



European Network of  
Transmission System Operators  
for Electricity

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# STATE INSTRUCTION SCHEDULE PROFILE SPECIFICATION

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2026-09-10

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ICTC APPROVED  
VERSION 2.5.0

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## 689 1 Introduction

690 The state instruction schedule enables an exchange of additional information related to  
691 schedules like bid schedule, GLKS schedule or availability schedule of Assessed elements,  
692 RAs or Contingencies amongst others.

## 693 2 Application profile specification

### 694 2.1 Version information

695 The content is generated from UML model file CIM17-2\_CGMES31v01\_PROF-  
696 20v03\_NC25v25\_MS10v12\_DES10v01.qea.

697 This edition is based on the IEC 61970 UML version “”, dated “”.

698 - Title:

699 - Keyword:

700 - Description:

701 - Version IRI:

702 - Version info:

703 - Prior version:

704 - Conforms to:

705 - Identifier:

### 706 2.2 Constraints naming convention

707 The naming of the rules shall not be used for machine processing. The rule names are just a  
708 string. The naming convention of the constraints is as follows.

709 “{rule.Type}:{rule.Standard}:{rule.Profile}:{rule.Property}:{rule.Name}”

710 where

711 rule.Type: C – for constraint; R – for requirement

712 rule.Standard: the number of the standard e.g. 301 for 61970-301, 456 for 61970-456, 13 for  
713 61968-13. 61970-600 specific constraints refer to 600 although they are related to one or  
714 combination of the 61970-450 series profiles. For NC profiles, NC is used.

715 rule.Profile: the abbreviation of the profile, e.g. TP for Topology profile. If set to “ALL” the  
716 constraint is applicable to all IEC 61970-600 profiles.

717 rule.Property: for UML classes, the name of the class, for attributes and associations, the name  
718 of the class and attribute or association end, e.g. EnergyConsumer, IdentifiedObject.name, etc.  
719 If set to “NA” the property is not applicable to a specific UML element.

720 rule.Name: the name of the rule. It is unique for the same property.

721 Example: C:600:ALL:IdentifiedObject.name:stringLength

### 722 2.3 Profile constraints

723 This clause defines requirements and constraints that shall be fulfilled by applications that  
724 conform to this document.

725 This document is the master for rules and constraints tagged "NC". For the sake of self-  
726 containment, the list below also includes a copy of the relevant rules from IEC 61970-452,  
727 tagged "452".

- 728 • C:452:ALL:NA:datatypes

729 According to 61970-501, datatypes are not exchanged in the instance data. The  
730 UnitMultiplier is 1 in cases none value is specified in the profile.

- 731 • R:452:ALL:NA:exchange

732 Optional and required attributes and associations must be imported and exported if they  
733 are in the model file prior to import.

- 734 • R:452:ALL:NA:exchange1

735 If an optional attribute does not exist in the imported file, it does not have to be exported  
736 in case exactly the same data set is exported, i.e. the tool is not obliged to automatically  
737 provide this attribute. If the export is resulting from an action by the user performed after  
738 the import, e.g. data processing or model update the export can contain optional  
739 attributes.

- 740 • R:452:ALL:NA:exchange2

741 In most of the profiles the selection of optional and required attributes is made so as to  
742 ensure a minimum set of required attributes without which the exchange does not fulfil  
743 its basic purpose. Business processes governing different exchanges can require  
744 mandatory exchange of certain optional attributes or associations. Optional and required  
745 attributes and associations shall therefore be supported by applications which claim  
746 conformance with certain functionalities of the IEC 61970-452. This provides flexibility  
747 for the business processes to adapt to different business requirements and base the  
748 exchanges on IEC 61970-452 compliant applications.

- 749 • R:452:ALL:NA:exchange3

750 An exporter may, at his or her discretion, produce a serialization containing additional  
751 class data described by the CIM Schema but not required by this document provided  
752 these data adhere to the conventions established in Clause 5.

- 753 • R:452:ALL:NA:exchange4

754 From the standpoint of the model import used by a data recipient, the document  
755 describes a subset of the CIM that importing software shall be able to interpret in order  
756 to import exported models. Data providers are free to exceed the minimum requirements  
757 described herein as long as their resulting data files are compliant with the CIM Schema  
758 and the conventions established in Clause 5. The document, therefore, describes  
759 additional classes and class data that, although not required, exporters will, in all  
760 likelihood, choose to include in their data files. The additional classes and data are  
761 labelled as required (cardinality 1..1) or as optional (cardinality 0..1) to distinguish them  
762 from their required counterparts. Please note, however, that data importers could  
763 potentially receive data containing instances of any and all classes described by the  
764 CIM Schema.

- 765 • R:452:ALL:NA:cardinality

766 The cardinality defined in the CIM model shall be followed, unless a more restrictive  
767 cardinality is explicitly defined in this document. For instance, the cardinality on the  
768 association between VoltageLevel and BaseVoltage indicates that a VoltageLevel shall

- 769 be associated with one and only one BaseVoltage, but a BaseVoltage can be associated  
770 with zero to many VoltageLevels.
- 771 • R:452:ALL:NA:associations
- 772 Associations between classes referenced in this document and classes not referenced  
773 here are not required regardless of cardinality.
- 774 • R:452:ALL:IdentifiedObject.name:rule
- 775 The attribute “name” inherited by many classes from the abstract class IdentifiedObject  
776 is not required to be unique. It must be a human readable identifier without additional  
777 embedded information that would need to be parsed. The attribute is used for purposes  
778 such as User Interface and data exchange debugging. The MRID defined in the data  
779 exchange format is the only unique and persistent identifier used for this data exchange.  
780 The attribute IdentifiedObject.name is, however, always required for CoreEquipment  
781 profile and Short Circuit profile.
- 782 • R:452:ALL:IdentifiedObject.description:rule
- 783 The attribute “description” inherited by many classes from the abstract class  
784 IdentifiedObject must contain human readable text without additional embedded  
785 information that would need to be parsed.
- 786 • R:452:ALL:NA:uniqueIdentifier
- 787 All IdentifiedObject-s shall have a persistent and globally unique identifier (Master  
788 Resource Identifier - mRID).
- 789 • R:452:ALL:NA:unitMultiplier
- 790 For exchange of attributes defined using CIM Data Types (ActivePower, Susceptance,  
791 etc.) a unit multiplier of 1 is used if the UnitMultiplier specified in this document is “none”.
- 792 • C:452:ALL:IdentifiedObject.name:stringLength
- 793 The string IdentifiedObject.name has a maximum of 128 characters.
- 794 • C:452:ALL:IdentifiedObject.description:stringLength
- 795 The string IdentifiedObject.description is maximum 256 characters.
- 796 • C:452:ALL:NA:float
- 797 An attribute that is defined as float (e.g. has a type Float or a type which is a Datatype  
798 with .value attribute of type Float) shall support ISO/IEC 60559:2020 for floating-point  
799 arithmetic using single precision floating point. A single precision float supports 7  
800 significant digits where the significant digits are described as an integer, or a decimal  
801 number with 6 decimal digits. Two float values are equal when the significant with 7  
802 digits are identical, e.g. 1234567 is equal 1.234567E6 and so are 1.2345678 and  
803 1.234567E0.
- 804 • R:NC:ALL:NA:serialization
- 805 The profiles are defined in the EnterpriseArchitect application and have multiple artifacts  
806 that describe them. The main artifacts are:
- 807 1) the EAP file (EnterpriseArchitect project file),  
808 2) the profiles’ specification document and

### 3) the application profiles (RDFS and SHACL).

Due to the complexity of the profiles, there are various cross profile associations that, from profiling and profile maintenance point of view, it is not practical to include the complete inheritance structure in all profiles. If this is done the documentation provided for all profiles would also include duplicated information on the description of classes defined in other profiles. The following cases are often observed in profiles:

- Case 1: An association end refers to an abstract class
- Case 2: An abstract class (stereotyped with "Description") has an association (direction to another class)
- Case 3: An abstract class (not stereotyped with "Description") has an association (direction to another class)
- Case 4: An abstract class has attributes and subclasses are not in the profile

In all cases, the datasets shall only include the subtypes of the abstract classes with the related properties (i.e. association or attributes) defined in the profile. The information is taken from either canonical model or the profiles where complete (expected) inheritance structure for the related abstract class is described. SHACL based constraints include constraints only for the concrete classes that are subtypes of the abstract class in the profile, and this can be used to inform which are the concrete classes expected in a dataset that conforms to this profile.

It should be taken into account that this approach deviates from MVAL5 (IEC 61970-600-1:2021), which creates multiple inheritance at serialization. For instance, with this more explicit exchange the serialization of the association between abstract class Equipment and abstract class Circuit for a PowerTransformer will be serialized as follows:

- for association

```
<cim:PowerTransformer rdf:about="_c328f787-bc17-47ad-a59f-6ba7133340d0">
```

```
  <nc:Equipment.Circuit rdf:resource="#_9ced16ac-d076-4ef9-a241-a998a579e77b"/>
```

```
</cim:PowerTransformer>
```

- for attribute

```
<cim:ACLineSegment rdf:about="_04f681aa-6999-4fb3-9775-acaa5eb7ceff">
```

```
  <cim:Equipment.inService>true</cim:Equipment.inService>
```

```
</cim:ACLineSegment>
```

The usage of rdf:ID or rdf:about depends on the stereotype of the class. rdf:about is used if the class has the stereotype "Description".

An example of not allowed serialization, as the Equipment is an abstract class

```
<cim:Equipment rdf:about="_c328f787-bc17-47ad-a59f-6ba7133340d0">
```

```
  <nc:Equipment.Circuit rdf:resource="#_9ced16ac-d076-4ef9-a241-a998a579e77b"/>
```

```
</cim:Equipment>
```

- R:NC:SIS:ParticipationFactorTimePoint.atTime:cardinality  
The attribute ParticipationFactorTimePoint.atTime is optional because PowerShiftKeySchedule can be used as a part of a bid pattern. In that case, the schedules are following the bid time.

- 851 • C:NC:SIS:PowerShiftKeySchedule.ParticipationFactorTimePoint.dependency
- 852 The multiplicity of the association end
- 853 PowerShiftKeySchedule.ParticipationFactorTimePoint shall be 1..n for all cases except
- 854 if the PowerShiftKeySchedule is associated with PowerShiftKeyDistribution.
- 855 • C:NC:SIS:PowerShiftKeySchedule:associations
- 856 PowerShiftKeySchedule shall include one and only one association to
- 857 ScheduleResource, PowerElectronicUnit, GeneratingUnit, DCPole,
- 858 EnergyResourceGroupCapacity, EquivalentInjection, EnergyConsumer, EnergySource,
- 859 ExternalNetworkInjection, SchedulingArea, DCEquivalentInjection, EnergyBlockOrder
- 860 and HydroPump.
- 861 • C:NC:SIS:PowerShiftKeyDistribution:associations
- 862 PowerShiftKeyDistribution shall include one and only one association to either
- 863 PowerBidSchedule or PowerShiftKeyStrategy.
- 864 • C:NC:SIS:GenericSequenceSchedule:associations
- 865 Association end GenericSequenceSchedule.EnergyBlockOrder is required.
- 866 • C:NC:SIS:PowerBidSchedule:associations
- 867 PowerBidSchedule shall include one and only one association to either
- 868 ScheduleResource or PowerRemedialAction.
- 869 • C:NC:SIS:PowerBidScheduleTimePoint:attributes
- 870 PowerBidScheduleTimePoint can have the following combinations of optional attributes:
- 871 1) activationCost, 2) shutdownCost or 3) any of the following p, minimumActivationP,
- 872 price, reservePrice, stepIncrementP.
- 873 • C:NC:SIS:PeerTemporalDependency.finishToFinishLagKind:required
- 874 If PeerTemporalDependency.finishToFinishLag is present
- 875 PeerTemporalDependency.finishToFinishLagKind is required.
- 876 • C:NC:SIS:PeerTemporalDependency.finishToStartLagKind:required
- 877 If PeerTemporalDependency.finishToStartLag is present
- 878 PeerTemporalDependency.finishToStartLagKind is required.
- 879 • C:NC:SIS:PeerTemporalDependency.overlapKind:required
- 880 If PeerTemporalDependency.overlap is present PeerTemporalDependency.overlapKind
- 881 is required.
- 882 • C:NC:SIS:PeerTemporalDependency.startToStartLagKind:required
- 883 If PeerTemporalDependency.startToStartLag is present
- 884 PeerTemporalDependency.startToStartLagKind is required.
- 885 • C:NC:SIS:PeerTemporalDependency.constraintKind:exclusive
- 886 If PeerTemporalDependency.constraintKind is set to
- 887 DependencyConstraintKind.exclusive, the following attributes shall not be defined:
- 888 PeerTemporalDependency.overlap, PeerTemporalDependency.startToStartLag,
- 889 PeerTemporalDependency.finishToStartLag,
- 890 PeerTemporalDependency.finishToFinishLag.
- 891
- 892
- 893
- 894

## 2.4 Metadata

ENTSO-E agreed to extend the header and metadata definitions by IEC 61970-552 Ed2. This new header definitions rely on W3C recommendations which are used worldwide and are positively recognised by the European Commission. The new definitions of the header mainly use Provenance ontology (PROV-O), Time Ontology and Data Catalog Vocabulary (DCAT). The global new header applicable for this profile is included in the metadata and document header specification document.

The header vocabulary contains all attributes defined in IEC 61970-552. This is done only for the purpose of having one vocabulary for header and to ensure transition for data exchanges that are using IEC 61970-552:2016 header. This profile does not use IEC 61970-552:2016 header attributes and relies only on the extended attributes.

### 2.4.1 Constraints

The identification of the constraints related to the metadata follows the same convention for naming of the constraints as for profile constraints.

- R:NC:ALL:wasAttributedTo:usage

The prov:wasAttributedTo should normally be the “X” EIC code of the actor or their URI (prov:Agent).

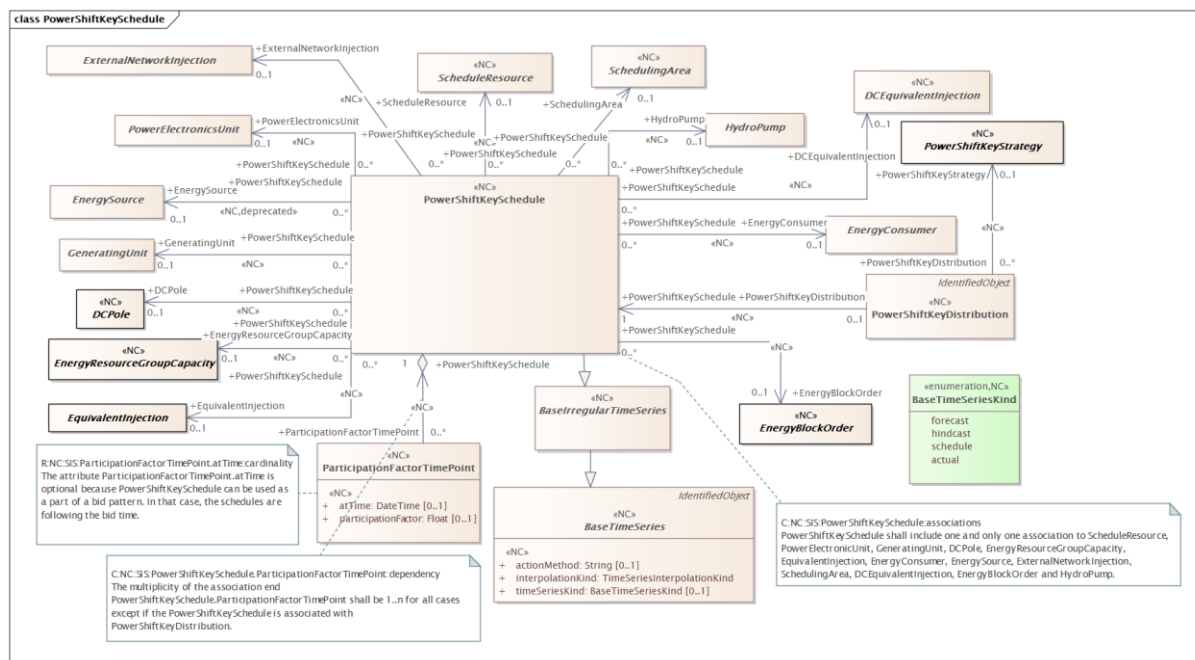
### 2.4.2 Reference metadata

The header defined for this profile requires availability of a set of reference metadata. For instance, the attribute prov:wasGeneratedBy requires a reference to an activity which produced the model or the related process. The activities are defined as reference metadata and their identifiers are referenced from the header to enable the receiving entity to retrieve the “static” (reference) information that is not modified frequently. This approach imposes a requirement that both the sending entity and the receiving entity have access to a unique version of the reference metadata. Therefore, each business process shall define which reference metadata is used and where it is located.

