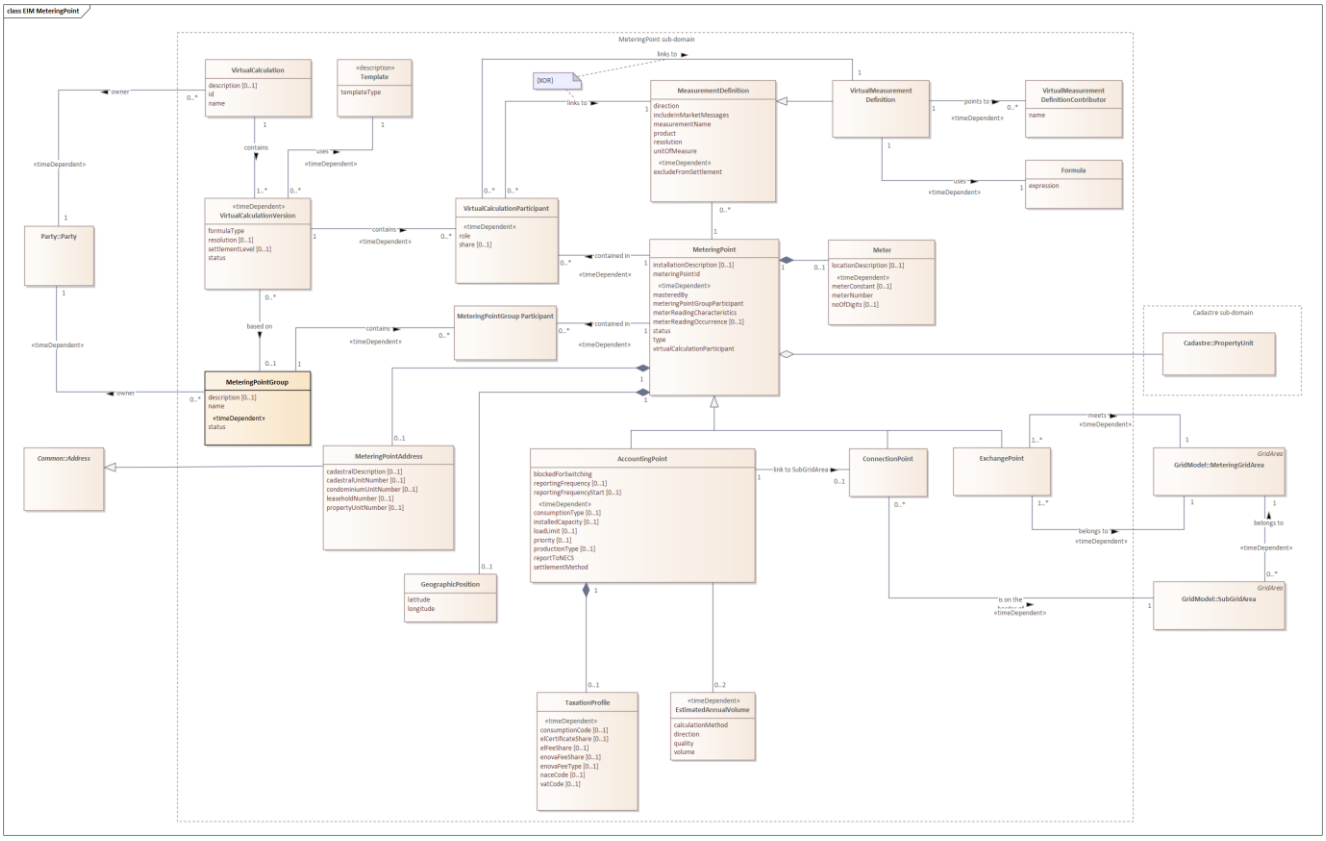
[CIM4NoUtility/Telemark-120/docs/MeasurementAndMeterReadingSpecification.adoc at develop · 3lbits/CIM4NoUtility]


AnV
An
CT
PT
PT
T
CN
SS
T
Low Voltage alternative
or
UP
MR
IR
Meter
Meter
MR
R
AMS
Multiinstrument


Outage
Fault
FailureEvent
Switching-Event
String-Measurement
String-Measurement (Scada)
Discrete-Measurement
ConformLoad
ProtectiveEq
Switch

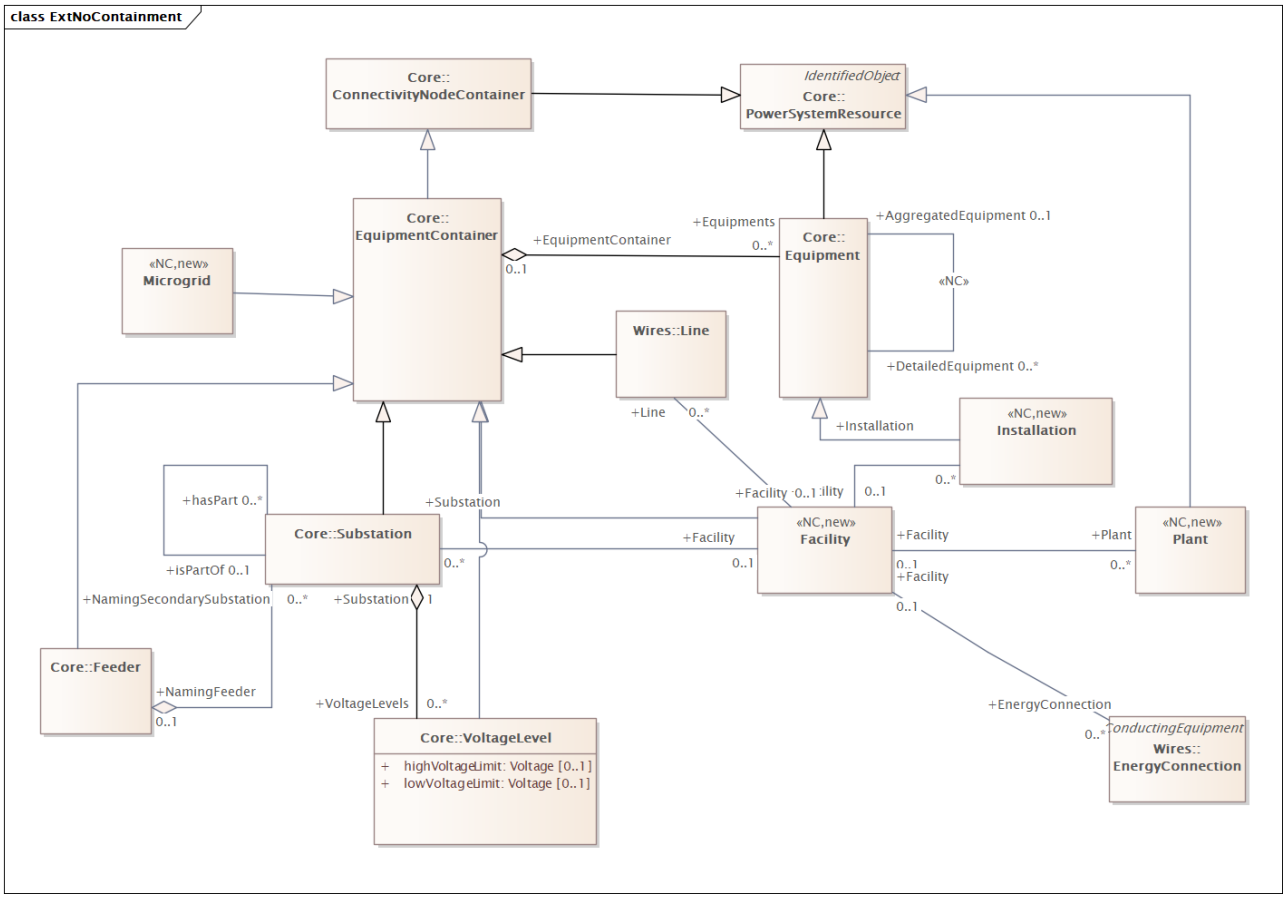

class Elhub informasjonsmodell Nettmodell
Domene
Nettmodell
Parametere for nettap
Metode for tapsberegning
Tapskonstant [0..1]
Tomgangstap [0..1]
Nettområde
Utenlandsk
Nettområde ID
Navn
Uten nettap
Rapportere til NBS
Avregnet
Status
Type
Budområde
Utenlandsk
Budområde ID
Navn
Status
Netteier
er ansvarlig for
Kraftleverandør for nettap
Leveringspliktig kraftleverandør
består av
Aktør
Måledatainnsamler
Nettområde autorisasjon
Nettavregningsområde
måler
Målepunkt
Utvekslingspunkt
tilhører
Balanseansvarlighetskontrakt
retning
Kraftleverandør
Balanseansvarlig
har
inneholder
Virtuelt nettområde
Subnettområde
Nabonettområde
er på grensen til
Målepunkt
Avregningspunkt
koblet til
Målepunkt
Tilknytningspunkt

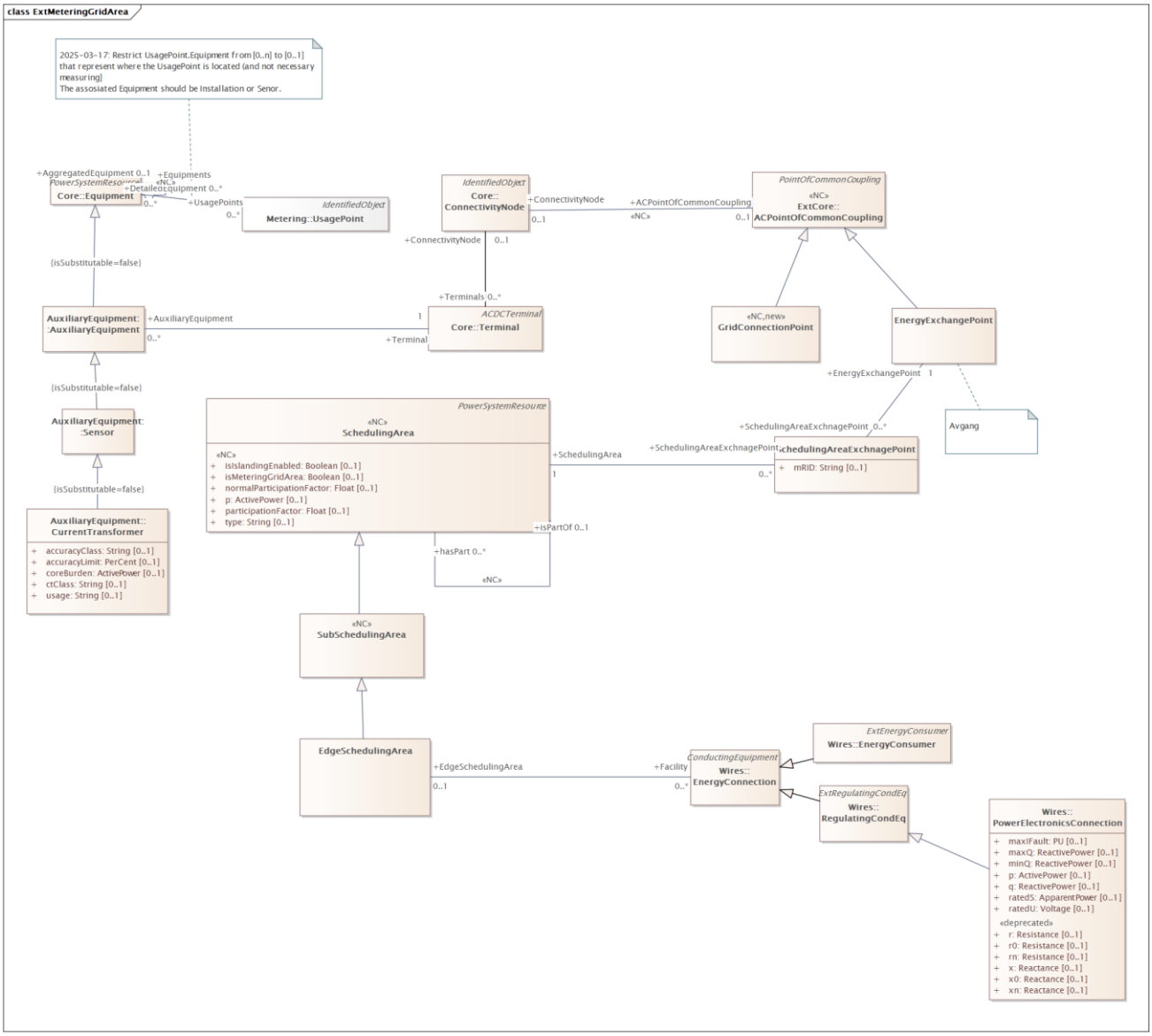

class EIM Grid Model
BusinessRuleParameter
BusinessRule::ImbalanceSettlementValidationParameter
Common::Domain
description
id
imbalanceSettlementResolution
valid for
Grid Model sub-domain
GridLossParameters
«timeDependent»
lossCalculationMethod
lossConstant [0..1]
noLoadLoss [0..1]
GridArea
foreign
masteredBy
mgaId
name
reportToNBS
type
«timeDependent»
noLoss
settled
status
MarketBalanceArea
foreign
masteredBy
mbaId
name
«timeDependent»
status
«timeDependent»
is responsible for
gridOwner
«timeDependent»
supplierForLosses
«timeDependent»
balanceSupplierOfLastResort
«timeDependent»
contains
Party::Party
meteredDataCollector
«timeDependent»
MGAAuthorization
MeteringGridArea
meets
«timeDependent»
MeteringPoint
MeteringPoint::ExchangePoint
balanceSupplier
balanceResponsible
«timeDependent»
BalanceResponsibilityContract
direction
«timeDependent»
belongs to
«timeDependent»
contains
belongs to
has
VirtualGridArea
SubGridArea
«timeDependent»
NeighboringGridArea
«timeDependent»
is on the border of
link to SubGridArea
MeteringPoint
MeteringPoint::
AccountingPoint
MeteringPoint
MeteringPoint::
ConnectionPoint