## 3 Detailed Profile Specification

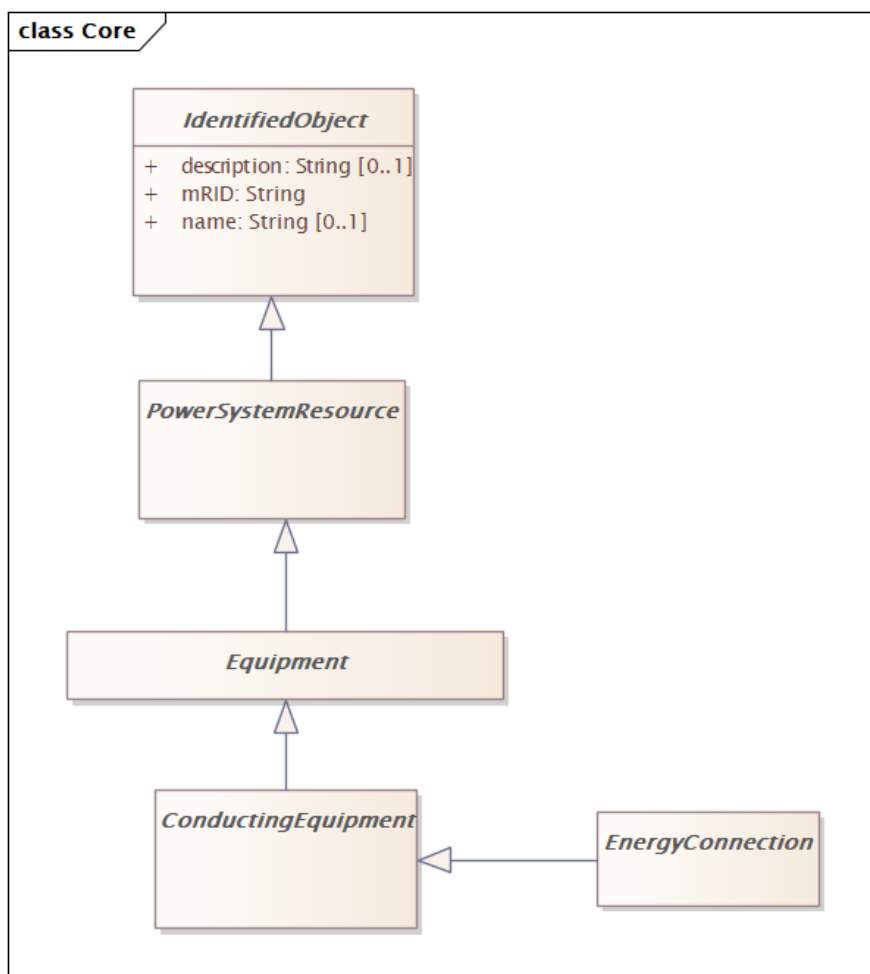
### 3.1 General

This package contains the state instruction schedule profile.



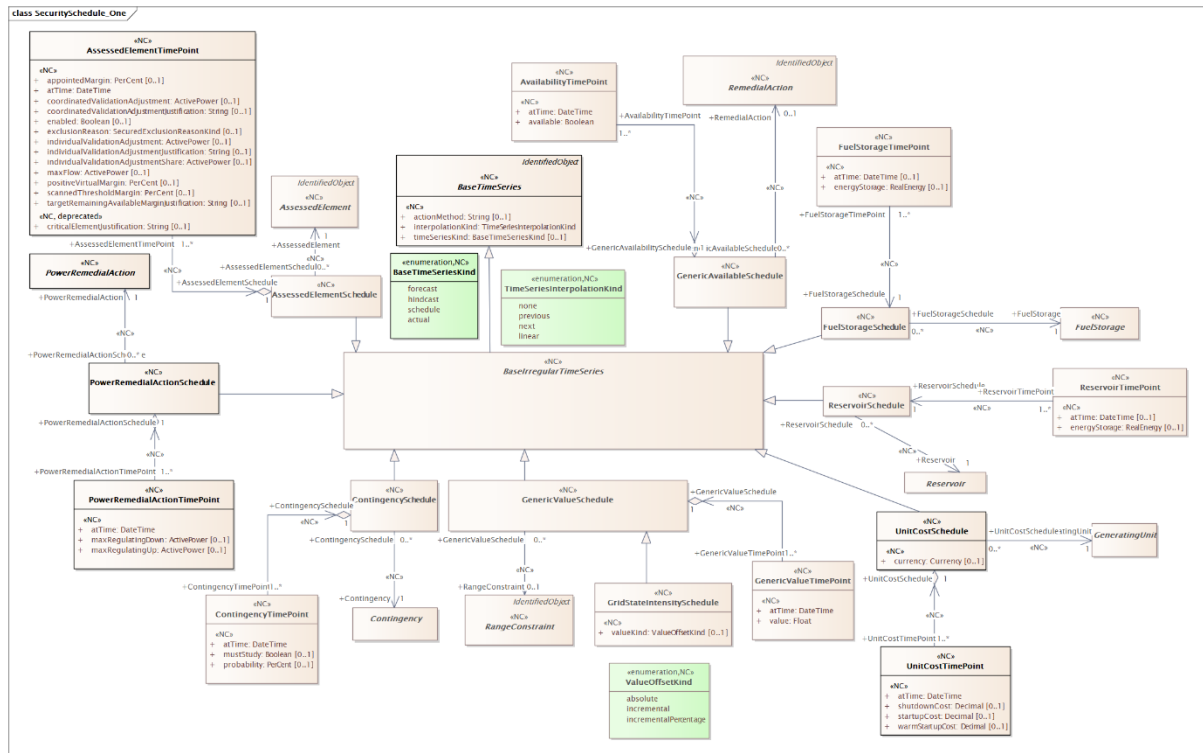
**Figure 1 – Class diagram StateInstructionScheduleProfile::PowerShiftKeySchedule**

Figure 1: The diagram shows power shift keys related classes.



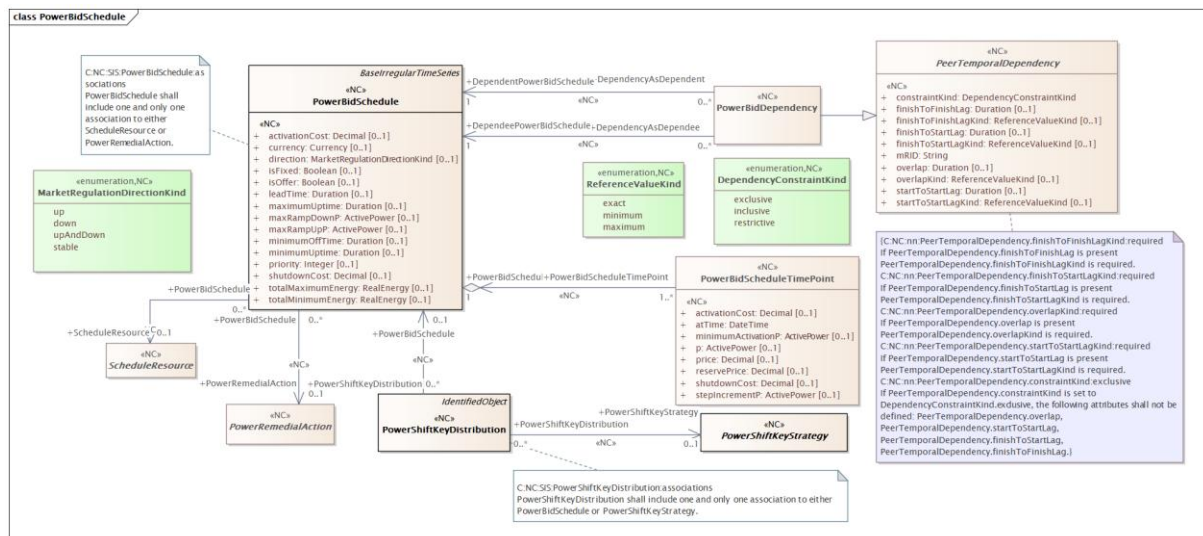
**Figure 2 – Class diagram StateInstructionScheduleProfile::Core**

Figure 2: The diagram shows classes from Base CIM used in the security schedule profile.



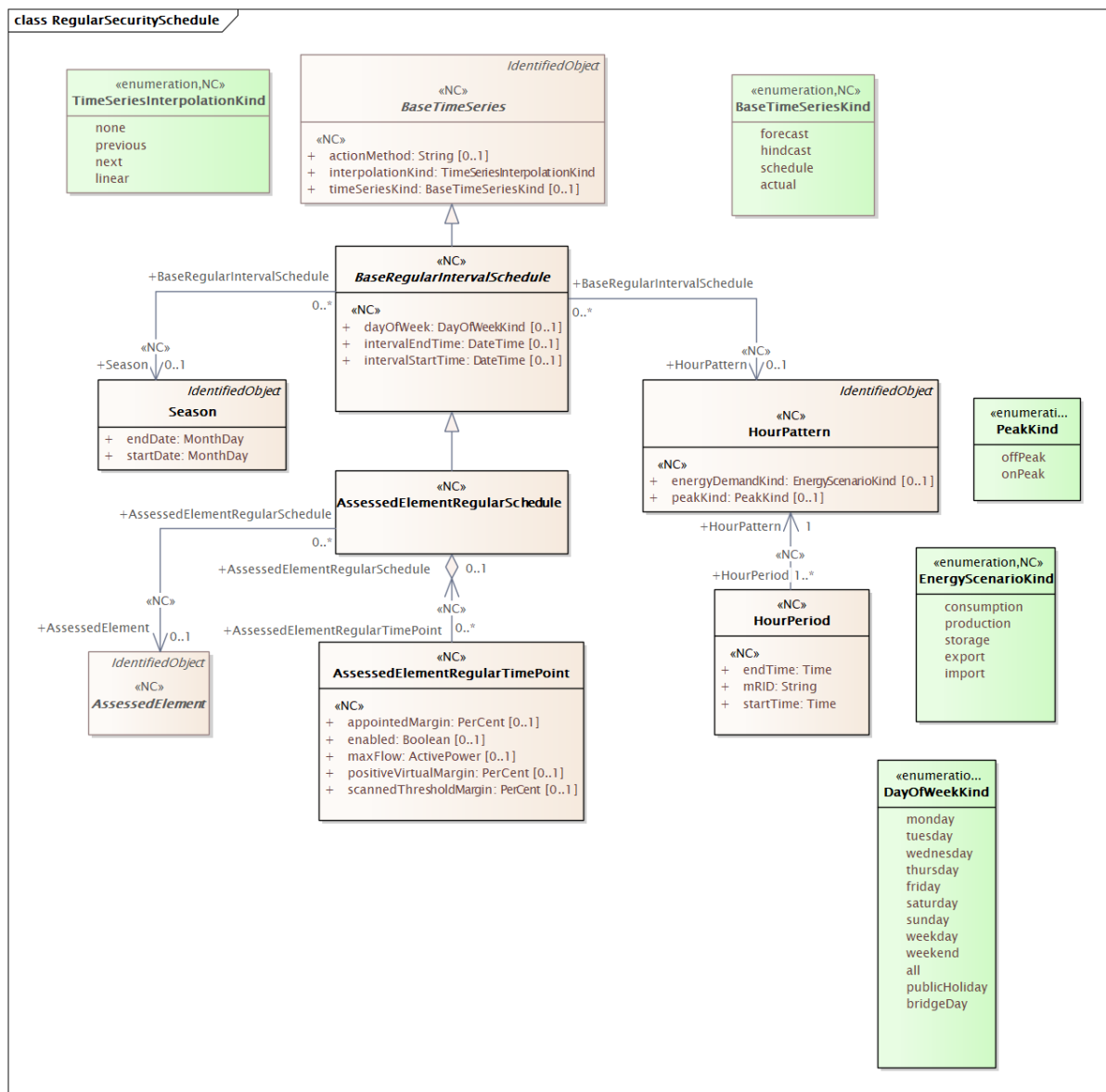
**Figure 3 – Class diagram StateInstructionScheduleProfile::SecuritySchedule\_One**

Figure 3: The diagram shows security schedule related classes.



**Figure 4 – Class diagram StateInstructionScheduleProfile::PowerBidSchedule**

Figure 4: The diagram shows power bid schedule related classes. The power bid schedule part of the security schedule profile shall be used only for Coordinated Security Analysis (CSA) process. We shall not use this profile for any market related bidding process. This profile should not prevent to use the Reserve Bid document market profile if users want to use it for their local markets.



**Figure 5 – Class diagram StateInstructionScheduleProfile::RegularSecuritySchedule**

Figure 5: The diagram shows regular security schedule related classes.

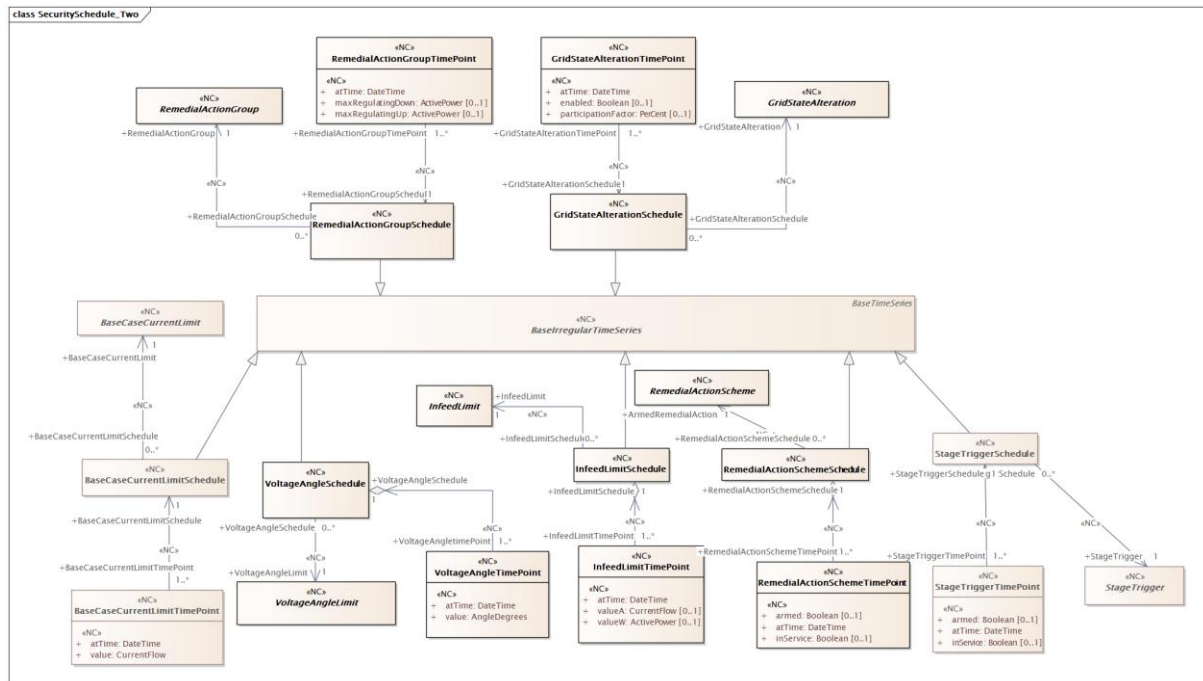


Figure 6 – Class diagram StateInstructionScheduleProfile::SecuritySchedule\_Two

Figure 6: The diagram shows security schedule related classes.

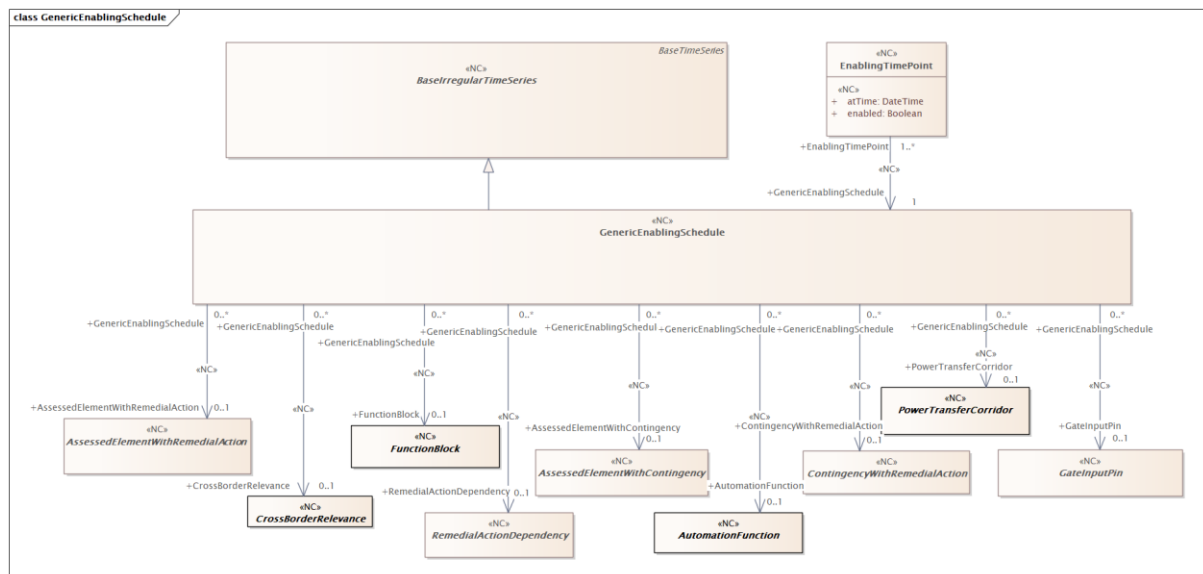
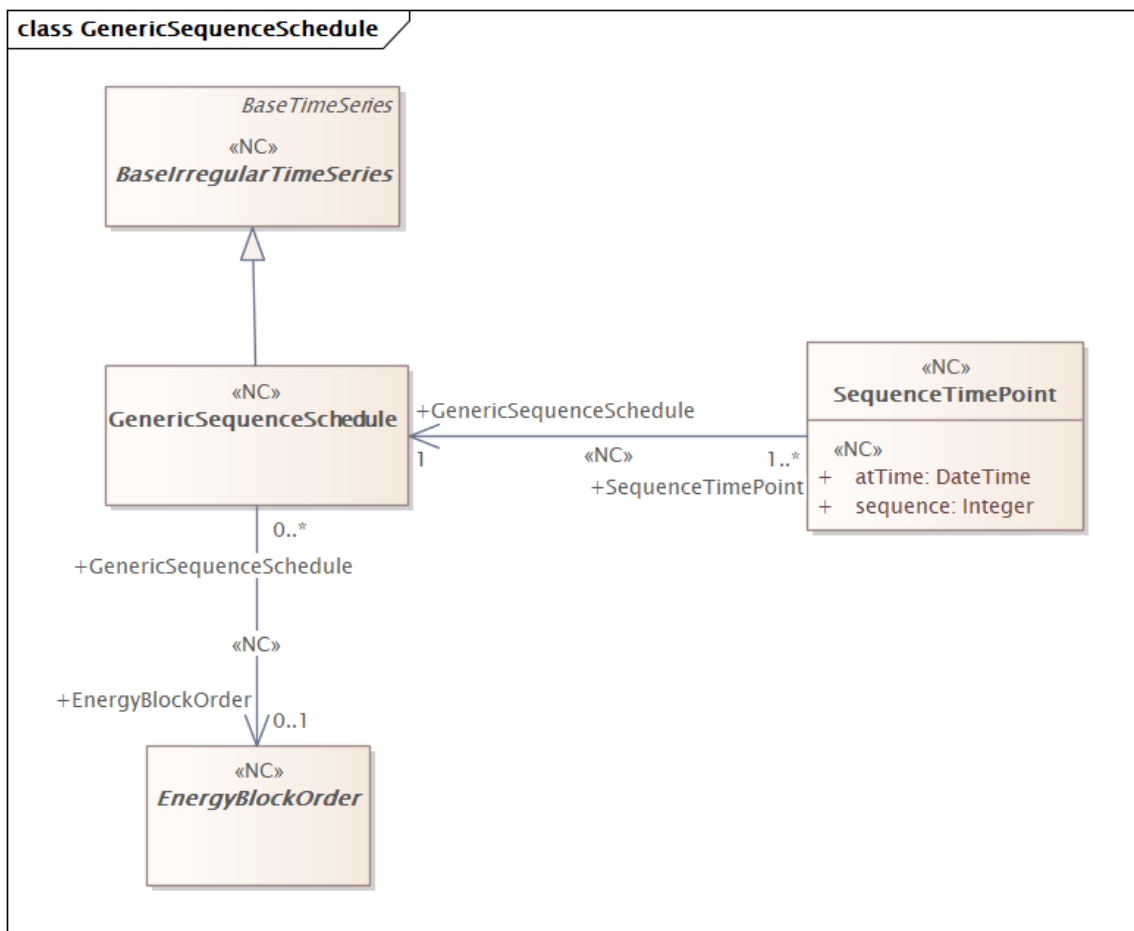