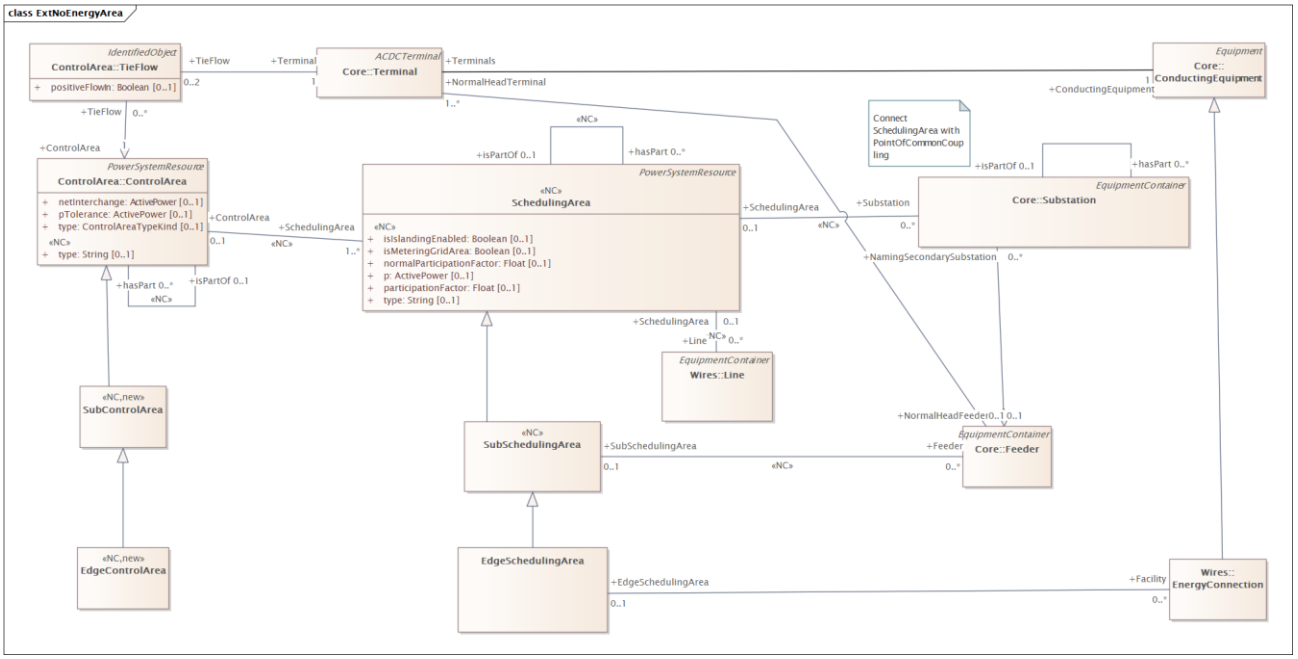


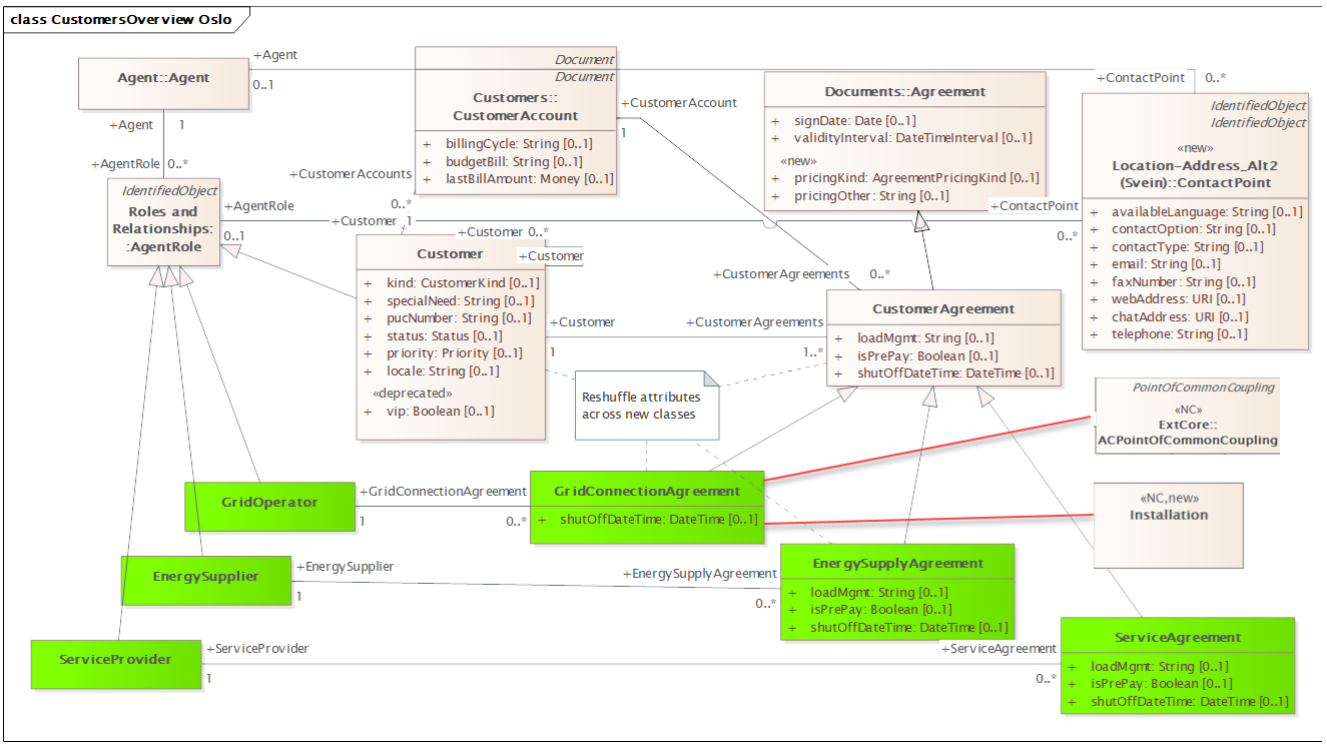
Mapping:

Update on 2025-03-24

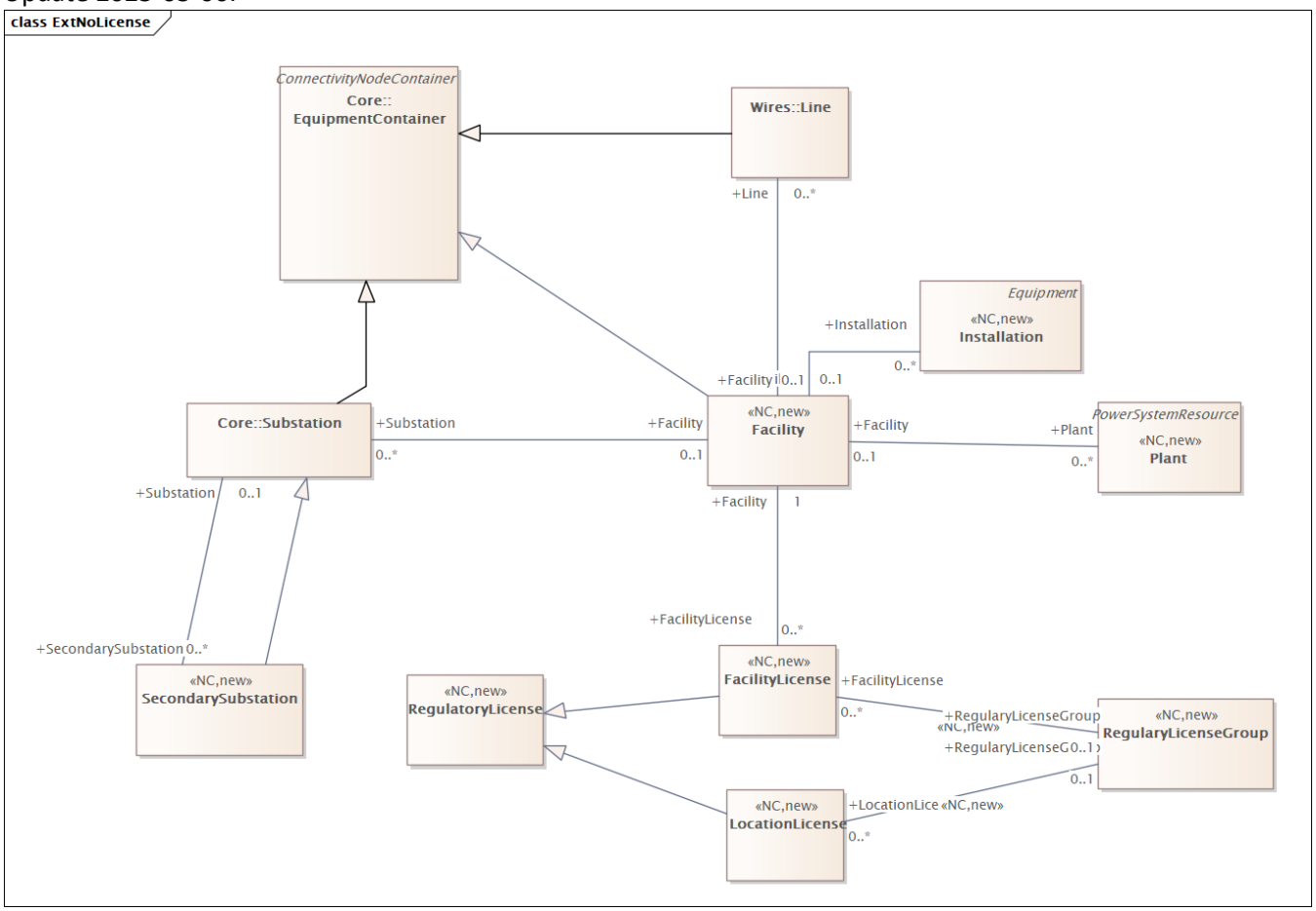


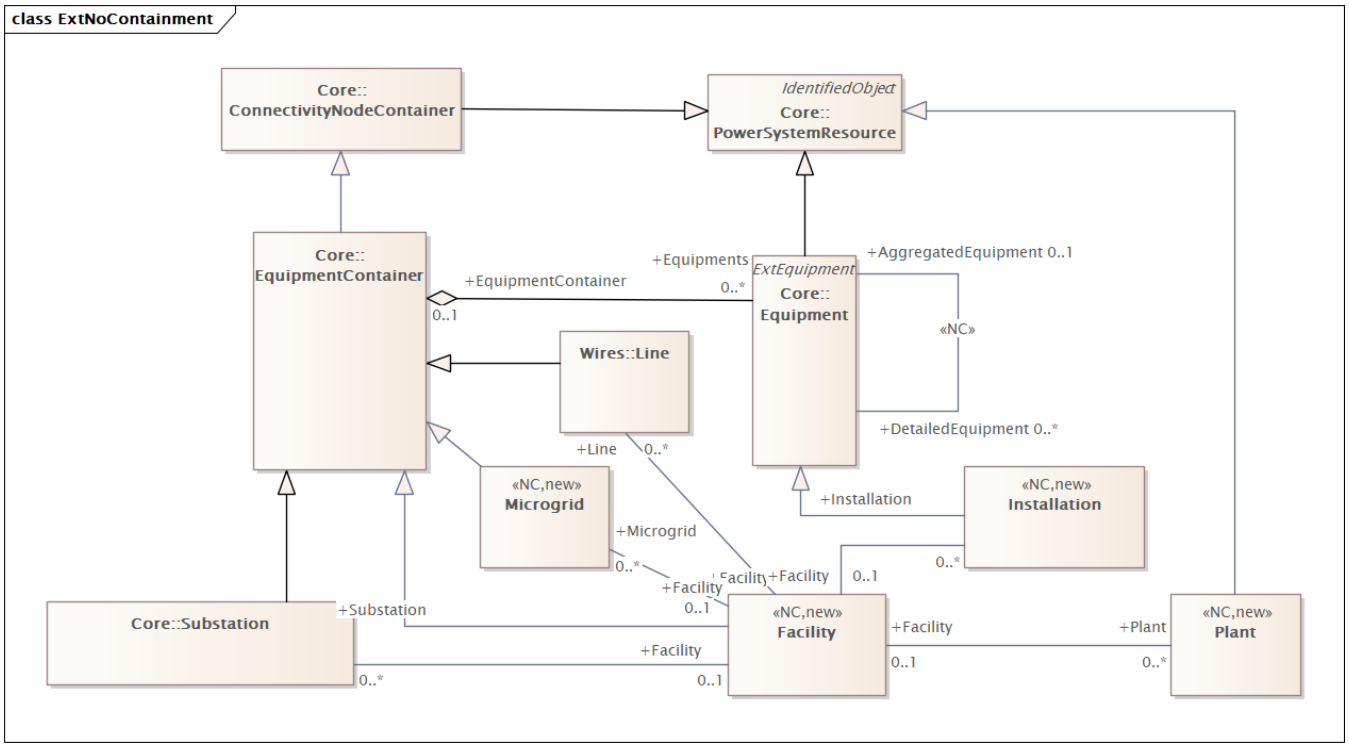

class ExtMeteringGridArea
2025-03-17: Restrict UsagePoint.Equipment from [0..n] to [0..1] that represent where the UsagePoint is located (and not necessary measuring]
The assosiated Equipment should be Installation or Senor.
Core::Equipment
Metering::UsagePoint
Core::ConnectivityNode
ExtCore::ACPointOfCommonCoupling
AuxiliaryEquipment::AuxiliaryEquipment
Core::Terminal
GridConnectionPoint
EnergyExchangePoint
AuxiliaryEquipment::Sensor
SchedulingArea
SchedulingAreaExchnagePoint
Avgang
AuxiliaryEquipment::CurrentTransformer
SubSchedulingArea
EdgeSchedulingArea
Wires::EnergyConsumer
Wires::EnergyConnection
Wires::RegulatingCondEq
Wires::PowerElectronicsConnection

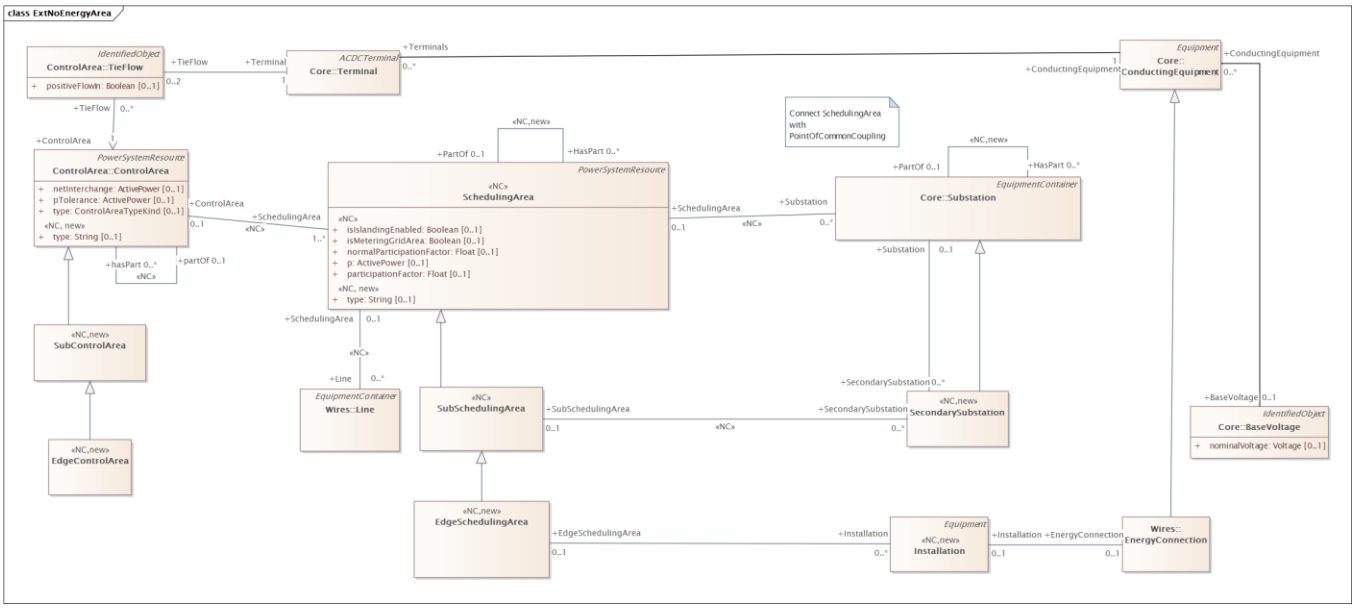

class ExtNoEnergyArea
ControlArea::TieFlow
Core::Terminal
Core::ConductingEquipment
ControlArea::ControlArea
SchedulingArea
Core::Substation
Wires::Line
SubControlArea
SubSchedulingArea
Core::Feeder
EdgeControlArea
EdgeSchedulingArea
Wires::EnergyConnection

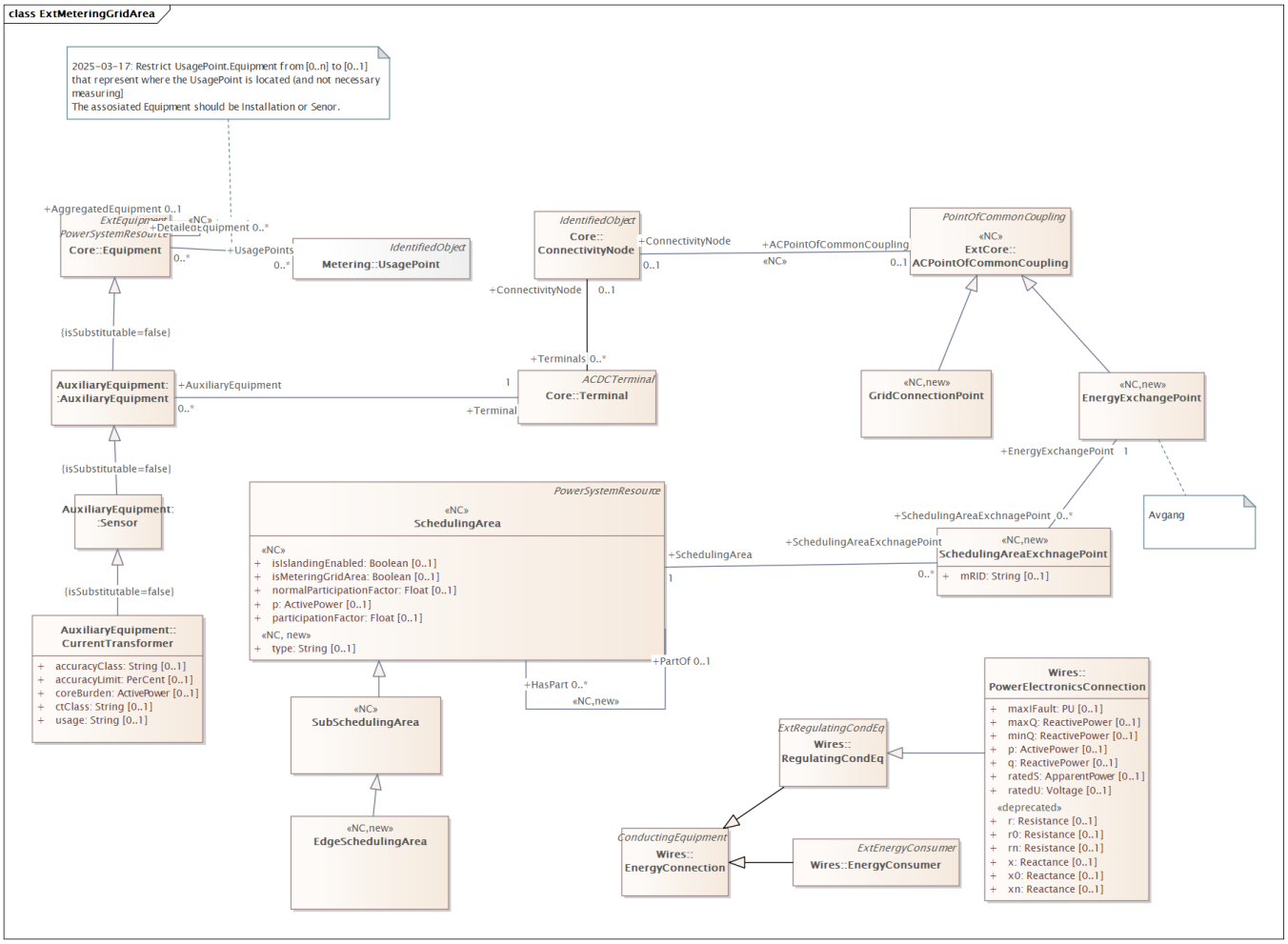


Update 2025-05-06:

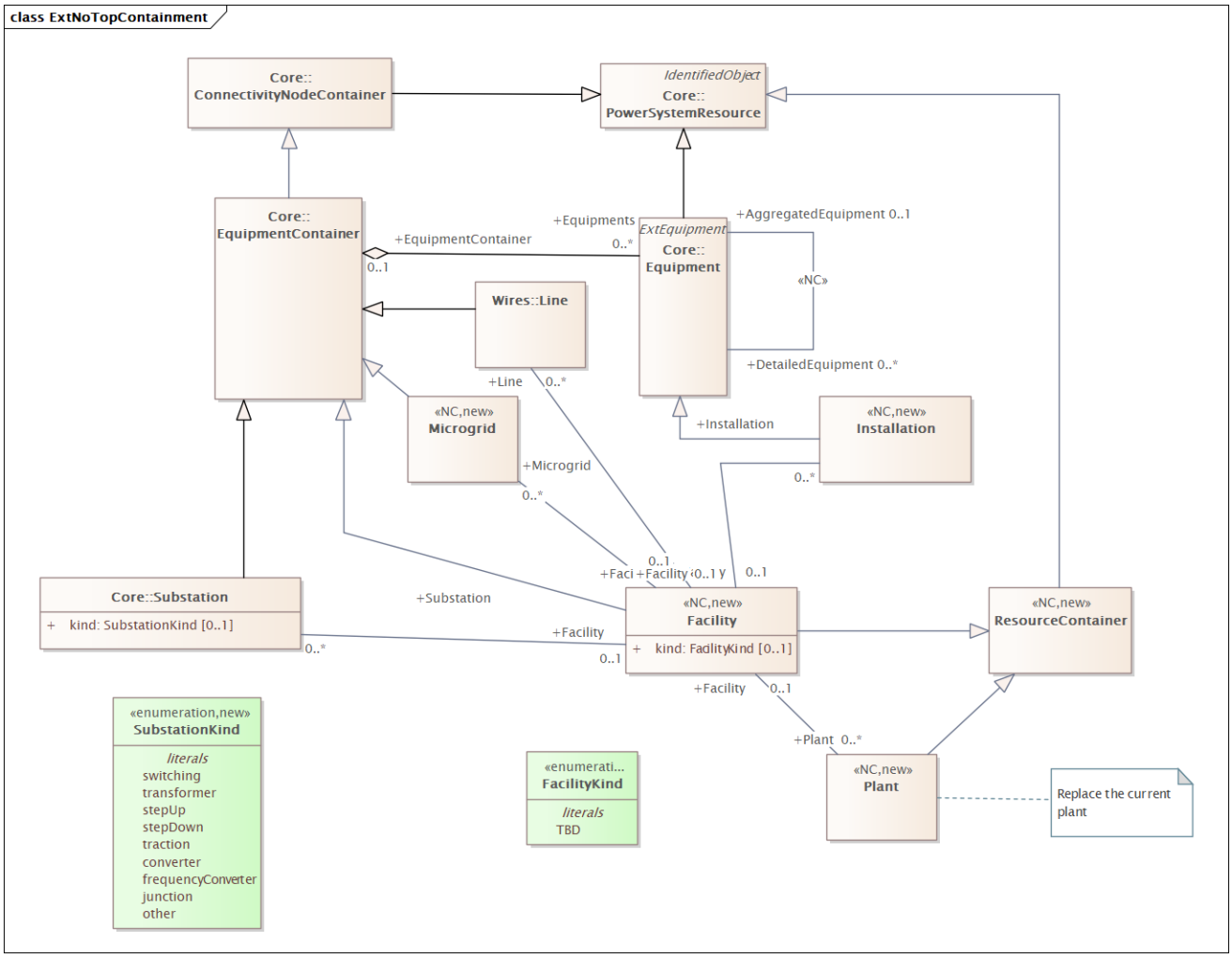


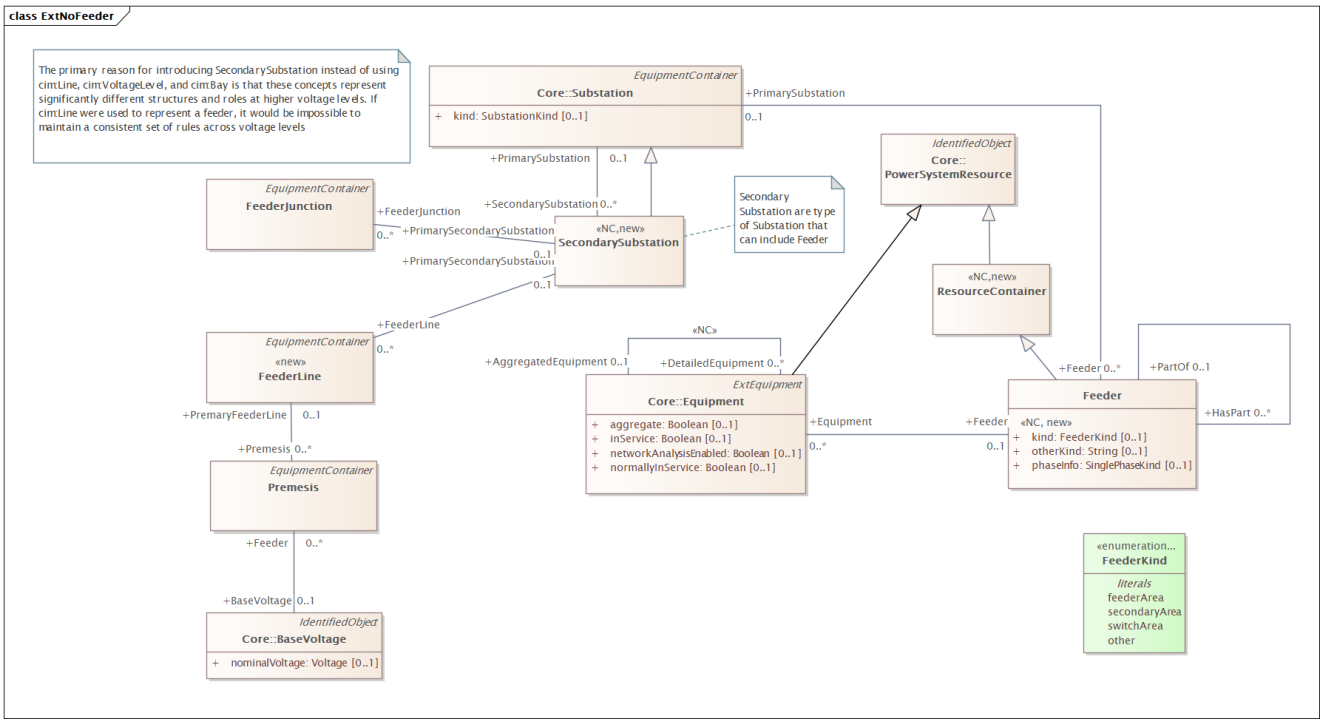

class ExtNoContainment
Core::
ConnectivityNodeContainer
IdentifiedObject
Core::
PowerSystemResource
Core::
EquipmentContainer
+Equipments
0..*
ExtEquipment
Core::
Equipment
+AggregatedEquipment 0..1
«NC»
+EquipmentContainer
0..1
Wires::Line
+DetailedEquipment 0..*
+Line
0..*
«NC,new»
Microgrid
+Installation
«NC,new»
Installation
+Microgrid
0..*
0..*
+Facility
0..1
+Facility
0..1
Core::Substation
+Substation
«NC,new»
Facility
+Facility
+Plant
«NC,new»
Plant
+Facility
0..*
0..1
0..1
0..*