Figure 7 – Class diagram StateInstructionScheduleProfile::GenericEnablingSchedule

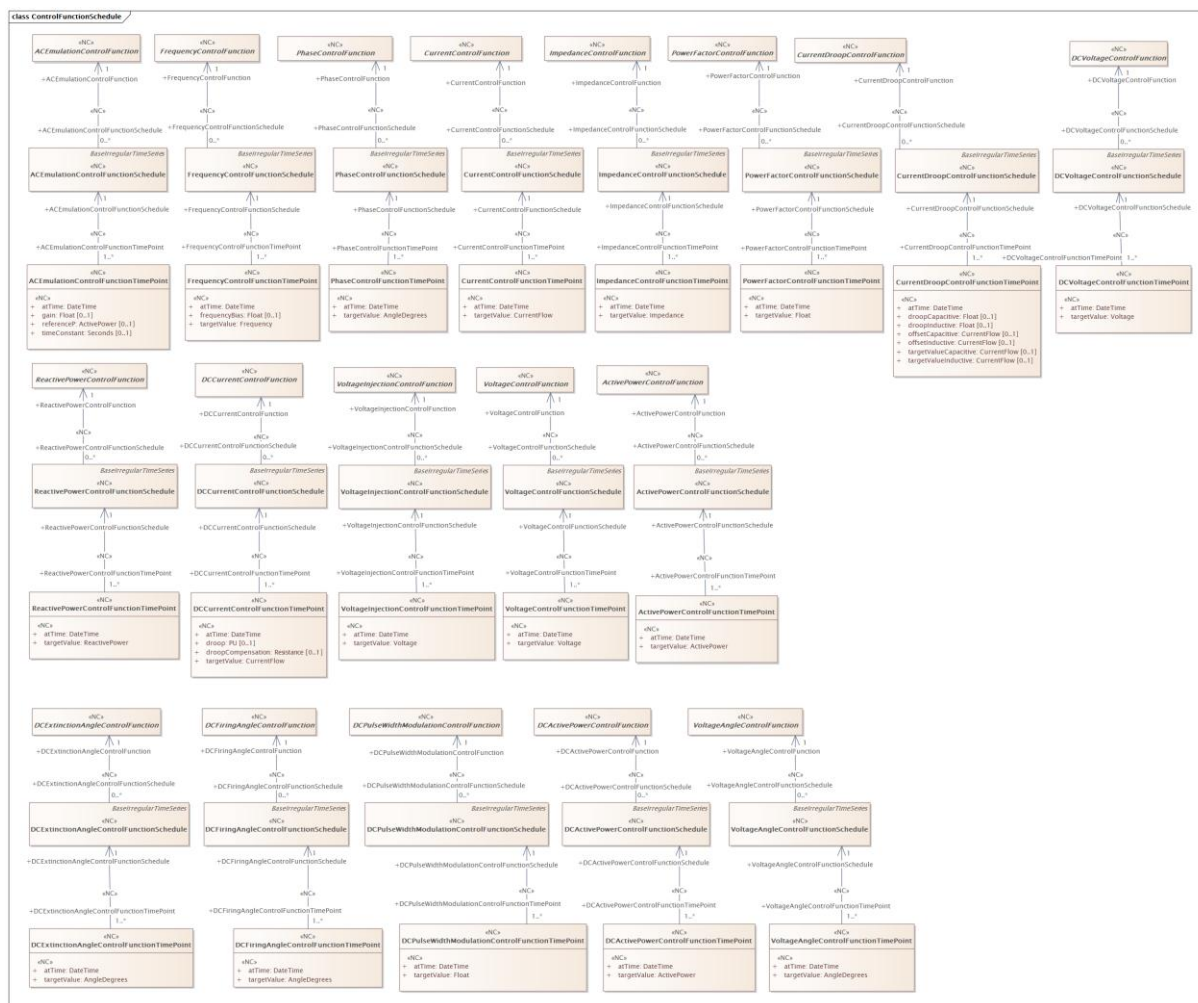
Figure 7: The diagram shows generic enabling schedule related classes.



950

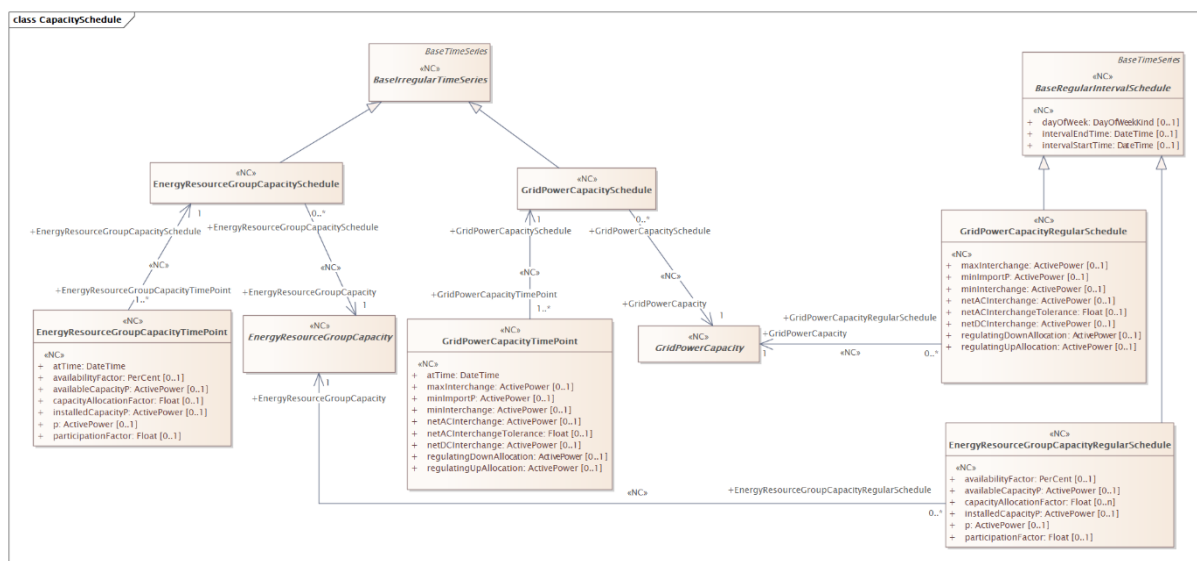
951 **Figure 8 – Class diagram StateInstructionScheduleProfile::GenericSequenceSchedule**

952 Figure 8: The diagram shows generic sequence schedule related classes.



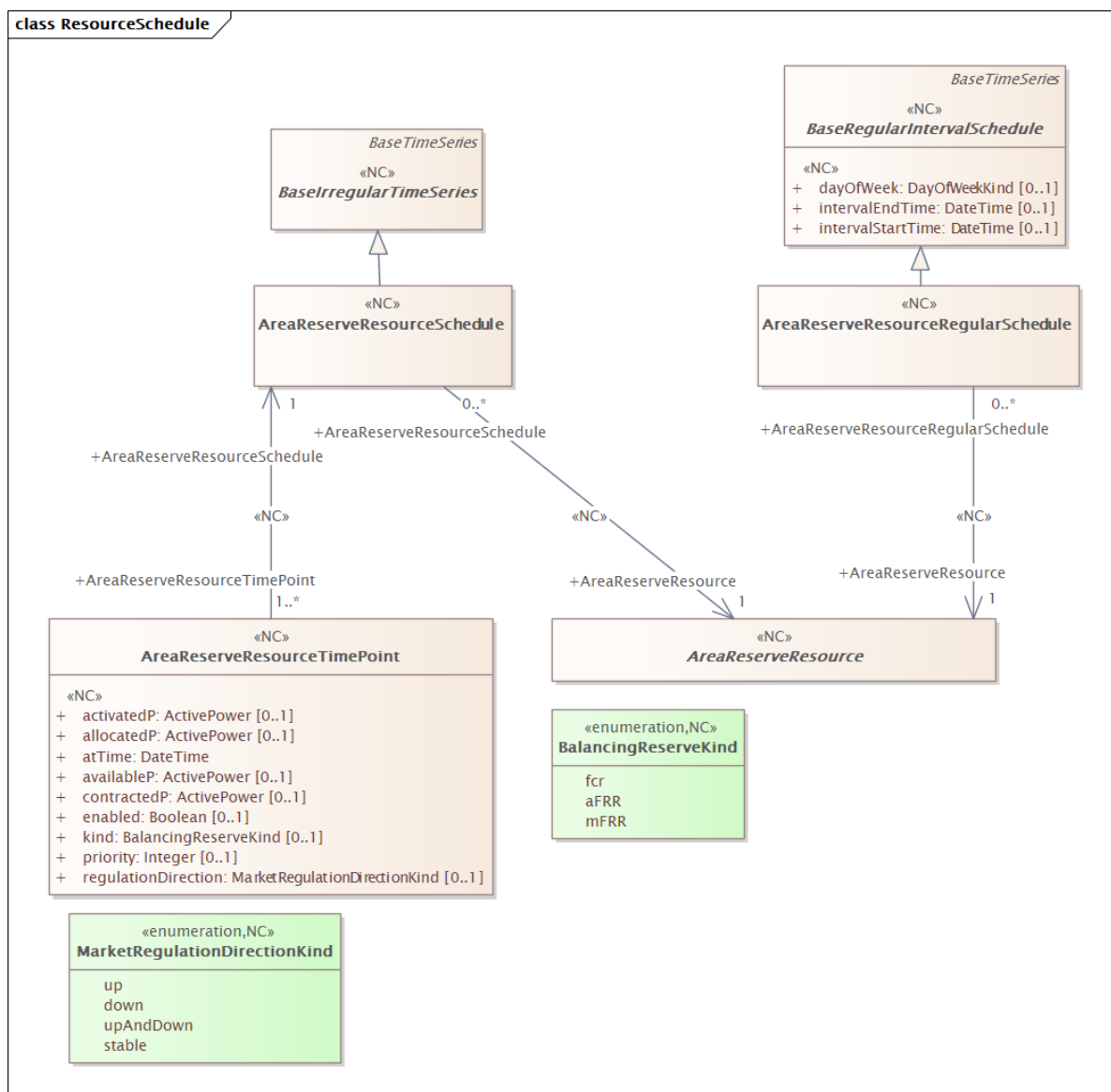
**Figure 9 – Class diagram StateInstructionScheduleProfile::ControlFunctionSchedule**

Figure 9: The diagram contains main classes and associations related to control function schedules.



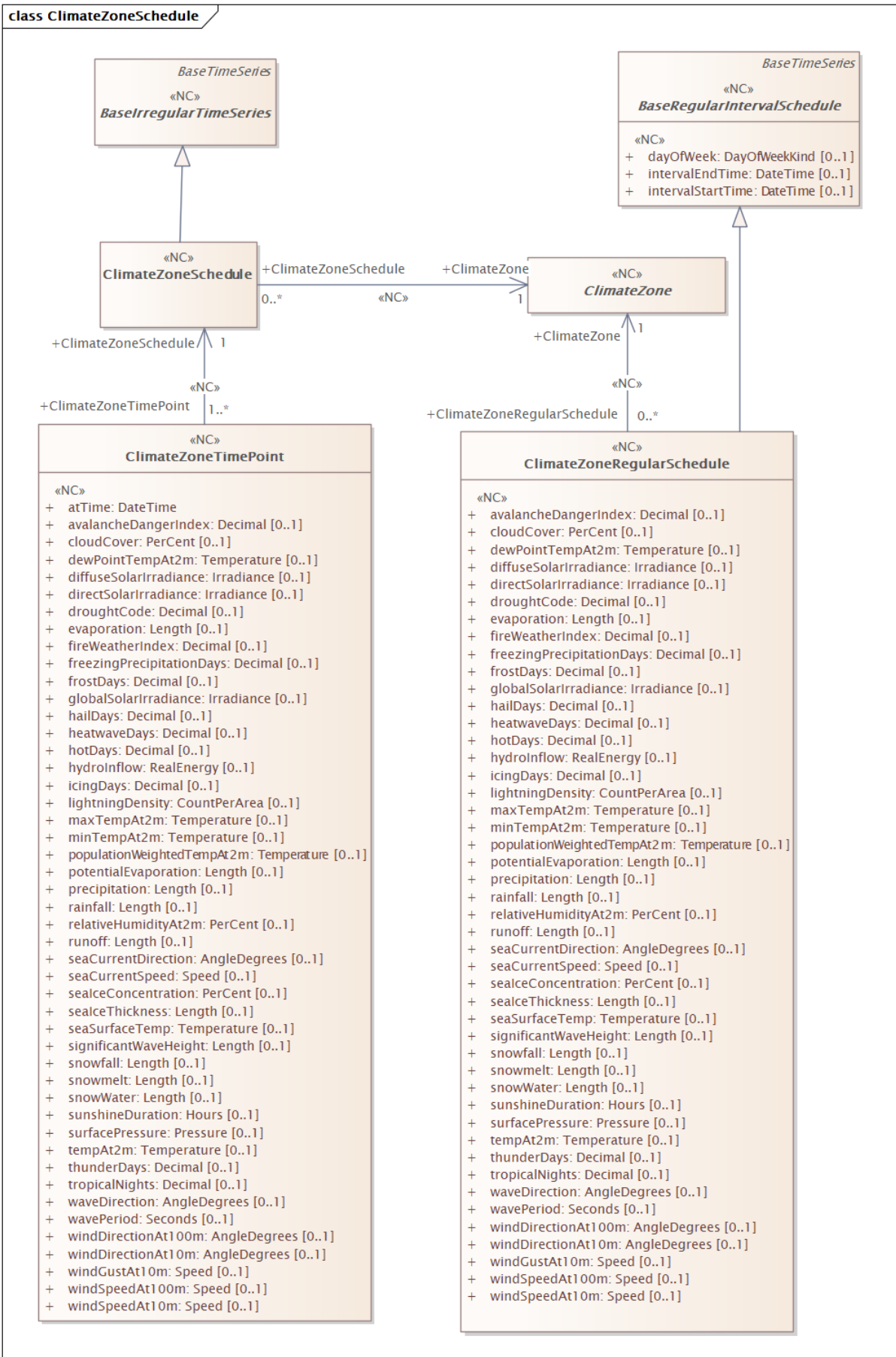
**Figure 10 – Class diagram StateInstructionScheduleProfile::CapacitySchedule**

Figure 10: The diagram contains main classes and associations related to capacity schedules.



**Figure 11 – Class diagram StateInstructionScheduleProfile::ResourceSchedule**

Figure 11: The diagram contains main classes and associations related to resource schedules.



**Figure 12 – Class diagram StateInstructionScheduleProfile::ClimateZoneSchedule**

Figure 12: The diagram contains main classes and associations related to climate zone schedules.

**3.2 (abstract) ConductingEquipment**

Inheritance path = [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

The parts of the AC power system that are designed to carry current or that are conductively connected through terminals.

Table 1 shows all attributes of ConductingEquipment.

**Table 1 – Attributes of StateInstructionScheduleProfile::ConductingEquipment**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

**3.3 (abstract) Contingency root class**

An event threatening system reliability, consisting of one or more contingency elements.

**3.4 (abstract) EnergyConnection**

Inheritance path = [ConductingEquipment](#) : [Equipment](#) : [PowerSystemResource](#) : [IdentifiedObject](#)

A connection of energy generation or consumption on the power system model.

Table 2 shows all attributes of EnergyConnection.

**Table 2 – Attributes of StateInstructionScheduleProfile::EnergyConnection**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

**3.5 (abstract) EnergyConsumer root class**

Generic user of energy - a point of consumption on the power system model.

EnergyConsumer.pfixed, .qfixed, .pfixedPct and .qfixedPct have meaning only if there is no LoadResponseCharacteristic associated with EnergyConsumer or if LoadResponseCharacteristic.exponentModel is set to False.

**3.6 (abstract) EnergySource root class**

A generic equivalent for an energy supplier on a transmission or distribution voltage level.

**3.7 (abstract) Equipment**

Inheritance path = [PowerSystemResource](#) : [IdentifiedObject](#)

The parts of a power system that are physical devices, electronic or mechanical.

Table 3 shows all attributes of Equipment.

**Table 3 – Attributes of StateInstructionScheduleProfile::Equipment**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

995

996 **3.8 (abstract) EquivalentInjection root class**

997 This class represents equivalent injections (generation or load). Voltage regulation is allowed  
998 only at the point of connection.

999 **3.9 (abstract) ExternalNetworkInjection root class**

1000 This class represents the external network and it is used for IEC 60909 calculations.

1001 **3.10 (abstract) GeneratingUnit root class**

1002 A single or set of synchronous machines for converting mechanical power into alternating-  
1003 current power. For example, individual machines within a set may be defined for scheduling  
1004 purposes while a single control signal is derived for the set. In this case there would be a  
1005 GeneratingUnit for each member of the set and an additional GeneratingUnit corresponding to  
1006 the set.

1007 **3.11 (abstract) HydroPump root class**

1008 A synchronous motor-driven pump, typically associated with a pumped storage plant.

1009 **3.12 (abstract) IdentifiedObject root class**

1010 This is a root class to provide common identification for all classes needing identification and  
1011 naming attributes.

1012 Table 4 shows all attributes of IdentifiedObject.

1013 **Table 4 – Attributes of StateInstructionScheduleProfile::IdentifiedObject**

| name        | mult | type                   | description                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | The description is a free human readable text describing or naming the object. It may be non unique and may not correlate to a naming hierarchy.                                                                                                                                                                                                                                                              |
| mRID        | 1..1 | <a href="#">String</a> | Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.<br><br>For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements. |
| name        | 0..1 | <a href="#">String</a> | The name is any free human readable and possibly non unique text naming the object.                                                                                                                                                                                                                                                                                                                           |

1014

1015 **3.13 (abstract) PowerElectronicsUnit root class**

1016 A generating unit or battery or aggregation that connects to the AC network using power  
1017 electronics rather than rotating machines.

1018 **3.14 (abstract) PowerSystemResource**

1019 Inheritance path = [IdentifiedObject](#)

1020 A power system resource (PSR) can be an item of equipment such as a switch, an equipment  
1021 container containing many individual items of equipment such as a substation, or an  
1022 organisational entity such as sub-control area. Power system resources can have  
1023 measurements associated.

1024 Table 5 shows all attributes of PowerSystemResource.

**Table 5 – Attributes of StateInstructionScheduleProfile::PowerSystemResource**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

**3.15 (abstract) Reservoir root class**

A water storage facility within a hydro system, including: ponds, lakes, lagoons, and rivers. The storage is usually behind some type of dam.

**3.16 Season**

Inheritance path = [IdentifiedObject](#)

A specified time period of the year.

Table 6 shows all attributes of Season.

**Table 6 – Attributes of StateInstructionScheduleProfile::Season**

| name        | mult | type                     | description                                      |
|-------------|------|--------------------------|--------------------------------------------------|
| endDate     | 1..1 | <a href="#">MonthDay</a> | Date season ends.                                |
| startDate   | 1..1 | <a href="#">MonthDay</a> | Date season starts.                              |
| description | 0..1 | <a href="#">String</a>   | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a>   | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a>   | inherited from: <a href="#">IdentifiedObject</a> |

**3.17 (NC) BalancingReserveKind enumeration**

Classification of the balancing reserve product represented by an AreaReserveResource. The kind identifies the reserve service for which the associated resource has been qualified and made available.

Table 7 shows all literals of BalancingReserveKind.

**Table 7 – Literals of StateInstructionScheduleProfile::BalancingReserveKind**

| literal | value | description                                                                                                                                                                                     |
|---------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| fcr     |       | Frequency Containment Reserve (FCR). Automatically activated reserve that provides immediate frequency containment following small frequency deviations or disturbances.                        |
| aFRR    |       | Automatic Frequency Restoration Reserve (aFRR). Automatically activated balancing reserve used to restore system frequency and scheduled interchanges under automatic generation control (AGC). |
| mFRR    |       | Manual Frequency Restoration Reserve (mFRR). Manually activated balancing reserve used to restore system balance following activation by the system operator.                                   |

**3.18 (NC) BaseTimeSeriesKind enumeration**

Kind of time series.

Table 8 shows all literals of BaseTimeSeriesKind.

1046

**Table 8 – Literals of StateInstructionScheduleProfile::BaseTimeSeriesKind**

| literal  | value | description                                                                                                                                                                                                                                                                                                  |
|----------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| schedule |       | Time series is schedule data. The values represent the result of a committed and plan forecast data that has been through a quality control and could incur penalty when not followed.                                                                                                                       |
| forecast |       | Time series is forecast data. The values represent the result of scientific predictions based on historical time stamped data.                                                                                                                                                                               |
| hindcast |       | Time series is hindcast data. The value represent probable past (historic) condition given by calculation done using actual values. For instance, determine the among of wind based on the energy produced by wind. However, hindcast is typical the result of a simulated forecasts for historical periods. |
| actual   |       | Time series is actual data. The values represent measured or calculated values that represent the actual behaviour.                                                                                                                                                                                          |

1047

**3.19 Currency enumeration**

1049 Monetary currencies. ISO 4217 standard including 3-character currency code.

1050 Table 9 shows all literals of Currency.

1051

**Table 9 – Literals of StateInstructionScheduleProfile::Currency**

| literal | value | description                                             |
|---------|-------|---------------------------------------------------------|
| AED     |       | United Arab Emirates dirham.                            |
| AFN     |       | Afghan afghani.                                         |
| ALL     |       | Albanian lek.                                           |
| AMD     |       | Armenian dram.                                          |
| ANG     |       | Netherlands Antillean guilder.                          |
| AOA     |       | Angolan kwanza.                                         |
| ARS     |       | Argentine peso.                                         |
| AUD     |       | Australian dollar.                                      |
| AWG     |       | Aruban florin.                                          |
| AZN     |       | Azerbaijani manat.                                      |
| BAM     |       | Bosnia and Herzegovina convertible mark.                |
| BBD     |       | Barbados dollar.                                        |
| BDT     |       | Bangladeshi taka.                                       |
| BGN     |       | Bulgarian lev.                                          |
| BHD     |       | Bahraini dinar.                                         |
| BIF     |       | Burundian franc.                                        |
| BMD     |       | Bermudian dollar (customarily known as Bermuda dollar). |
| BND     |       | Brunei dollar.                                          |
| BOB     |       | Boliviano.                                              |
| BOV     |       | Bolivian Mvdol (funds code).                            |

| literal | value | description                            |
|---------|-------|----------------------------------------|
| BRL     |       | Brazilian real.                        |
| BSD     |       | Bahamian dollar.                       |
| BTN     |       | Bhutanese ngultrum.                    |
| BWP     |       | Botswana pula.                         |
| BYR     |       | Belarusian ruble.                      |
| BZD     |       | Belize dollar.                         |
| CAD     |       | Canadian dollar.                       |
| CDF     |       | Congolese franc.                       |
| CHF     |       | Swiss franc.                           |
| CLF     |       | Unidad de Fomento (funds code), Chile. |
| CLP     |       | Chilean peso.                          |
| CNY     |       | Chinese yuan.                          |
| COP     |       | Colombian peso.                        |
| COU     |       | Unidad de Valor Real.                  |
| CRC     |       | Costa Rican colon.                     |
| CUC     |       | Cuban convertible peso.                |
| CUP     |       | Cuban peso.                            |
| CVE     |       | Cape Verde escudo.                     |
| CZK     |       | Czech koruna.                          |
| DJF     |       | Djiboutian franc.                      |
| DKK     |       | Danish krone.                          |
| DOP     |       | Dominican peso.                        |
| DZD     |       | Algerian dinar.                        |
| EEK     |       | Estonian kroon.                        |
| EGP     |       | Egyptian pound.                        |
| ERN     |       | Eritrean nakfa.                        |
| ETB     |       | Ethiopian birr.                        |
| EUR     |       | Euro.                                  |
| FJD     |       | Fiji dollar.                           |
| FKP     |       | Falkland Islands pound.                |
| GBP     |       | Pound sterling.                        |
| GEL     |       | Georgian lari.                         |
| GHS     |       | Ghanaian cedi.                         |
| GIP     |       | Gibraltar pound.                       |
| GMD     |       | Gambian dalasi.                        |
| GNF     |       | Guinean franc.                         |
| GTQ     |       | Guatemalan quetzal.                    |
| GYD     |       | Guyanese dollar.                       |
| HKD     |       | Hong Kong dollar.                      |
| HNL     |       | Honduran lempira.                      |
| HRK     |       | Croatian kuna.                         |

| literal | value | description            |
|---------|-------|------------------------|
| HTG     |       | Haitian gourde.        |
| HUF     |       | Hungarian forint.      |
| IDR     |       | Indonesian rupiah.     |
| ILS     |       | Israeli new sheqel.    |
| INR     |       | Indian rupee.          |
| IQD     |       | Iraqi dinar.           |
| IRR     |       | Iranian rial.          |
| ISK     |       | Icelandic króna.       |
| JMD     |       | Jamaican dollar.       |
| JOD     |       | Jordanian dinar.       |
| JPY     |       | Japanese yen.          |
| KES     |       | Kenyan shilling.       |
| KGS     |       | Kyrgyzstani som.       |
| KHR     |       | Cambodian riel.        |
| KMF     |       | Comoro franc.          |
| KPW     |       | North Korean won.      |
| KRW     |       | South Korean won.      |
| KWD     |       | Kuwaiti dinar.         |
| KYD     |       | Cayman Islands dollar. |
| KZT     |       | Kazakhstani tenge.     |
| LAK     |       | Lao kip.               |
| LBP     |       | Lebanese pound.        |
| LKR     |       | Sri Lanka rupee.       |
| LRD     |       | Liberian dollar.       |
| LSL     |       | Lesotho loti.          |
| LTL     |       | Lithuanian litas.      |
| LVL     |       | Latvian lats.          |
| LYD     |       | Libyan dinar.          |
| MAD     |       | Moroccan dirham.       |
| MDL     |       | Moldovan leu.          |
| MGA     |       | Malagasy ariary.       |
| MKD     |       | Macedonian denar.      |
| MMK     |       | Myanma kyat.           |
| MNT     |       | Mongolian tugrik.      |
| MOP     |       | Macanese pataca.       |
| MRO     |       | Mauritanian ouguiya.   |
| MUR     |       | Mauritian rupee.       |
| MVR     |       | Maldivian rufiyaa.     |
| MWK     |       | Malawian kwacha.       |
| MXN     |       | Mexican peso.          |
| MYR     |       | Malaysian ringgit.     |

| literal | value | description                  |
|---------|-------|------------------------------|
| MZN     |       | Mozambican metical.          |
| NAD     |       | Namibian dollar.             |
| NGN     |       | Nigerian naira.              |
| NIO     |       | Cordoba oro.                 |
| NOK     |       | Norwegian krone.             |
| NPR     |       | Nepalese rupee.              |
| NZD     |       | New Zealand dollar.          |
| OMR     |       | Omani rial.                  |
| PAB     |       | Panamanian balboa.           |
| PEN     |       | Peruvian nuevo sol.          |
| PGK     |       | Papua New Guinean kina.      |
| PHP     |       | Philippine peso.             |
| PKR     |       | Pakistani rupee.             |
| PLN     |       | Polish zloty.                |
| PYG     |       | Paraguayan guaraní.          |
| QAR     |       | Qatari rial.                 |
| RON     |       | Romanian new leu.            |
| RSD     |       | Serbian dinar.               |
| RUB     |       | Russian rouble.              |
| RWF     |       | Rwandan franc.               |
| SAR     |       | Saudi riyal.                 |
| SBD     |       | Solomon Islands dollar.      |
| SCR     |       | Seychelles rupee.            |
| SDG     |       | Sudanese pound.              |
| SEK     |       | Swedish krona/kronor.        |
| SGD     |       | Singapore dollar.            |
| SHP     |       | Saint Helena pound.          |
| SLL     |       | Sierra Leonean leone.        |
| SOS     |       | Somali shilling.             |
| SRD     |       | Surinamese dollar.           |
| STD     |       | São Tomé and Príncipe dobra. |
| SYP     |       | Syrian pound.                |
| SZL     |       | Lilangeni.                   |
| THB     |       | Thai baht.                   |
| TJS     |       | Tajikistani somoni.          |
| TMT     |       | Turkmenistani manat.         |
| TND     |       | Tunisian dinar.              |
| TOP     |       | Tongan pa'anga.              |
| TRY     |       | Turkish lira.                |
| TTD     |       | Trinidad and Tobago dollar.  |
| TWD     |       | New Taiwan dollar.           |

| literal | value | description                |
|---------|-------|----------------------------|
| TZS     |       | Tanzanian shilling.        |
| UAH     |       | Ukrainian hryvnia.         |
| UGX     |       | Ugandan shilling.          |
| USD     |       | United States dollar.      |
| UYU     |       | Uruguayan peso.            |
| UZS     |       | Uzbekistan som.            |
| VEF     |       | Venezuelan bolívar fuerte. |
| VND     |       | Vietnamese Dong.           |
| VUV     |       | Vanuatu vatu.              |
| WST     |       | Samoan tala.               |
| XAF     |       | CFA franc BEAC.            |
| XCD     |       | East Caribbean dollar.     |
| XOF     |       | CFA Franc BCEAO.           |
| XPF     |       | CFP franc.                 |
| YER     |       | Yemeni rial.               |
| ZAR     |       | South African rand.        |
| ZMK     |       | Zambian kwacha.            |
| ZWL     |       | Zimbabwe dollar.           |

1052

1053 **3.20 (NC) DayOfWeekKind enumeration**

1054 The kind of day to be included in a regular schedule.

1055 Table 10 shows all literals of DayOfWeekKind.

1056 **Table 10 – Literals of StateInstructionScheduleProfile::DayOfWeekKind**

| literal       | value | description                                                                                                                                                                                                                                                                          |
|---------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| monday        |       | Monday as the day of the week.                                                                                                                                                                                                                                                       |
| tuesday       |       | Tuesday as the day of the week.                                                                                                                                                                                                                                                      |
| wednesday     |       | Wednesday as the day of the week.                                                                                                                                                                                                                                                    |
| thursday      |       | Thursday as the day of the week.                                                                                                                                                                                                                                                     |
| friday        |       | Friday as the day of the week.                                                                                                                                                                                                                                                       |
| saturday      |       | Saturday as the day of the week.                                                                                                                                                                                                                                                     |
| sunday        |       | Sunday as the day of the week.                                                                                                                                                                                                                                                       |
| weekday       |       | Day of the week other than Sunday or Saturday.                                                                                                                                                                                                                                       |
| weekend       |       | Day of the week which is Sunday or Saturday.                                                                                                                                                                                                                                         |
| all           |       | All days of the week.                                                                                                                                                                                                                                                                |
| publicHoliday |       | Public holiday is an officially designated day when most workplaces and schools are closed.                                                                                                                                                                                          |
| bridgeDay     |       | A day that is a gap between two distinguished days e.g holiday and weekend that leads to an abnormal scheduling behavior. e.g. if Ascension day falls on a Thursday, then Friday would be a bridge day due to the schedule will not have a normal Friday consumption and production. |

1057

**3.21 (NC) DependencyConstraintKind enumeration**

The kind of dependency constraint defined between the dependee and dependent peer objects.  
 Note: The dependee is the peer object upon which another peer object depends. The dependent is the peer object whose temporal or operational behaviour is constrained by the dependee.  
 Although dependee is not a commonly used English term, it is used here to distinguish this relationship from a parent-child hierarchy, as both objects are peer instances of the same class.  
 Table 11 shows all literals of DependencyConstraintKind.

**Table 11 – Literals of StateInstructionScheduleProfile::DependencyConstraintKind**

| literal     | value | description                                                                                                                                                                                                                                                              |
|-------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| exclusive   |       | The dependee and dependent shall not both be active or effective at the same time.                                                                                                                                                                                       |
| inclusive   |       | The dependent shall only be active or effective while the dependee is active or effective.                                                                                                                                                                               |
| restrictive |       | The dependee constrains the dependent without requiring the dependent to become active or effective.<br>Note: A restrictive dependency defines temporal or operational constraints on the behaviour of the dependent while leaving its activation or operation optional. |

**3.22 (NC) EnergyScenarioKind enumeration**

Kind of energy scenario.  
 Table 12 shows all literals of EnergyScenarioKind.

**Table 12 – Literals of StateInstructionScheduleProfile::EnergyScenarioKind**

| literal     | value | description                              |
|-------------|-------|------------------------------------------|
| consumption |       | Scenario focus on consumption of energy. |
| production  |       | Scenario focus on production of energy.  |
| storage     |       | Scenario focus on storage of energy.     |
| export      |       | Scenario focus on export of energy.      |
| import      |       | Scenario focus on import of energy.      |

**3.23 (NC) MarketRegulationDirectionKind enumeration**

Identifies the direction of activation or reserve provision for a market regulation product or instrument (e.g., aFRR, mFRR, FCR). It expresses how the service affects the system balance — by increasing or decreasing net generation or consumption.  
 Table 13 shows all literals of MarketRegulationDirectionKind.