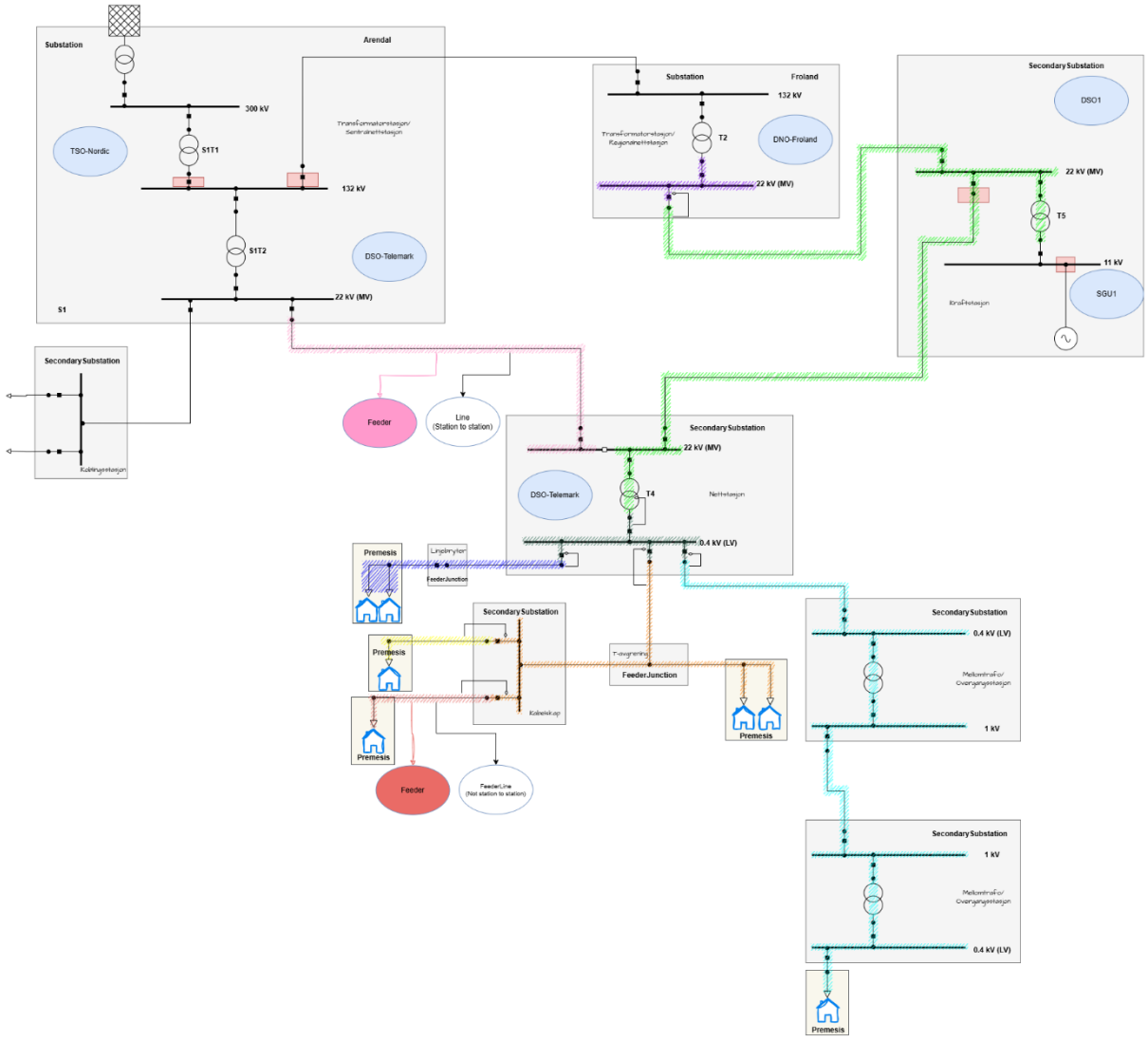

class ExtNoEnergyArea
IdentifiedObject
ControlArea::TieFlow
+ positiveFlowIn: Boolean [0..1]
+TieFlow
+Terminal
ACDCTerminal
Core::Terminal
+Terminals
Equipment
Core::
ConductingEquipment
+ConductingEquipment
Connect SchedulingArea with PointOfCommonCoupling
PowerSystemResource
ControlArea::ControlArea
+ netInterchange: ActivePower [0..1]
+ pTolerance: ActivePower [0..1]
+ type: ControlAreaTypeKind [0..1]
«NC, new»
+ type: String [0..1]
+ControlArea
+SchedulingArea
+hasPart 0..*
+partOf 0..1
«NC,new»
SubControlArea
«NC,new»
EdgeControlArea
«NC,new»
+PartOf 0..1
+HasPart 0..*
PowerSystemResource
«NC»
SchedulingArea
«NC»
+ isIslandingEnabled: Boolean [0..1]
+ isMeteringGridArea: Boolean [0..1]
+ normalParticipationFactor: Float [0..1]
+ p: ActivePower [0..1]
+ participationFactor: Float [0..1]
«NC, new»
+ type: String [0..1]
+SchedulingArea
+Substation
«NC,new»
+PartOf 0..1
+HasPart 0..*
EquipmentContainer
Core::Substation
+Substation
+Line
EquipmentContainer
Wires::Line
«NC»
SubSchedulingArea
+SubSchedulingArea
+SecondarySubstation
«NC,new»
SecondarySubstation
+BaseVoltage
IdentifiedObject
Core::BaseVoltage
+ nominalVoltage: Voltage [0..1]
«NC,new»
EdgeSchedulingArea
+EdgeSchedulingArea
+Installation
Equipment
«NC,new»
Installation
+Installation +EnergyConnection
Wires::
EnergyConnection



2025-09-04:
The following slides was presented in the join WG13, WG14 and WG16 meeting in Paris:


class ExtNoTopContainment
Core::
ConnectivityNodeContainer
IdentifiedObject
Core::
PowerSystemResource
Core::
EquipmentContainer
+Equipments
0..*
ExtEquipment
Core::
Equipment
+AggregatedEquipment 0..1
«NC»
+DetailedEquipment 0..*
+EquipmentContainer
0..1
Wires::Line
+Line
0..*
«NC,new»
Microgrid
+Microgrid
0..*
+Installation
«NC,new»
Installation
0..*
0..1
+Faci +Facility 0..1 y
0..1
Core::Substation
+ kind: SubstationKind [0..1]
+Substation
+Facility
0..*
0..1
«NC,new»
Facility
+ kind: FadlityKind [0..1]
«NC,new»
ResourceContainer
+Facility
0..1
+Plant 0..*
«enumeration,new»
SubstationKind
literals
switching
transformer
stepUp
stepDown
traction
converter
frequencyConverter
junction
other
«enumerati...
FacilityKind
literals
TBD
«NC,new»
Plant
Replace the current plant


class ExtNoFeeder
The primary reason for introducing SecondarySubstation instead of using cim:Line, cim:VoltageLevel, and cim:Bay is that these concepts represent significantly different structures and roles at higher voltage levels. If cim:Line were used to represent a feeder, it would be impossible to maintain a consistent set of rules across voltage levels
EquipmentContainer
Core::Substation
+ kind: SubstationKind [0..1]
+PrimarySubstation
0..1
+PrimarySubstation 0..1
IdentifiedObject
Core::
PowerSystemResource
EquipmentContainer
FeederJunction
+FeederJunction
0..*
+SecondarySubstation 0..*
+PrimarySecondarySubstation
«NC,new»
SecondarySubstation
0..1
Secondary Substation are type of Substation that can include Feeder
«NC,new»
ResourceContainer
+FeederLine
0..*
EquipmentContainer
«new»
FeederLine
«NC»
+AggregatedEquipment 0..1
+DetailedEquipment 0..*
ExtEquipment
Core::Equipment
+ aggregate: Boolean [0..1]
+ inService: Boolean [0..1]
+ networkAnalysisEnabled: Boolean [0..1]
+ normallyInService: Boolean [0..1]
+Equipment
0..*
+Feeder
0..1
+Feeder 0..*
+PartOf 0..1
Feeder
«NC, new»
+ kind: FeederKind [0..1]
+ otherKind: String [0..1]
+ phaseInfo: SinglePhaseKind [0..1]
+HasPart 0..*
+PremaryFeederLine
0..1
+Premesis 0..*
EquipmentContainer
Premesis
+Feeder
0..*
+BaseVoltage 0..1
IdentifiedObject
Core::BaseVoltage
+ nominalVoltage: Voltage [0..1]
«enumeration...
FeederKind
literals
feederArea
secondaryArea
switchArea
other



nc:Plant
A Plant is a ResourceContainer that groups together resources providing a specific industrial energy-related system function—typically generation, conversion, or storage. It serves as an operational unit with common measurement, scheduling, and control, and can be operated within defined capacity limits.

nc:Feeder
A Feeder is a ResourceContainer that groups distribution resources as a system functional unit of the distribution network.
It may represent equipment supplied from or supplying to one or more substations, and does not prescribe power flow direction or topology. A Feeder may contain installations, prosumers, or other feeders.
A Feeder serves as an organizational and operational unit for applying measurement, scheduling, and operational limits, independent of its instantaneous connectivity or state.

nc:FeederJunction
A FeederJunction is a point inside a distribution feeder where one or more conducting equipment elements are connected with negligible impedance.

nc:FeederLine

Contains equipment belonging to a distribution feeder that connects a Secondary Substation to one or more Premises.

nc:Premises

Contains equipment belonging to a site operated by a person or company, within which one or more installations are located. A premises may represent a household, building, shopping mall, campus, industrial facility, or other site that connects to the grid though one or more grid connections.

nc:Microgrid

Contains equipment that is constructed and operated as a self-contained, controllable electrical subsystem, either connected to or normally isolated from the wider grid.

nc:ResourceContainer

Containment of resources that collectively provide a system function and are subject to measurement, scheduling and operable within defined limits.

nc:Installation

An Installation represents a functionally integrated system at a premises or facility that is connected to an energy infrastructure, but is not itself an energy device (e.g., generator, load, or storage).
It serves as a system-level abstraction of the internal infrastructure—such as intake cable, switchboards, internal cabling, distribution panels, protection devices, and auxiliary equipment —that enables and constraints the connection to one or more energy connections (electrical, thermal, gas, etc.).
Installations are typically owned and operated by the site holder, not the utility, and exist within buildings, industrial sites, or campus.

nc:Facility

A Facility in the power system context refers to any physical infrastructure, installation, or equipment designed for the generation, transmission, distribution, storage, or consumption of electrical energy.
This includes, but is not limited to, power plants, substations, transmission lines, distribution networks, energy storage systems, and large-scale electrical installations directly connected to the grid. A facility may be owned or operated by a network operator, producer, consumer, or other market participant and is subject to regulatory and technical requirements to ensure the safe and reliable operation of the power system.

nc:EdgeSchedulingArea

An EdgeSchedulingArea is a electrical area that is part of a SubSchedulingArea with one or more Installations connected.
It serves as the smallest energy level scheduling, forecasting and aggregated measurement used for coordinating energy production, consumption, and storage across its constituent connections.
An EdgeSchedulingArea may represent physical locations with multiple grid connection, such as a shopping mall, university campus, industrial facility, or private microgrid that are normally connected to the grid.