**Table 13 – Literals of StateInstructionScheduleProfile::MarketRegulationDirectionKind**

| literal | value | description                                                                                                                                                                               |
|---------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| up      |       | Regulation activation that increases the system's net power injection — achieved either by increasing generation or decreasing consumption. Used for up-regulation bids or activations.   |
| down    |       | Regulation activation that decreases the system's net power injection — achieved either by decreasing generation or increasing consumption. Used for down-regulation bids or activations. |

| literal   | value | description                                                                                                                                                                                     |
|-----------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| upAndDown |       | Product or capacity symmetrical for both up- and down-regulation; the same magnitude applies in both directions. Common for bidirectional balancing services (e.g., symmetrical aFRR capacity). |
| stable    |       | No activation or neutral position; used for capacity or reserve states that maintain stability without a directional effect (e.g., system in balanced or standby mode).                         |

1078

1079 **3.24 (NC) PeakKind enumeration**

1080 Kind of time period with similar intensity.

1081 Table 14 shows all literals of PeakKind.

1082 **Table 14 – Literals of StateInstructionScheduleProfile::PeakKind**

| literal | value | description                                                                       |
|---------|-------|-----------------------------------------------------------------------------------|
| offPeak |       | Off-peak refer to periods of lower demand for a particular service or commodity.  |
| onPeak  |       | Off-peak refer to periods of higher demand for a particular service or commodity. |

1083

1084 **3.25 (NC) ReferenceValueKind enumeration**

1085 Kind of reference value.

1086 Table 15 shows all literals of ReferenceValueKind.

1087 **Table 15 – Literals of StateInstructionScheduleProfile::ReferenceValueKind**

| literal | value | description                                      |
|---------|-------|--------------------------------------------------|
| exact   |       | The referenced value is to be met exactly.       |
| minimum |       | The referenced value establishes a lower bound.  |
| maximum |       | The referenced value establishes an upper bound. |

1088

1089 **3.26 (NC) SecuredExclusionReasonKind enumeration**

1090 The kind of secured exclusion reason.

1091 Table 16 shows all literals of SecuredExclusionReasonKind.

1092 **Table 16 – Literals of StateInstructionScheduleProfile::SecuredExclusionReasonKind**

| literal                            | value | description                                                                                                                                                                                       |
|------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| systemOperator                     |       | The network element that is going to be assessed is excluded for being secured by the system operator.                                                                                            |
| capacityCalculationRegion          |       | The network element that is going to be assessed is excluded for being secured by the capacity calculation region.                                                                                |
| nonNativeCapacityCalculationRegion |       | The network element that is going to be assessed is excluded for being secured for the native capacity calculation region since it would be secured for a non native capacity calculation region. |

1093

**3.27 (NC) TimeSeriesInterpolationKind enumeration**

Kinds of interpolation of values between two time point.

Table 17 shows all literals of TimeSeriesInterpolationKind.

**Table 17 – Literals of StateInstructionScheduleProfile::TimeSeriesInterpolationKind**

| literal  | value | description                                                         |
|----------|-------|---------------------------------------------------------------------|
| none     |       | No interpolation is applied.                                        |
| previous |       | The value between two time points is set to previous value.         |
| next     |       | The value between two time points is set to next value.             |
| linear   |       | Linear interpolation is applied for values between two time points. |

**3.28 UnitMultiplier enumeration**

The unit multipliers defined for the CIM. When applied to unit symbols, the unit symbol is treated as a derived unit. Regardless of the contents of the unit symbol text, the unit symbol shall be treated as if it were a single-character unit symbol. Unit symbols should not contain multipliers, and it should be left to the multiplier to define the multiple for an entire data type.

For example, if a unit symbol is "m2Pers" and the multiplier is "k", then the value is  $k(m^{**2}/s)$ , and the multiplier applies to the entire final value, not to any individual part of the value. This can be conceptualized by substituting a derived unit symbol for the unit type. If one imagines that the symbol "P" represents the derived unit "m2Pers", then applying the multiplier "k" can be conceptualized simply as "kP".

For example, the SI unit for mass is "kg" and not "g". If the unit symbol is defined as "kg", then the multiplier is applied to "kg" as a whole and does not replace the "k" in front of the "g". In this case, the multiplier of "m" would be used with the unit symbol of "kg" to represent one gram. As a text string, this violates the instructions in IEC 80000-1. However, because the unit symbol in CIM is treated as a derived unit instead of as an SI unit, it makes more sense to conceptualize the "kg" as if it were replaced by one of the proposed replacements for the SI mass symbol. If one imagines that the "kg" were replaced by a symbol "P", then it is easier to conceptualize the multiplier "m" as creating the proper unit "mP", and not the forbidden unit "mkg".

Table 18 shows all literals of UnitMultiplier.

**Table 18 – Literals of StateInstructionScheduleProfile::UnitMultiplier**

| literal | value | description                                  |
|---------|-------|----------------------------------------------|
| none    |       | No multiplier or equivalently multiply by 1. |
| M       |       | Mega $10^{**6}$ .                            |

**3.29 UnitSymbol enumeration**

The derived units defined for usage in the CIM. In some cases, the derived unit is equal to an SI unit. Whenever possible, the standard derived symbol is used instead of the formula for the derived unit. For example, the unit symbol Farad is defined as "F" instead of "CPerV". In cases where a standard symbol does not exist for a derived unit, the formula for the unit is used as the unit symbol. For example, density does not have a standard symbol and so it is represented as "kgPerm3". With the exception of the "kg", which is an SI unit, the unit symbols do not contain multipliers and therefore represent the base derived unit to which a multiplier can be applied as a whole.

Every unit symbol is treated as an unparseable text as if it were a single-letter symbol. The meaning of each unit symbol is defined by the accompanying descriptive text and not by the text contents of the unit symbol.

To allow the widest possible range of serializations without requiring special character handling, several substitutions are made which deviate from the format described in IEC 80000-1. The division symbol "/" is replaced by the letters "Per". Exponents are written in plain text after the unit as "m3" instead of being formatted as "m" with a superscript of 3 or introducing a symbol as in "m^3". The degree symbol "°" is replaced with the letters "deg". Any clarification of the meaning for a substitution is included in the description for the unit symbol.

Non-SI units are included in list of unit symbols to allow sources of data to be correctly labelled with their non-SI units (for example, a GPS sensor that is reporting numbers that represent feet instead of meters). This allows software to use the unit symbol information correctly convert and scale the raw data of those sources into SI-based units.

The integer values are used for harmonization with IEC 61850.

Table 19 shows all literals of UnitSymbol.

**Table 19 – Literals of StateInstructionScheduleProfile::UnitSymbol**

| literal         | value | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| none            |       | Dimension less quantity, e.g. count, per unit, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| s               |       | Time in seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| A               |       | Current in amperes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| deg             |       | Plane angle in degrees.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| V               |       | Electric potential in volts (W/A).                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| ohm             |       | Electric resistance in ohms (V/A).                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Hz              |       | Frequency in hertz (1/s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| W               |       | Real power in watts (J/s). Electrical power may have real and reactive components. The real portion of electrical power ( $I^2R$ or $VI\cos(\phi)$ ), is expressed in Watts. See also apparent power and reactive power.                                                                                                                                                                                                                                                                   |
| VA <sub>r</sub> |       | Reactive power in volt amperes reactive. The "reactive" or "imaginary" component of electrical power ( $VI\sin(\phi)$ ). (See also real power and apparent power).<br><br>Note: Different meter designs use different methods to arrive at their results. Some meters may compute reactive power as an arithmetic value, while others compute the value vectorially. The data consumer should determine the method in use and the suitability of the measurement for the intended purpose. |
| Wh              |       | Real energy in watt hours.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

### 3.30 (NC) ValueOffsetKind enumeration

The kind of the value offset.

Table 20 shows all literals of ValueOffsetKind.

**Table 20 – Literals of StateInstructionScheduleProfile::ValueOffsetKind**

| literal     | value | description                                                                                                                                 |
|-------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------|
| absolute    |       | Value of the range constraint is replacing the attribute value referenced by the PropertyReference in a determined operational scenario.    |
| incremental |       | Value of the range constraint is incrementing the attribute value referenced by the PropertyReference in a determined operational scenario. |

| literal               | value | description                                                                                                                                               |
|-----------------------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| incrementalPercentage |       | Value of the range constraint is incrementing in percentage the attribute value referenced by the PropertyReference in a determined operational scenario. |

1150

1151 **3.31 ActivePower datatype**1152 Product of RMS value of the voltage and the RMS value of the in-phase component of the  
1153 current.

1154 Table 21 shows all attributes of ActivePower.

1155 **Table 21 – Attributes of StateInstructionScheduleProfile::ActivePower**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1156

1157 **3.32 AngleDegrees datatype**

1158 Measurement of angle in degrees.

1159 Table 22 shows all attributes of AngleDegrees.

1160 **Table 22 – Attributes of StateInstructionScheduleProfile::AngleDegrees**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1161

1162 **3.33 CurrentFlow datatype**1163 Electrical current with sign convention: positive flow is out of the conducting equipment into the  
1164 connectivity node. Can be both AC and DC.

1165 Table 23 shows all attributes of CurrentFlow.

1166 **Table 23 – Attributes of StateInstructionScheduleProfile::CurrentFlow**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1167

1168 **3.34 Frequency datatype**

1169 Cycles per second.

1170 Table 24 shows all attributes of Frequency.

1171 **Table 24 – Attributes of StateInstructionScheduleProfile::Frequency**

| name  | mult | type                       | description |
|-------|------|----------------------------|-------------|
| value | 0..1 | <a href="#">Float</a>      |             |
| unit  | 0..1 | <a href="#">UnitSymbol</a> |             |

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1172

1173 **3.35 Hours datatype**

1174 Time specified in hours.

1175 Table 25 shows all attributes of Hours.

1176 **Table 25 – Attributes of StateInstructionScheduleProfile::Hours**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1177

1178 **3.36 Impedance datatype**

1179 Ratio of voltage to current.

1180 Table 26 shows all attributes of Impedance.

1181 **Table 26 – Attributes of StateInstructionScheduleProfile::Impedance**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1182

1183 **3.37 Length datatype**

1184 Unit of length. It shall be a positive value or zero.

1185 Table 27 shows all attributes of Length.

1186 **Table 27 – Attributes of StateInstructionScheduleProfile::Length**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1187

1188 **3.38 PerCent datatype**

1189 Percentage on a defined base. For example, specify as 100 to indicate at the defined base.

1190 Table 28 shows all attributes of PerCent.

1191 **Table 28 – Attributes of StateInstructionScheduleProfile::PerCent**

| name       | mult | type                           | description                          |
|------------|------|--------------------------------|--------------------------------------|
| value      | 0..1 | <a href="#">Float</a>          | Normally 0 to 100 on a defined base. |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |                                      |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |                                      |

1192

1193 **3.39 Pressure datatype**

1194 Pressure in pascals.

1195 Table 29 shows all attributes of Pressure.

1196 **Table 29 – Attributes of StateInstructionScheduleProfile::Pressure**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1197

### 1198 3.40 PU datatype

1199 Per Unit - a positive or negative value referred to a defined base. Values typically range from -  
1200 10 to +10.

1201 Table 30 shows all attributes of PU.

1202 **Table 30 – Attributes of StateInstructionScheduleProfile::PU**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1203

### 1204 3.41 ReactivePower datatype

1205 Product of RMS value of the voltage and the RMS value of the quadrature component of the  
1206 current.

1207 Table 31 shows all attributes of ReactivePower.

1208 **Table 31 – Attributes of StateInstructionScheduleProfile::ReactivePower**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1209

### 1210 3.42 RealEnergy datatype

1211 Real electrical energy.

1212 Table 32 shows all attributes of RealEnergy.

1213 **Table 32 – Attributes of StateInstructionScheduleProfile::RealEnergy**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1214

### 1215 3.43 Resistance datatype

1216 Resistance (real part of impedance).

1217 Table 33 shows all attributes of Resistance.

1218 **Table 33 – Attributes of StateInstructionScheduleProfile::Resistance**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| value      | 0..1 | <a href="#">Float</a>          |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |

1219

1220 **3.44 Seconds datatype**

1221 Time, in seconds.

1222 Table 34 shows all attributes of Seconds.

1223 **Table 34 – Attributes of StateInstructionScheduleProfile::Seconds**

| name       | mult | type                           | description      |
|------------|------|--------------------------------|------------------|
| value      | 0..1 | <a href="#">Float</a>          | Time, in seconds |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |                  |
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |                  |

1224

1225 **3.45 Speed datatype**

1226 Distance per unit of time.

1227 Table 35 shows all attributes of Speed.

1228 **Table 35 – Attributes of StateInstructionScheduleProfile::Speed**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1229

1230 **3.46 Temperature datatype**

1231 Value of temperature in degrees Celsius.

1232 Table 36 shows all attributes of Temperature.

1233 **Table 36 – Attributes of StateInstructionScheduleProfile::Temperature**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

1234

1235 **3.47 Voltage datatype**

1236 Electrical voltage, can be both AC and DC.

1237 Table 37 shows all attributes of Voltage.

1238 **Table 37 – Attributes of StateInstructionScheduleProfile::Voltage**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |

| name  | mult | type                  | description |
|-------|------|-----------------------|-------------|
| value | 0..1 | <a href="#">Float</a> |             |

1239

1240 **3.48 Boolean primitive**

1241 A type with the value space "true" and "false".

1242 **3.49 DateTime primitive**

1243 Date and time as "yyyy-mm-ddThh:mm:ss.sss", which conforms with ISO 8601. UTC time zone  
 1244 is specified as "yyyy-mm-ddThh:mm:ss.sssZ". A local timezone relative UTC is specified as  
 1245 "yyyy-mm-ddThh:mm:ss.sss-hh:mm". The second component (shown here as "ss.sss") could  
 1246 have any number of digits in its fractional part to allow any kind of precision beyond seconds.

1247 **3.50 Decimal primitive**

1248 Decimal is the base-10 notational system for representing real numbers.

1249 **3.51 Duration primitive**

1250 Duration as "PnYnMnDTnHnMnS" which conforms to ISO 8601, where nY expresses a number  
 1251 of years, nM a number of months, nD a number of days. The letter T separates the date  
 1252 expression from the time expression and, after it, nH identifies a number of hours, nM a number  
 1253 of minutes and nS a number of seconds. The number of seconds could be expressed as a  
 1254 decimal number, but all other numbers are integers.

1255 **3.52 Float primitive**

1256 A floating point number. The range is unspecified and not limited.

1257 **3.53 Integer primitive**

1258 An integer number. The range is unspecified and not limited.

1259 **3.54 MonthDay primitive**

1260 MonthDay format as "--mm-dd", which conforms with XSD data type gMonthDay.

1261 **3.55 String primitive**

1262 A string consisting of a sequence of characters. The character encoding is UTF-8. The string  
 1263 length is unspecified and unlimited.

1264 **3.56 Time primitive**

1265 Time as "hh:mm:ss.sss", which conforms with ISO 8601. UTC time zone is specified as  
 1266 "hh:mm:ss.sssZ". A local timezone relative UTC is specified as "hh:mm:ss.sss±hh:mm". The  
 1267 second component (shown here as "ss.sss") could have any number of digits in its fractional  
 1268 part to allow any kind of precision beyond seconds.

1269 **3.57 (abstract,NC) ACEmulationControlFunction root class**

1270 The AC emulation control function is used when AC emulation model is activated for a DC  
 1271 system. It consists in computing the active power set point of the DC system as a function of  
 1272 the voltage angle difference between both points of common coupling with the AC network in  
 1273 order to mimic the behavior of an AC transmission line. This control mode enables the automatic  
 1274 adjustment of the active power reference following variations of the AC system operational  
 1275 point.

1276 The setpoint of the DC system is calculated by  $P_{setpoint} = P_{ref} + K_{dc} * (angle1 - angle2)$ , where

1277 - Pref is the existing active power setpoint;

1278 - Kdc is the control system gain and

1279 - angle1 and angle2 are the phase angle measurement (measured at points of common coupling  
 1280 with the AC network) respectively at the side 1 and 2 of the DC system.

1281 **3.58 (NC) ACEmulationControlFunctionSchedule**1282 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

1283 The schedule for ACEmulationControlFunction.

1284 Table 38 shows all attributes of ACEmulationControlFunctionSchedule.

1285 **Table 38 – Attributes of**  
1286 **StateInstructionScheduleProfile::ACEmulationControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

1287  
1288 Table 39 shows all association ends of ACEmulationControlFunctionSchedule with other  
1289 classes.

1290 **Table 39 – Association ends of**  
1291 **StateInstructionScheduleProfile::ACEmulationControlFunctionSchedule with other**  
1292 **classes**

| mult from | name                       | mult to | type                                       | description                                       |
|-----------|----------------------------|---------|--------------------------------------------|---------------------------------------------------|
| 0..*      | ACEmulationControlFunction | 1..1    | <a href="#">ACEmulationControlFunction</a> | (NC) The control function that has this schedule. |

1293

### 1294 3.59 (NC) ACEmulationControlFunctionTimePoint root class

1295 AC emulation control function value for a given point in time.

1296 Table 40 shows all attributes of ACEmulationControlFunctionTimePoint.

1297 **Table 40 – Attributes of**  
1298 **StateInstructionScheduleProfile::ACEmulationControlFunctionTimePoint**

| name         | mult | type                        | description                                                                                                                                                                                                                                                                                                               |
|--------------|------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime       | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                                                                                                                                                                                      |
| gain         | 0..1 | <a href="#">Float</a>       | (NC) Control system gain in AC transmission emulation control measured in MW/deg. It plays the role of an admittance of the equivalent AC transmission line that the control is emulating the higher is the gain the higher is the active power transfer at steady state.                                                 |
| referenceP   | 0..1 | <a href="#">ActivePower</a> | (NC) Existing active power setpoint used to calculate the active power setpoint of the AC emulation control.                                                                                                                                                                                                              |
| timeConstant | 0..1 | <a href="#">Seconds</a>     | (NC) Control system time constant in AC transmission emulation control. It affects the time needed to reach a new steady state equilibrium point after a network perturbation extremely important to guarantee N-1 relief related to an interconnection. The higher is time constant the slower is the DC system dynamic. |

1299

1300 Table 41 shows all association ends of ACEmulationControlFunctionTimePoint with other  
1301 classes.

**Table 41 – Association ends of  
StateInstructionScheduleProfile::ACEmulationControlFunctionTimePoint with other  
classes**

| mult from | name                               | mult to | type                                               | description                                 |
|-----------|------------------------------------|---------|----------------------------------------------------|---------------------------------------------|
| 1..*      | ACEmulationControlFunctionSchedule | 1..1    | <a href="#">ACEmulationControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.60 (abstract,NC) ActivePowerControlFunction root class

Active power control function is a function block that calculates operating point of the controlled equipment to achieve the target active power.

### 3.61 (NC) ActivePowerControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for ActivePowerControlFunction.

Table 42 shows all attributes of ActivePowerControlFunctionSchedule.

**Table 42 – Attributes of  
StateInstructionScheduleProfile::ActivePowerControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 43 shows all association ends of ActivePowerControlFunctionSchedule with other classes.

**Table 43 – Association ends of  
StateInstructionScheduleProfile::ActivePowerControlFunctionSchedule with other  
classes**

| mult from | name                       | mult to | type                                       | description                                       |
|-----------|----------------------------|---------|--------------------------------------------|---------------------------------------------------|
| 0..*      | ActivePowerControlFunction | 1..1    | <a href="#">ActivePowerControlFunction</a> | (NC) The control function that has this schedule. |

### 3.62 (NC) ActivePowerControlFunctionTimePoint root class

Active power control function value for a given point in time.

Table 44 shows all attributes of ActivePowerControlFunctionTimePoint.

**Table 44 – Attributes of  
StateInstructionScheduleProfile::ActivePowerControlFunctionTimePoint**

| name        | mult | type                        | description                                                                                   |
|-------------|------|-----------------------------|-----------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                          |
| targetValue | 1..1 | <a href="#">ActivePower</a> | (NC) Target value for the active power that the control function is calculating to achieve by |

| name | mult | type | description                                                    |
|------|------|------|----------------------------------------------------------------|
|      |      |      | adjusting the operational setting to the controlled equipment. |

Table 45 shows all association ends of `ActivePowerControlFunctionTimePoint` with other classes.

**Table 45 – Association ends of  
StateInstructionScheduleProfile::ActivePowerControlFunctionTimePoint with other  
classes**

| mult from | name                               | mult to | type                                               | description                                 |
|-----------|------------------------------------|---------|----------------------------------------------------|---------------------------------------------|
| 1..*      | ActivePowerControlFunctionSchedule | 1..1    | <a href="#">ActivePowerControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.63 (abstract,NC) AreaReserveResource root class

A resource representation for a specific balancing reserve product, associated with either a scheduling area or a tie corridor, and used to represent reserve capability made available to a control area for market and operational purposes.

Note: An `AreaReserveResource` shall be associated with either a `SchedulingArea` or a `TieCorridor`, but not both.

When associated with a `SchedulingArea`, the resource represents reserve capability made available within that area context.

When associated with a `TieCorridor`, the resource represents reserve capability provided across an inter-area connection to support a control area other than the one in which the underlying resource is located.

A single physical or logical resource (for example a `GeneratingUnit`, `HydroPump`, `PowerElectronicsUnit`, or equivalent) may be represented by multiple `AreaReserveResource` instances, each corresponding to a different balancing reserve product (e.g. FCR, aFRR, mFRR).

### 3.64 (NC) AreaReserveResourceRegularSchedule

Inheritance path = [BaseRegularIntervalSchedule](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Regular schedule for area reserve resource .

Table 46 shows all attributes of `AreaReserveResourceRegularSchedule`.

**Table 46 – Attributes of  
StateInstructionScheduleProfile::AreaReserveResourceRegularSchedule**

| name              | mult | type                                        | description                                                      |
|-------------------|------|---------------------------------------------|------------------------------------------------------------------|
| dayOfWeek         | 0..1 | <a href="#">DayOfWeekKind</a>               | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| intervalStartTime | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| intervalEndTime   | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |

Table 47 shows all association ends of AreaReserveResourceRegularSchedule with other classes.

**Table 47 – Association ends of  
StateInstructionScheduleProfile::AreaReserveResourceRegularSchedule with other  
classes**

| mult from | name                | mult to | type                                | description                                                         |
|-----------|---------------------|---------|-------------------------------------|---------------------------------------------------------------------|
| 0..*      | AreaReserveResource | 1..1    | <a href="#">AreaReserveResource</a> | (NC) The resource that has a schedule.                              |
| 0..*      | Season              | 0..1    | <a href="#">Season</a>              | (NC) inherited from:<br><a href="#">BaseRegularIntervalSchedule</a> |
| 0..*      | HourPattern         | 0..1    | <a href="#">HourPattern</a>         | (NC) inherited from:<br><a href="#">BaseRegularIntervalSchedule</a> |

### 3.65 (NC) AreaReserveResourceSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Schedule for area reserve resource .

Table 48 shows all attributes of AreaReserveResourceSchedule.

**Table 48 – Attributes of  
StateInstructionScheduleProfile::AreaReserveResourceSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 49 shows all association ends of AreaReserveResourceSchedule with other classes.

**Table 49 – Association ends of  
StateInstructionScheduleProfile::AreaReserveResourceSchedule with other classes**

| mult from | name                | mult to | type                                | description                            |
|-----------|---------------------|---------|-------------------------------------|----------------------------------------|
| 0..*      | AreaReserveResource | 1..1    | <a href="#">AreaReserveResource</a> | (NC) The resource that has a schedule. |

### 3.66 (NC) AreaReserveResourceTimePoint root class

Area reserve resource for a given point in time.

Table 50 shows all attributes of AreaReserveResourceTimePoint.

**Table 50 – Attributes of  
StateInstructionScheduleProfile::AreaReserveResourceTimePoint**

| name       | mult | type                        | description                                                              |
|------------|------|-----------------------------|--------------------------------------------------------------------------|
| activatedP | 0..1 | <a href="#">ActivePower</a> | (NC) Amount of active power currently activated for the reserve product. |

| name                | mult | type                                          | description                                                                                                                                                                                                                             |
|---------------------|------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| allocatedP          | 0..1 | <a href="#">ActivePower</a>                   | (NC) Amount of active power capability allocated from the associated resource to the area for the given reserve product.                                                                                                                |
| atTime              | 1..1 | <a href="#">DateTime</a>                      | (NC) The time the data is valid for.                                                                                                                                                                                                    |
| availableP          | 0..1 | <a href="#">ActivePower</a>                   | (NC) Amount of active power currently available for provision of the reserve product.                                                                                                                                                   |
| contractedP         | 0..1 | <a href="#">ActivePower</a>                   | (NC) Amount of active power contracted for the reserve product.                                                                                                                                                                         |
| enabled             | 0..1 | <a href="#">Boolean</a>                       | (NC) Identifies if the unit is enabled to accept a dispatch instruction. If true, the unit is enabled to accept a dispatch instruction. If false, the unit has the capability, but it is not enabled to receive a dispatch instruction. |
| kind                | 0..1 | <a href="#">BalancingReserveKind</a>          | (NC) Type of reserve product represented by the allocation.                                                                                                                                                                             |
| priority            | 0..1 | <a href="#">Integer</a>                       | (NC) Relative priority for activation or selection within an area or aggregated reserve structure.                                                                                                                                      |
| regulationDirection | 0..1 | <a href="#">MarketRegulationDirectionKind</a> | (NC) Direction of the product flow.                                                                                                                                                                                                     |

Table 51 shows all association ends of AreaReserveResourceTimePoint with other classes.

**Table 51 – Association ends of  
StateInstructionScheduleProfile::AreaReserveResourceTimePoint with other classes**

| mult from | name                        | mult to | type                                        | description                              |
|-----------|-----------------------------|---------|---------------------------------------------|------------------------------------------|
| 1..*      | AreaReserveResourceSchedule | 1..1    | <a href="#">AreaReserveResourceSchedule</a> | (NC) The schedule that has a time point. |

### 3.67 (abstract,NC) AssessedElement

Inheritance path = [IdentifiedObject](#)

Assessed element is a network element for which the electrical state is evaluated in the regional or cross-regional process and which value is expected to fulfil regional rules function of the operational security limits.

The measurements and limits are as defined in the steady state hypothesis.

Table 52 shows all attributes of AssessedElement.

**Table 52 – Attributes of StateInstructionScheduleProfile::AssessedElement**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

### 3.68 (NC) AssessedElementRegularSchedule

Inheritance path = [BaseRegularIntervalSchedule](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Regular schedule for assessed element.

Table 53 shows all attributes of AssessedElementRegularSchedule.

1396  
1397**Table 53 – Attributes of  
StateInstructionScheduleProfile::AssessedElementRegularSchedule**

| name              | mult | type                                        | description                                                      |
|-------------------|------|---------------------------------------------|------------------------------------------------------------------|
| dayOfWeek         | 0..1 | <a href="#">DayOfWeekKind</a>               | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| intervalStartTime | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| intervalEndTime   | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |

1398  
1399  
1400  
1401

Table 54 shows all association ends of AssessedElementRegularSchedule with other classes.

**Table 54 – Association ends of  
StateInstructionScheduleProfile::AssessedElementRegularSchedule with other classes**

| mult from | name            | mult to | type                            | description                                                      |
|-----------|-----------------|---------|---------------------------------|------------------------------------------------------------------|
| 0..*      | AssessedElement | 0..1    | <a href="#">AssessedElement</a> | (NC) Assessed Element that has regular schedules.                |
| 0..*      | Season          | 0..1    | <a href="#">Season</a>          | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| 0..*      | HourPattern     | 0..1    | <a href="#">HourPattern</a>     | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |

1402  
1403  
1404  
1405  
1406  
1407**3.69 (NC) AssessedElementRegularTimePoint root class**

Assessed element instruction value at a given point in time.

Table 55 shows all attributes of AssessedElementRegularTimePoint.

**Table 55 – Attributes of  
StateInstructionScheduleProfile::AssessedElementRegularTimePoint**

| name            | mult | type                        | description                                                                                                                                                                                                                                                                                                                        |
|-----------------|------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| appointedMargin | 0..1 | <a href="#">PerCent</a>     | (NC) The percentage (appointed to a region) of the remaining margin obtained in the grid model to reach its current limit. The maximum percentage shall by default be 10% of the remaining margin.<br><br>It is only used when an assessed element is considered conservative for a region.<br>The allowed value range is [0,100]. |
| maxFlow         | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum flow on an a conducting equipment or a collection of conducting equipment forming a power transfer corridor. For assessed elements that is becomes critical due to contingency, this value represents the maximum flow with remedial action taken into consideration.                                                 |

| name                   | mult | type                    | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| enabled                | 0..1 | <a href="#">Boolean</a> | (NC) It identifies if the assessed element is enabled. True means enabled, False means disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| positiveVirtualMargin  | 0..1 | <a href="#">PerCent</a> | (NC) A margin defined only for scanned AssessedElement (If AssessedElement.ScannedForRegion is present) in order to represent the influence of available remedial action which is not cross-border relevant remedial action.<br><br>The margin is modifying the limits used for the assessment whatever the limit it is (e.g. PATL, TATL). This symbolizes a remedial action that can be applied internally by the System Operator. It will be resolved by the System Operator and not by the optimization of remedial actions. The attribute shall be a positive value. The allowed value range is [0,100]. |
| scannedThresholdMargin | 0..1 | <a href="#">PerCent</a> | (NC) Threshold percentage that a scanned element can be overloaded, on a given element, on top of any overload prior to optimisation (default= 5%). e.g. Initial loading of the element is 110%, with a 5% scanned threshold margin, the new maximum is 115% of the limit (e.g. PATL, TATL, etc).<br><br>The allowed value range is [0,100].                                                                                                                                                                                                                                                                 |

Table 56 shows all association ends of AssessedElementRegularTimePoint with other classes.

**Table 56 – Association ends of StateInstructionScheduleProfile::AssessedElementRegularTimePoint with other classes**

| mult from | name                           | mult to | type                                           | description                                                                            |
|-----------|--------------------------------|---------|------------------------------------------------|----------------------------------------------------------------------------------------|
| 0..*      | AssessedElementRegularSchedule | 0..1    | <a href="#">AssessedElementRegularSchedule</a> | (NC) Assessed element regular schedule which has assessed element regular time points. |

### 3.70 (NC) AssessedElementSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Schedule for assessed element.

Table 57 shows all attributes of AssessedElementSchedule.

**Table 57 – Attributes of StateInstructionScheduleProfile::AssessedElementSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 58 shows all association ends of AssessedElementSchedule with other classes.

**Table 58 – Association ends of StateInstructionScheduleProfile::AssessedElementSchedule with other classes**

| mult from | name            | mult to | type                            | description                                                   |
|-----------|-----------------|---------|---------------------------------|---------------------------------------------------------------|
| 0..*      | AssessedElement | 1..1    | <a href="#">AssessedElement</a> | (NC) Assessed element which has an assessed element schedule. |

### 3.71 (NC) AssessedElementTimePoint root class

Assessed element instruction value at a given point in time.

Table 59 shows all attributes of AssessedElementTimePoint.

**Table 59 – Attributes of StateInstructionScheduleProfile::AssessedElementTimePoint**

| name                           | mult | type                                       | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------|------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| enabled                        | 0..1 | <a href="#">Boolean</a>                    | (NC) It identifies if the assessed element is enabled. True means enabled, False means disabled.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| appointedMargin                | 0..1 | <a href="#">PerCent</a>                    | (NC) The percentage (appointed to a region) of the remaining margin obtained in the grid model to reach its current limit. The maximum percentage shall by default be 10% of the remaining margin.<br><br>It is only used when an assessed element is considered conservative for a region.<br>The allowed value range is [0,100].                                                                                                                                                                                                                                                                              |
| maxFlow                        | 0..1 | <a href="#">ActivePower</a>                | (NC) Maximum flow on an a conducting equipment or a collection of conducting equipment forming a power transfer corridor. For assessed elements that is becomes critical due to contingency, this value represents the maximum flow with remedial action taken into consideration.                                                                                                                                                                                                                                                                                                                              |
| atTime                         | 1..1 | <a href="#">DateTime</a>                   | (NC) The time the data is valid for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| positiveVirtualMargin          | 0..1 | <a href="#">PerCent</a>                    | (NC) A margin defined only for scanned AssessedElement (If AssessedElement.ScannedForRegion is present) in order to represent the influence of available remedial action which is not cross-border relevant remedial action.<br><br>The margin is modifying the limits used for the assessment whatever the limit it is (e.g. PATL, TATL). This symbolizes a remedial action that can be applied internally by the System Operator. It will be resolved by the System Operator and not by the optimization of remedial actions. The attribute shall be a positive value.<br>The allowed value range is [0,100]. |
| scannedThresholdMargin         | 0..1 | <a href="#">PerCent</a>                    | (NC) Threshold percentage that a scanned element can be overloaded, on a given element, on top of any overload prior to optimisation (default= 5%). e.g. Initial loading of the element is 110%, with a 5% scanned threshold margin, the new maximum is 115% of the limit (e.g. PATL, TATL, etc).<br>The allowed value range is [0,100].                                                                                                                                                                                                                                                                        |
| exclusionReason                | 0..1 | <a href="#">SecuredExclusionReasonKind</a> | (NC) Reason for not associating this assessed element with a secured region.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| individualValidationAdjustment | 0..1 | <a href="#">ActivePower</a>                | (NC) A positive value expressed in MW, calculated and provided by System Operators                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| name                                         | mult | type                        | description                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              |      |                             | from their individual validation process for the reduction of Remaining Available Margin in order to ensure grid security.                                                                                                                                                                                                                                                                           |
| coordinatedValidationAdjustment              | 0..1 | <a href="#">ActivePower</a> | (NC) A positive value expressed in MW, calculated and provided by the coordinated capacity calculator (CCC) for the reduction of Remaining Available Margin (RAM) in order to ensure grid security.                                                                                                                                                                                                  |
| individualValidationAdjustmentShare          | 0..1 | <a href="#">ActivePower</a> | (NC) A positive value expressed in MW, calculated by the coordinated capacity calculator (CCC) based on the provided Individual Validation Adjustment (IVA) by System Operators in order to show the actual reduction of Remaining Available Margin (RAM). Individual Validation Adjustment Share is a positive non-zero value. It is equal or less than the Individual Validation Adjustment value. |
| individualValidationAdjustmentJustification  | 0..1 | <a href="#">String</a>      | (NC) A text description provided by System Operators for justifying the reduction of Remaining Available Margin (RAM) by means of Individual Validation Adjustment (IVA). This justification is not intended for any application processing purpose, it should only be used for reporting.                                                                                                           |
| coordinatedValidationAdjustmentJustification | 0..1 | <a href="#">String</a>      | (NC) A text description provided by the coordinated capacity calculator (CCC) for justifying the reduction of Remaining Available Margin (RAM) by means of Coordinated Validation Adjustment (CVA). This justification is not intended for any application processing purpose, it should only be used for reporting.                                                                                 |
| criticalElementJustification                 | 0..1 | <a href="#">String</a>      | (deprecated,NC) Justification indicating the kind of critical element contingency. This justification is not intended for any application processing purpose, it should only be used for reporting.                                                                                                                                                                                                  |
| targetRemainingAvailableMarginJustification  | 0..1 | <a href="#">String</a>      | (NC) Justification indicating the target remaining available margin. This justification is not intended for any application processing purpose, it should only be used for reporting.                                                                                                                                                                                                                |

Table 60 shows all association ends of AssessedElementTimePoint with other classes.

**Table 60 – Association ends of  
StateInstructionScheduleProfile::AssessedElementTimePoint with other classes**

| mult from | name                    | mult to | type                                    | description                                                  |
|-----------|-------------------------|---------|-----------------------------------------|--------------------------------------------------------------|
| 1..*      | AssessedElementSchedule | 1..1    | <a href="#">AssessedElementSchedule</a> | (NC) The assessed element schedule that has this time point. |

### 3.72 (abstract,NC) AssessedElementWithContingency root class

Combination of an assessed element and a contingency.

### 3.73 (abstract,NC) AssessedElementWithRemedialAction root class

Combination of an assessed element and a remedial action

### 3.74 (abstract,NC) AutomationFunction root class

Automation function is a collection of functional block or other automation function that can be executed as a work cycle program as part of an automated system.

**3.75 (NC) AvailabilityTimePoint root class**

Availability instruction value at a given point in time.

Table 61 shows all attributes of AvailabilityTimePoint.

**Table 61 – Attributes of StateInstructionScheduleProfile::AvailabilityTimePoint**

| name      | mult | type                     | description                                                                                    |
|-----------|------|--------------------------|------------------------------------------------------------------------------------------------|
| atTime    | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                           |
| available | 1..1 | <a href="#">Boolean</a>  | (NC) It identifies if the element is available. True means available, False means unavailable. |

Table 62 shows all association ends of AvailabilityTimePoint with other classes.