nc:SecondarySubstation

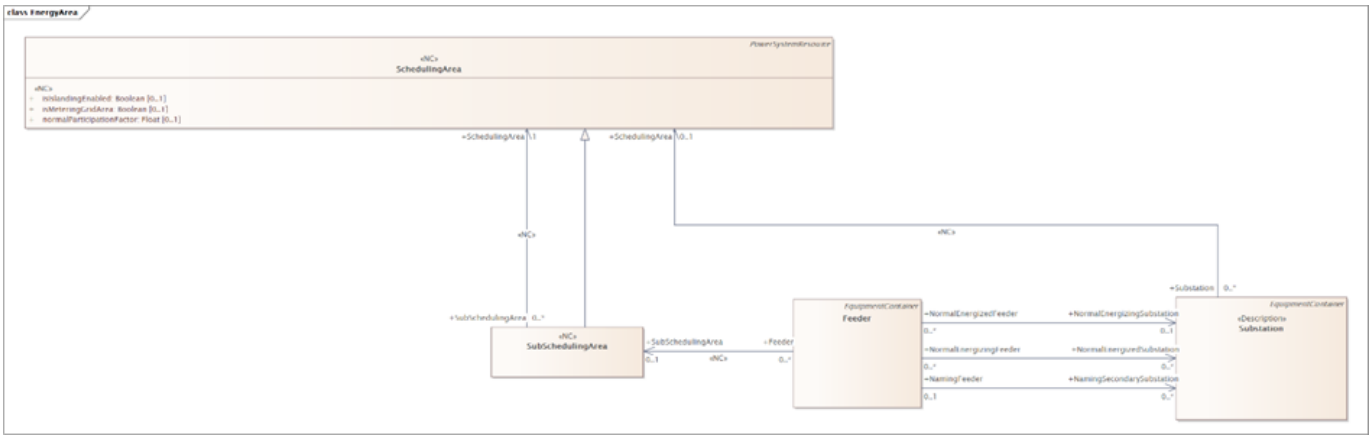
A SecondarySubstation is a substation that is either supplied by or serves a primary substation. It is responsible for transforming, distributing, or aggregating power to and from installations such as homes, industrial facilities, or prosumer sites.
A secondary substation supports bidirectional power flows, enabling both consumption and injection of energy within the distribution network.
It typically includes transformers, switchgear, protection, and measurement equipment, and may be equipped for remote monitoring or autonomous control

nc:GridConnectionPoint

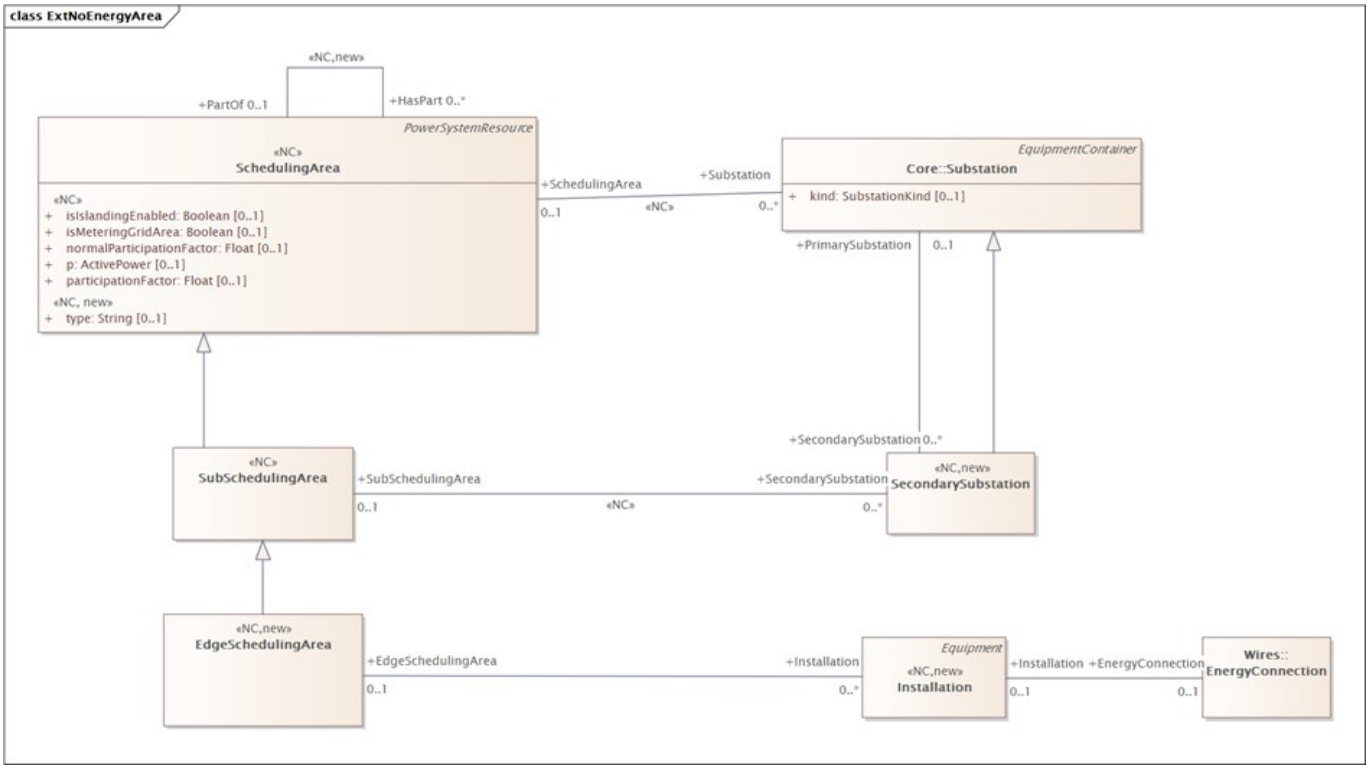
A GridConnectionPoint is a Point of Common Coupling (PCC) that defines the contractual and operational interface between a grid operator (e.g., TSO, DSO, or CDSO) and a connecting entity, such as a person, company, prosumer, or facility operator.
It represents the electrical location at which the connection agreement—as defined by applicable grid connection codes (e.g., EU RfG, DCC, HVDC)—is enacted, establishing the technical, legal, and compliance boundaries for power exchange between the public grid and the connected installation or energy system.
All operational conditions required by regulation—such as voltage and frequency ranges, fault ride-through capabilities, power quality limits, and observability—are applicable at this point.
The GridConnectionPoint may support bidirectional power flow, and is typically associated with metering, disconnection, and protection devices, but is independent of voltage level or specific technology.

nc:EnergyExchangePoint
An EnergyExchangePoint is a PointOfCommonCoupling that defines the electrical and operational interface between two independent adjacent grid operators —such as two TSOs, a TSO and a DSO, or two DSOs—who are responsible for coordinated operation of interconnected power systems.
It marks the electrical boundary point at which the energy exchange agreement between the two grid operators is enacted, and where power flows, balancing responsibilities, and observability requirements are formally managed. Operational conditions defined by applicable regulation—such as exchange capacity, frequency and voltage support, fault ride-through, protection coordination, and metering—can be defined at this point and in some cases enforced at this point.
It supports bidirectional power flow and may be associated with operational requirements such as balancing, frequency and voltage control, telemetry, protection coordination, and energy accounting.

nc:SchedulingAreaExchangePoint
Combination of scheduling area and one or more energy exchange point to define the relevant exchange point for a given scheduling area.



The updated is:


class ExtNoEnergyArea
«NC,new»
+PartOf 0..1
+HasPart 0..*
PowerSystemResource
«NC»
SchedulingArea
«NC»
+ isIslandingEnabled: Boolean [0..1]
+ isMeteringGridArea: Boolean [0..1]
+ normalParticipationFactor: Float [0..1]
+ p: ActivePower [0..1]
+ participationFactor: Float [0..1]
«NC, new»
+ type: String [0..1]
+SchedulingArea
0..1
«NC»
+Substation
0..*
EquipmentContainer
Core::Substation
+ kind: SubstationKind [0..1]
+PrimarySubstation
0..1
«NC»
SubSchedulingArea
+SubSchedulingArea
0..1
«NC»
+SecondarySubstation 0..*
+SecondarySubstation
0..*
«NC,new»
SecondarySubstation
«NC,new»
EdgeSchedulingArea
+EdgeSchedulingArea
0..1
+Installation
0..*
Equipment
«NC,new»
Installation
+Installation
0..1
+EnergyConnection
0..1
Wires::
EnergyConnection