**Table 62 – Association ends of StateInstructionScheduleProfile::AvailabilityTimePoint with other classes**

| mult from | name                        | mult to | type                                     | description                                                                 |
|-----------|-----------------------------|---------|------------------------------------------|-----------------------------------------------------------------------------|
| 1..*      | GenericAvailabilitySchedule | 1..1    | <a href="#">GenericAvailableSchedule</a> | (NC) The availability schedule which belongs to the availability timepoint. |

**3.76 (abstract,NC) BaseCaseCurrentLimit root class**

Operational limit on current applicable for base case.

**3.77 (NC) BaseCaseCurrentLimitSchedule**

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for a base case current limit.

Table 63 shows all attributes of BaseCaseCurrentLimitSchedule.

**Table 63 – Attributes of StateInstructionScheduleProfile::BaseCaseCurrentLimitSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 64 shows all association ends of BaseCaseCurrentLimitSchedule with other classes.

**Table 64 – Association ends of StateInstructionScheduleProfile::BaseCaseCurrentLimitSchedule with other classes**

| mult from | name                 | mult to | type                                 | description                                                              |
|-----------|----------------------|---------|--------------------------------------|--------------------------------------------------------------------------|
| 0..*      | BaseCaseCurrentLimit | 1..1    | <a href="#">BaseCaseCurrentLimit</a> | (NC) Base case current limit which has base case current limit schedule. |

**3.78 (NC) BaseCaseCurrentLimitTimePoint root class**

Base case current limit at a given point in time.

Table 65 shows all attributes of BaseCaseCurrentLimitTimePoint.

**Table 65 – Attributes of  
StateInstructionScheduleProfile::BaseCaseCurrentLimitTimePoint**

| name   | mult | type                        | description                                                                   |
|--------|------|-----------------------------|-------------------------------------------------------------------------------|
| atTime | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                          |
| value  | 1..1 | <a href="#">CurrentFlow</a> | (NC) Value of current limit. The attribute shall be a positive value or zero. |

Table 66 shows all association ends of BaseCaseCurrentLimitTimePoint with other classes.

**Table 66 – Association ends of  
StateInstructionScheduleProfile::BaseCaseCurrentLimitTimePoint with other classes**

| mult from | name                         | mult to | type                                         | description                                                |
|-----------|------------------------------|---------|----------------------------------------------|------------------------------------------------------------|
| 1..*      | BaseCaseCurrentLimitSchedule | 1..1    | <a href="#">BaseCaseCurrentLimitSchedule</a> | (NC) Base case current limit schedule that has time point. |

### 3.79 (abstract,NC) BaseIrregularTimeSeries

Inheritance path = [BaseTimeSeries](#) : [IdentifiedObject](#)

Time series that has irregular points in time.

Table 67 shows all attributes of BaseIrregularTimeSeries.

**Table 67 – Attributes of StateInstructionScheduleProfile::BaseIrregularTimeSeries**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

### 3.80 (abstract,NC) BaseRegularIntervalSchedule

Inheritance path = [BaseTimeSeries](#) : [IdentifiedObject](#)

Time series that has regular points in time.

Table 68 shows all attributes of BaseRegularIntervalSchedule.

**Table 68 – Attributes of StateInstructionScheduleProfile::BaseRegularIntervalSchedule**

| name              | mult | type                                        | description                                                   |
|-------------------|------|---------------------------------------------|---------------------------------------------------------------|
| dayOfWeek         | 0..1 | <a href="#">DayOfWeekKind</a>               | (NC) Day of the week for which the schedule is valid for.     |
| intervalStartTime | 0..1 | <a href="#">DateTime</a>                    | (NC) Interval start time for which the schedule is valid for. |
| intervalEndTime   | 0..1 | <a href="#">DateTime</a>                    | (NC) Interval end time for which the schedule is valid for.   |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>           |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>           |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>           |

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 69 shows all association ends of BaseRegularIntervalSchedule with other classes.

**Table 69 – Association ends of  
StateInstructionScheduleProfile::BaseRegularIntervalSchedule with other classes**

| mult from | name        | mult to | type                        | description                                                   |
|-----------|-------------|---------|-----------------------------|---------------------------------------------------------------|
| 0..*      | Season      | 0..1    | <a href="#">Season</a>      | (NC) Season associated with a base regular interval schedule. |
| 0..*      | HourPattern | 0..1    | <a href="#">HourPattern</a> | (NC) HourPattern that has base regular interval schedule.     |

### 3.81 (abstract,NC) BaseTimeSeries

Inheritance path = [IdentifiedObject](#)

Time series of values at points in time.

Table 70 shows all attributes of BaseTimeSeries.

**Table 70 – Attributes of StateInstructionScheduleProfile::BaseTimeSeries**

| name              | mult | type                                        | description                                                                                                                                                         |
|-------------------|------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) Kind of interpolation done between time point.                                                                                                                 |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) Kind of base time series.                                                                                                                                      |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) Action method used to create the value. This is used for identification in the case where there is multiple time series for the same validity period and kind. |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                    |

### 3.82 (abstract,NC) ClimateZone root class

A geographically defined area characterised according to a climate classification and used as a spatial reference for representative meteorological, hydrological and marine conditions relevant to energy production, consumption and resource availability.

Note: ClimateZone provides selected climatological normal values as structured information and may reference time series for detailed climate, weather, hydrological and marine data. A normal value represents a climatological reference condition for the area. Time series may represent observed, historical, modelled, forecast, scenario or climatological data. Reference period, scenario, source, calculation method and other provenance information are represented separately.

ClimateZone may be used to associate energy resources and energy-system studies with climate-dependent conditions such as temperature, wind, solar irradiance, precipitation, snow, hydro inflow, extreme weather, waves, sea ice and sea currents.

Example: Climate study zones defined in the Pan-European Climate Database (PECD) for European energy-system modelling.

1508 **3.83 (NC) ClimateZoneRegularSchedule**1509 Inheritance path = [BaseRegularIntervalSchedule](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

1510 Regular schedule for ClimateZone.

1511 Table 71 shows all attributes of ClimateZoneRegularSchedule.

1512 **Table 71 – Attributes of StateInstructionScheduleProfile::ClimateZoneRegularSchedule**

| name                   | mult | type                        | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------|------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| avalancheDangerIndex   | 0..1 | <a href="#">Decimal</a>     | (NC) An index representing the avalanche danger for the corresponding time interval.<br><br>Note: The applicable avalanche danger methodology and classification are identified through the associated data provenance. The CIM model does not prescribe a particular avalanche danger scale. Where the index represents categorical danger levels, the numerical values shall not be assumed to form a linear scale.<br><br>Example: Using the European Avalanche Danger Scale: "1" (Low), "2" (Moderate), "3" (Considerable), "4" (High), "5" (Very high).                                                                                                                                                                                                                                  |
| cloudCover             | 0..1 | <a href="#">PerCent</a>     | (NC) The proportion of the sky covered by cloud for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| dewPointTempAt2m       | 0..1 | <a href="#">Temperature</a> | (NC) The dew-point temperature at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| diffuseSolarIrradiance | 0..1 | <a href="#">Irradiance</a>  | (NC) The diffuse solar irradiance for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| directSolarIrradiance  | 0..1 | <a href="#">Irradiance</a>  | (NC) The direct solar irradiance for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| droughtCode            | 0..1 | <a href="#">Decimal</a>     | (NC) The Drought Code for the corresponding time interval.<br><br>Note: The Drought Code is a component of the Canadian Fire Weather Index System representing the moisture condition of deep, compact organic fuel layers. It is particularly useful for representing the cumulative effect of prolonged dry conditions and seasonal drought on wildfire potential. Higher values indicate drier conditions. The attribute is used when the applicable wildfire methodology provides a Drought Code.<br><br>Example: Values such as "15", "300" and "600" represent progressively drier conditions in the Drought Code scale. No universal low, moderate or high classification is implied by these example values; interpretation is provided by the applicable methodology and provenance. |
| evaporation            | 0..1 | <a href="#">Length</a>      | (NC) The evaporation and evapotranspiration during the corresponding time interval, expressed as an equivalent depth of water.<br><br>Note: The sign convention, where relevant, is defined by the applicable data specification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| fireWeatherIndex       | 0..1 | <a href="#">Decimal</a>     | (NC) A fire-weather index indicating the meteorological conditions relevant to wildfire danger for the corresponding time interval.<br><br>Note: The applicable fire-weather index methodology and classification are identified through the associated data provenance. The CIM model does not prescribe a specific wildfire classification. The Canadian Fire Weather Index (FWI) System, as used by European Forest Fire                                                                                                                                                                                                                                                                                                                                                                   |

| name                      | mult | type                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |      |                              | Information System (EFFIS), is one example. In this system, the index combines fuel-moisture and fire-behaviour components derived from temperature, relative humidity, wind speed and precipitation. Higher values indicate conditions increasingly favourable to intense wildfire.<br>Example: Using the EFFIS classification: "5.0" (Very low), "10.0" (Low), "15.0" (Moderate), "37.77" (High), "40.01" (Very high), "55.55" (Extreme).                          |
| freezingPrecipitationDays | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days with freezing precipitation within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                          |
| frostDays                 | 0..1 | <a href="#">Decimal</a>      | (NC) The number of frost days within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                |
| globalSolarIrradiance     | 0..1 | <a href="#">Irradiance</a>   | (NC) The global solar irradiance for the corresponding time interval.<br>Note: Global solar irradiance represents the total direct and diffuse solar power incident per unit area on the applicable reference surface. It may be used as an environmental input for applications such as photovoltaic production and thermal rating of overhead conductors. The orientation of the reference surface is defined by the applicable dataset or provenance information. |
| hailDays                  | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days on which hail occurs within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                 |
| heatwaveDays              | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days occurring as part of a heatwave within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                      |
| hotDays                   | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days meeting the applicable hot-day criterion within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                             |
| hydroInflow               | 0..1 | <a href="#">RealEnergy</a>   | (NC) The energy equivalent of natural hydro inflow associated with hydro resources in the ClimateZone during the corresponding time interval.<br>Note: The value represents inflow energy for the interval. For example, a weekly TimePoint may contain the natural hydro inflow energy for that week.                                                                                                                                                               |
| icingDays                 | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days meeting the applicable icing criterion within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                               |
| lightningDensity          | 0..1 | <a href="#">CountPerArea</a> | (NC) The number of lightning events per unit area occurring during the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                  |
| maxTempAt2m               | 0..1 | <a href="#">Temperature</a>  | (NC) The maximum air temperature at 2 metres above ground level during the corresponding time interval.<br>Note: This time series is intended for datasets providing maximum temperature directly.                                                                                                                                                                                                                                                                   |
| minTempAt2m               | 0..1 | <a href="#">Temperature</a>  | (NC) The minimum air temperature at 2 metres above ground level during the corresponding time interval.<br>Note: This time series is intended for datasets providing minimum temperature directly, for example daily minimum temperature. It is not required when the minimum can appropriately be derived from tempAt2m.                                                                                                                                            |

| name                       | mult | type                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| populationWeightedTempAt2m | 0..1 | <a href="#">Temperature</a>  | (NC) The population-weighted air temperature at 2 metres above ground level for the corresponding time interval.<br><br>Note: The value is derived by spatially weighting the air temperature within the represented area by the population distribution. It may be used for modelling temperature-dependent energy consumption, including heating and cooling demand. The population dataset and weighting method are identified through the applicable provenance information. |
| potentialEvaporation       | 0..1 | <a href="#">Length</a>       | (NC) The potential evaporation during the corresponding time interval, expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                                                                                                |
| precipitation              | 0..1 | <a href="#">Length</a>       | (NC) The total precipitation received during the corresponding time interval.<br><br>Note: The value represents accumulated precipitation expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                             |
| rainfall                   | 0..1 | <a href="#">Length</a>       | (NC) The amount of liquid precipitation received during the corresponding time interval.<br><br>Note: The value represents accumulated rainfall expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                       |
| relativeHumidityAt2m       | 0..1 | <a href="#">PerCent</a>      | (NC) The relative humidity at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                   |
| runoff                     | 0..1 | <a href="#">Length</a>       | (NC) The runoff during the corresponding time interval, expressed as an equivalent depth of water over the area.                                                                                                                                                                                                                                                                                                                                                                 |
| seaCurrentDirection        | 0..1 | <a href="#">AngleDegrees</a> | (NC) The direction of the sea-water current for the corresponding time interval.<br><br>Note: Current direction normally identifies the direction towards which the water is moving, unlike meteorological wind direction, which identifies the direction from which the wind originates.                                                                                                                                                                                        |
| seaCurrentSpeed            | 0..1 | <a href="#">Speed</a>        | (NC) The speed of the sea-water current for the corresponding time interval.<br><br>Note: The applicable depth or vertical reference is defined by the source dataset or provenance information.                                                                                                                                                                                                                                                                                 |
| seaIceConcentration        | 0..1 | <a href="#">PerCent</a>      | (NC) The proportion of the sea surface covered by sea ice for the corresponding time interval.<br><br>Note: Sea-ice concentration provides the time-dependent information needed to determine sea-ice presence and extent. It replaces a simple integer seaIce value, which cannot distinguish between partial and complete ice coverage.                                                                                                                                        |
| seaIceThickness            | 0..1 | <a href="#">Length</a>       | (NC) The sea-ice thickness for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| seaSurfaceTemp             | 0..1 | <a href="#">Temperature</a>  | (NC) The sea-surface temperature for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                            |
| significantWaveHeight      | 0..1 | <a href="#">Length</a>       | (NC) The significant wave height for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                            |
| snowfall                   | 0..1 | <a href="#">Length</a>       | (NC) The solid precipitation received during the corresponding time interval, expressed as its equivalent amount of liquid water.                                                                                                                                                                                                                                                                                                                                                |

| name                | mult | type                          | description                                                                                                                                                                                                                                                                                                                          |
|---------------------|------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| snowmelt            | 0..1 | <a href="#">Length</a>        | (NC) The amount of water released by melting snow during the corresponding time interval, expressed as an equivalent depth of liquid water.                                                                                                                                                                                          |
| snowWater           | 0..1 | <a href="#">Length</a>        | (NC) The amount of water stored in the snowpack at the corresponding time, expressed as an equivalent depth of liquid water.<br>Example: January = 180 mm, March = 430 mm, May = 160 mm, June = 0 mm.                                                                                                                                |
| sunshineDuration    | 0..1 | <a href="#">Hours</a>         | (NC) The duration of sunshine during the corresponding time interval.                                                                                                                                                                                                                                                                |
| surfacePressure     | 0..1 | <a href="#">Pressure</a>      | (NC) The atmospheric pressure at the surface for the corresponding time interval.<br>Note: Surface pressure may be relevant when determining air density for wind-energy calculations.                                                                                                                                               |
| tempAt2m            | 0..1 | <a href="#">Temperature</a>   | (NC) The air temperature at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                         |
| thunderDays         | 0..1 | <a href="#">Decimal</a>       | (NC) The number of days on which thunder is observed within the corresponding time interval.                                                                                                                                                                                                                                         |
| tropicalNights      | 0..1 | <a href="#">Decimal</a>       | (NC) The number of nights meeting the applicable tropical-night criterion within the corresponding time interval.                                                                                                                                                                                                                    |
| waveDirection       | 0..1 | <a href="#">AngleDegrees</a>  | (NC) The direction from which waves propagate for the corresponding time interval.<br>Note: No corresponding normal value is defined because a single average direction may not meaningfully represent a multi-directional sea state.                                                                                                |
| wavePeriod          | 0..1 | <a href="#">Seconds</a>       | (NC) The representative wave period for the corresponding time interval.                                                                                                                                                                                                                                                             |
| windDirectionAt100m | 0..1 | <a href="#">AngleDegrees</a>  | (NC) The wind direction at 100 metres above ground level for the corresponding time interval.<br>Note: Meteorological wind direction normally identifies the direction from which the wind originates.                                                                                                                               |
| windDirectionAt10m  | 0..1 | <a href="#">AngleDegrees</a>  | (NC) The wind direction at 10 metres above ground level for the corresponding time interval.<br>Note: Meteorological wind direction normally identifies the direction from which the wind originates. No corresponding normal attribute is defined because a single average direction may be misleading for multimodal wind regimes. |
| windGustAt10m       | 0..1 | <a href="#">Speed</a>         | (NC) The maximum wind gust at 10 metres above ground level during the corresponding time interval.<br>Note: The time interval over which the gust maximum applies is defined by the associated Schedule and TimePoint.                                                                                                               |
| windSpeedAt100m     | 0..1 | <a href="#">Speed</a>         | (NC) The wind speed at 100 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                            |
| windSpeedAt10m      | 0..1 | <a href="#">Speed</a>         | (NC) The wind speed at 10 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                             |
| dayOfWeek           | 0..1 | <a href="#">DayOfWeekKind</a> | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                                                                                                     |
| intervalStartTime   | 0..1 | <a href="#">DateTime</a>      | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                                                                                                     |

| name              | mult | type                                        | description                                                      |
|-------------------|------|---------------------------------------------|------------------------------------------------------------------|
| intervalEndTime   | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>              |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                 |

Table 72 shows all association ends of ClimateZoneRegularSchedule with other classes.

**Table 72 – Association ends of  
StateInstructionScheduleProfile::ClimateZoneRegularSchedule with other classes**

| mult from | name        | mult to | type                        | description                                                      |
|-----------|-------------|---------|-----------------------------|------------------------------------------------------------------|
| 0..*      | ClimateZone | 1..1    | <a href="#">ClimateZone</a> | (NC) The climate zone that has regular schedule.                 |
| 0..*      | Season      | 0..1    | <a href="#">Season</a>      | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| 0..*      | HourPattern | 0..1    | <a href="#">HourPattern</a> | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |

### 3.84 (NC) ClimateZoneSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The irregular schedule for the ClimateZone.

Table 73 shows all attributes of ClimateZoneSchedule.

**Table 73 – Attributes of StateInstructionScheduleProfile::ClimateZoneSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 74 shows all association ends of ClimateZoneSchedule with other classes.

**Table 74 – Association ends of StateInstructionScheduleProfile::ClimateZoneSchedule with other classes**

| mult from | name        | mult to | type                        | description                                   |
|-----------|-------------|---------|-----------------------------|-----------------------------------------------|
| 0..*      | ClimateZone | 1..1    | <a href="#">ClimateZone</a> | (NC) The climate zone that has this schedule. |

1528 **3.85 (NC) ClimateZoneTimePoint root class**

1529 Climate zone value at a given point in time.

1530 Table 75 shows all attributes of ClimateZoneTimePoint.

1531 **Table 75 – Attributes of StateInstructionScheduleProfile::ClimateZoneTimePoint**

| name                   | mult | type                        | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime                 | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| avalancheDangerIndex   | 0..1 | <a href="#">Decimal</a>     | (NC) An index representing the avalanche danger for the corresponding time interval.<br>Note: The applicable avalanche danger methodology and classification are identified through the associated data provenance. The CIM model does not prescribe a particular avalanche danger scale. Where the index represents categorical danger levels, the numerical values shall not be assumed to form a linear scale.<br>Example: Using the European Avalanche Danger Scale: "1" (Low), "2" (Moderate), "3" (Considerable), "4" (High), "5" (Very high).                                                                                                                                                                                                                                  |
| cloudCover             | 0..1 | <a href="#">PerCent</a>     | (NC) The proportion of the sky covered by cloud for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| dewPointTempAt2m       | 0..1 | <a href="#">Temperature</a> | (NC) The dew-point temperature at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| diffuseSolarIrradiance | 0..1 | <a href="#">Irradiance</a>  | (NC) The diffuse solar irradiance for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| directSolarIrradiance  | 0..1 | <a href="#">Irradiance</a>  | (NC) The direct solar irradiance for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| droughtCode            | 0..1 | <a href="#">Decimal</a>     | (NC) The Drought Code for the corresponding time interval.<br>Note: The Drought Code is a component of the Canadian Fire Weather Index System representing the moisture condition of deep, compact organic fuel layers. It is particularly useful for representing the cumulative effect of prolonged dry conditions and seasonal drought on wildfire potential. Higher values indicate drier conditions. The attribute is used when the applicable wildfire methodology provides a Drought Code.<br>Example: Values such as "15", "300" and "600" represent progressively drier conditions in the Drought Code scale. No universal low, moderate or high classification is implied by these example values; interpretation is provided by the applicable methodology and provenance. |
| evaporation            | 0..1 | <a href="#">Length</a>      | (NC) The evaporation and evapotranspiration during the corresponding time interval, expressed as an equivalent depth of water.<br>Note: The sign convention, where relevant, is defined by the applicable data specification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| fireWeatherIndex       | 0..1 | <a href="#">Decimal</a>     | (NC) A fire-weather index indicating the meteorological conditions relevant to wildfire danger for the corresponding time interval.<br>Note: The applicable fire-weather index methodology and classification are identified through the associated data provenance. The CIM model does not prescribe a specific wildfire classification. The Canadian Fire Weather Index (FWI) System, as used by European Forest Fire                                                                                                                                                                                                                                                                                                                                                               |

| name                      | mult | type                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------|------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           |      |                              | Information System (EFFIS), is one example. In this system, the index combines fuel-moisture and fire-behaviour components derived from temperature, relative humidity, wind speed and precipitation. Higher values indicate conditions increasingly favourable to intense wildfire.<br><br>Example: Using the EFFIS classification: "5.0" (Very low), "10.0" (Low), "15.0" (Moderate), "37.77" (High), "40.01" (Very high), "55.55" (Extreme).                          |
| freezingPrecipitationDays | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days with freezing precipitation within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                              |
| frostDays                 | 0..1 | <a href="#">Decimal</a>      | (NC) The number of frost days within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                    |
| globalSolarIrradiance     | 0..1 | <a href="#">Irradiance</a>   | (NC) The global solar irradiance for the corresponding time interval.<br><br>Note: Global solar irradiance represents the total direct and diffuse solar power incident per unit area on the applicable reference surface. It may be used as an environmental input for applications such as photovoltaic production and thermal rating of overhead conductors. The orientation of the reference surface is defined by the applicable dataset or provenance information. |
| hailDays                  | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days on which hail occurs within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                     |
| heatwaveDays              | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days occurring as part of a heatwave within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                          |
| hotDays                   | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days meeting the applicable hot-day criterion within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                 |
| hydroInflow               | 0..1 | <a href="#">RealEnergy</a>   | (NC) The energy equivalent of natural hydro inflow associated with hydro resources in the ClimateZone during the corresponding time interval.<br><br>Note: The value represents inflow energy for the interval. For example, a weekly TimePoint may contain the natural hydro inflow energy for that week.                                                                                                                                                               |
| icingDays                 | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days meeting the applicable icing criterion within the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                   |
| lightningDensity          | 0..1 | <a href="#">CountPerArea</a> | (NC) The number of lightning events per unit area occurring during the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                      |
| maxTempAt2m               | 0..1 | <a href="#">Temperature</a>  | (NC) The maximum air temperature at 2 metres above ground level during the corresponding time interval.<br><br>Note: This time series is intended for datasets providing maximum temperature directly.                                                                                                                                                                                                                                                                   |
| minTempAt2m               | 0..1 | <a href="#">Temperature</a>  | (NC) The minimum air temperature at 2 metres above ground level during the corresponding time interval.<br><br>Note: This time series is intended for datasets providing minimum temperature directly, for example daily minimum temperature. It is not required when the minimum can appropriately be derived from tempAt2m.                                                                                                                                            |

| name                       | mult | type                         | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| populationWeightedTempAt2m | 0..1 | <a href="#">Temperature</a>  | (NC) The population-weighted air temperature at 2 metres above ground level for the corresponding time interval.<br><br>Note: The value is derived by spatially weighting the air temperature within the represented area by the population distribution. It may be used for modelling temperature-dependent energy consumption, including heating and cooling demand. The population dataset and weighting method are identified through the applicable provenance information. |
| potentialEvaporation       | 0..1 | <a href="#">Length</a>       | (NC) The potential evaporation during the corresponding time interval, expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                                                                                                |
| precipitation              | 0..1 | <a href="#">Length</a>       | (NC) The total precipitation received during the corresponding time interval.<br><br>Note: The value represents accumulated precipitation expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                             |
| rainfall                   | 0..1 | <a href="#">Length</a>       | (NC) The amount of liquid precipitation received during the corresponding time interval.<br><br>Note: The value represents accumulated rainfall expressed as an equivalent depth of water.                                                                                                                                                                                                                                                                                       |
| relativeHumidityAt2m       | 0..1 | <a href="#">PerCent</a>      | (NC) The relative humidity at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                   |
| runoff                     | 0..1 | <a href="#">Length</a>       | (NC) The runoff during the corresponding time interval, expressed as an equivalent depth of water over the area.                                                                                                                                                                                                                                                                                                                                                                 |
| seaCurrentDirection        | 0..1 | <a href="#">AngleDegrees</a> | (NC) The direction of the sea-water current for the corresponding time interval.<br><br>Note: Current direction normally identifies the direction towards which the water is moving, unlike meteorological wind direction, which identifies the direction from which the wind originates.                                                                                                                                                                                        |
| seaCurrentSpeed            | 0..1 | <a href="#">Speed</a>        | (NC) The speed of the sea-water current for the corresponding time interval.<br><br>Note: The applicable depth or vertical reference is defined by the source dataset or provenance information.                                                                                                                                                                                                                                                                                 |
| seaIceConcentration        | 0..1 | <a href="#">PerCent</a>      | (NC) The proportion of the sea surface covered by sea ice for the corresponding time interval.<br><br>Note: Sea-ice concentration provides the time-dependent information needed to determine sea-ice presence and extent. It replaces a simple integer seaIce value, which cannot distinguish between partial and complete ice coverage.                                                                                                                                        |
| seaIceThickness            | 0..1 | <a href="#">Length</a>       | (NC) The sea-ice thickness for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| seaSurfaceTemp             | 0..1 | <a href="#">Temperature</a>  | (NC) The sea-surface temperature for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                            |
| significantWaveHeight      | 0..1 | <a href="#">Length</a>       | (NC) The significant wave height for the corresponding time interval.                                                                                                                                                                                                                                                                                                                                                                                                            |
| snowfall                   | 0..1 | <a href="#">Length</a>       | (NC) The solid precipitation received during the corresponding time interval, expressed as its equivalent amount of liquid water.                                                                                                                                                                                                                                                                                                                                                |

| name                | mult | type                         | description                                                                                                                                                                                                                                                                                                                          |
|---------------------|------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| snowmelt            | 0..1 | <a href="#">Length</a>       | (NC) The amount of water released by melting snow during the corresponding time interval, expressed as an equivalent depth of liquid water.                                                                                                                                                                                          |
| snowWater           | 0..1 | <a href="#">Length</a>       | (NC) The amount of water stored in the snowpack at the corresponding time, expressed as an equivalent depth of liquid water.<br>Example: January = 180 mm, March = 430 mm, May = 160 mm, June = 0 mm.                                                                                                                                |
| sunshineDuration    | 0..1 | <a href="#">Hours</a>        | (NC) The duration of sunshine during the corresponding time interval.                                                                                                                                                                                                                                                                |
| surfacePressure     | 0..1 | <a href="#">Pressure</a>     | (NC) The atmospheric pressure at the surface for the corresponding time interval.<br>Note: Surface pressure may be relevant when determining air density for wind-energy calculations.                                                                                                                                               |
| tempAt2m            | 0..1 | <a href="#">Temperature</a>  | (NC) The air temperature at 2 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                         |
| thunderDays         | 0..1 | <a href="#">Decimal</a>      | (NC) The number of days on which thunder is observed within the corresponding time interval.                                                                                                                                                                                                                                         |
| tropicalNights      | 0..1 | <a href="#">Decimal</a>      | (NC) The number of nights meeting the applicable tropical-night criterion within the corresponding time interval.                                                                                                                                                                                                                    |
| waveDirection       | 0..1 | <a href="#">AngleDegrees</a> | (NC) The direction from which waves propagate for the corresponding time interval.<br>Note: No corresponding normal value is defined because a single average direction may not meaningfully represent a multi-directional sea state.                                                                                                |
| wavePeriod          | 0..1 | <a href="#">Seconds</a>      | (NC) The representative wave period for the corresponding time interval.                                                                                                                                                                                                                                                             |
| windDirectionAt100m | 0..1 | <a href="#">AngleDegrees</a> | (NC) The wind direction at 100 metres above ground level for the corresponding time interval.<br>Note: Meteorological wind direction normally identifies the direction from which the wind originates.                                                                                                                               |
| windDirectionAt10m  | 0..1 | <a href="#">AngleDegrees</a> | (NC) The wind direction at 10 metres above ground level for the corresponding time interval.<br>Note: Meteorological wind direction normally identifies the direction from which the wind originates. No corresponding normal attribute is defined because a single average direction may be misleading for multimodal wind regimes. |
| windGustAt10m       | 0..1 | <a href="#">Speed</a>        | (NC) The maximum wind gust at 10 metres above ground level during the corresponding time interval.<br>Note: The time interval over which the gust maximum applies is defined by the associated Schedule and TimePoint.                                                                                                               |
| windSpeedAt100m     | 0..1 | <a href="#">Speed</a>        | (NC) The wind speed at 100 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                            |
| windSpeedAt10m      | 0..1 | <a href="#">Speed</a>        | (NC) The wind speed at 10 metres above ground level for the corresponding time interval.                                                                                                                                                                                                                                             |

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Table 76 shows all association ends of ClimateZoneTimePoint with other classes.

**Table 76 – Association ends of StateInstructionScheduleProfile::ClimateZoneTimePoint with other classes**

| mult from | name                | mult to | type                                | description                                                      |
|-----------|---------------------|---------|-------------------------------------|------------------------------------------------------------------|
| 1..*      | ClimateZoneSchedule | 1..1    | <a href="#">ClimateZoneSchedule</a> | (NC) The climate zone schedule that has climate zone time point. |

### 3.86 (NC) ContingencySchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for Contingency.

Table 77 shows all attributes of ContingencySchedule.

**Table 77 – Attributes of StateInstructionScheduleProfile::ContingencySchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 78 shows all association ends of ContingencySchedule with other classes.

**Table 78 – Association ends of StateInstructionScheduleProfile::ContingencySchedule with other classes**

| mult from | name        | mult to | type                        | description                                        |
|-----------|-------------|---------|-----------------------------|----------------------------------------------------|
| 0..*      | Contingency | 1..1    | <a href="#">Contingency</a> | (NC) Contingency which has a contingency schedule. |

### 3.87 (NC) ContingencyTimePoint root class

Contingency instruction value at a given point in time.

Table 79 shows all attributes of ContingencyTimePoint.

**Table 79 – Attributes of StateInstructionScheduleProfile::ContingencyTimePoint**

| name        | mult | type                     | description                                                         |
|-------------|------|--------------------------|---------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                |
| probability | 0..1 | <a href="#">PerCent</a>  | (NC) Probability of occurrence. The allowed value range is [0,100]. |
| mustStudy   | 0..1 | <a href="#">Boolean</a>  | (NC) Set true if must study this contingency.                       |

Table 80 shows all association ends of ContingencyTimePoint with other classes.

**Table 80 – Association ends of StateInstructionScheduleProfile::ContingencyTimePoint with other classes**

| mult from | name                | mult to | type                                | description                                             |
|-----------|---------------------|---------|-------------------------------------|---------------------------------------------------------|
| 1..*      | ContingencySchedule | 1..1    | <a href="#">ContingencySchedule</a> | (NC) The contingency schedule that has this time point. |

### 3.88 (abstract,NC) ContingencyWithRemedialAction root class

Combination of a contingency and a remedial action. ContingencyWithRemedialAction shall not be instantiated for preventive RemedialAction (RemedialAction.kind equals RemedialActionKind.preventive).

### 3.89 (NC,new) CountPerArea datatype

Number of discrete occurrences or events per unit area.

Note: Intended for spatial event densities such as lightning density. A new UnitSymbol countPerm2 is required if this quantity is represented as a CIMDatatype with an explicit unit.

Table 81 shows all attributes of CountPerArea.

**Table 81 – Attributes of StateInstructionScheduleProfile::CountPerArea**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

### 3.90 (abstract,NC) CrossBorderRelevance root class

Combination of an assessed element and one or more bidding zone border that are affected by the assessment.

### 3.91 (abstract,NC) CurrentControlFunction root class

Current control function is a function block that calculates the operating point of the controlled equipment to achieve the target current.

### 3.92 (NC) CurrentControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for CurrentControlFunction.

Table 82 shows all attributes of CurrentControlFunctionSchedule.

**Table 82 – Attributes of StateInstructionScheduleProfile::CurrentControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 83 shows all association ends of CurrentControlFunctionSchedule with other classes.

**Table 83 – Association ends of  
StateInstructionScheduleProfile::CurrentControlFunctionSchedule with other classes**

| mult from | name                   | mult to | type                                   | description                                       |
|-----------|------------------------|---------|----------------------------------------|---------------------------------------------------|
| 0..*      | CurrentControlFunction | 1..1    | <a href="#">CurrentControlFunction</a> | (NC) The control function that has this schedule. |

### 3.93 (NC) CurrentControlFunctionTimePoint root class

Current control function value for a given point in time.

Table 84 shows all attributes of CurrentControlFunctionTimePoint.

**Table 84 – Attributes of  
StateInstructionScheduleProfile::CurrentControlFunctionTimePoint**

| name        | mult | type                        | description                                                                                                                                             |
|-------------|------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                    |
| targetValue | 1..1 | <a href="#">CurrentFlow</a> | (NC) Target value for the current that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 85 shows all association ends of CurrentControlFunctionTimePoint with other classes.

**Table 85 – Association ends of  
StateInstructionScheduleProfile::CurrentControlFunctionTimePoint with other classes**

| mult from | name                           | mult to | type                                           | description                                 |
|-----------|--------------------------------|---------|------------------------------------------------|---------------------------------------------|
| 1..*      | CurrentControlFunctionSchedule | 1..1    | <a href="#">CurrentControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.94 (abstract,NC) CurrentDroopControlFunction root class

Current droop control function is a function block that calculates the operating point of the controlled equipment to achieve the target current.

### 3.95 (NC) CurrentDroopControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for CurrentDroopControlFunction.

Table 86 shows all attributes of CurrentDroopControlFunctionSchedule.

**Table 86 – Attributes of  
StateInstructionScheduleProfile::CurrentDroopControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 87 shows all association ends of CurrentDroopControlFunctionSchedule with other classes.

**Table 87 – Association ends of  
StateInstructionScheduleProfile::CurrentDroopControlFunctionSchedule with other  
classes**

| mult from | name                        | mult to | type                                        | description                                       |
|-----------|-----------------------------|---------|---------------------------------------------|---------------------------------------------------|
| 0..*      | CurrentDroopControlFunction | 1..1    | <a href="#">CurrentDroopControlFunction</a> | (NC) The control function that has this schedule. |

### 3.96 (NC) CurrentDroopControlFunctionTimePoint root class

Current droop control function value for a given point in time.

Table 88 shows all attributes of CurrentDroopControlFunctionTimePoint.

**Table 88 – Attributes of  
StateInstructionScheduleProfile::CurrentDroopControlFunctionTimePoint**

| name                  | mult | type                        | description                                                |
|-----------------------|------|-----------------------------|------------------------------------------------------------|
| atTime                | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                       |
| droopCapacitive       | 0..1 | <a href="#">Float</a>       | (NC) Droop in capacitive region. The unit is V/A.          |
| droopInductive        | 0..1 | <a href="#">Float</a>       | (NC) Droop in inductive region. The unit is V/A.           |
| offsetCapacitive      | 0..1 | <a href="#">CurrentFlow</a> | (NC) Offset in capacitive region.                          |
| offsetInductive       | 0..1 | <a href="#">CurrentFlow</a> | (NC) Offset in capacitive region.                          |
| targetValueCapacitive | 0..1 | <a href="#">CurrentFlow</a> | (NC) Setpoint when control is active in capacitive region. |
| targetValueInductive  | 0..1 | <a href="#">CurrentFlow</a> | (NC) Setpoint when control is active in inductive region.  |

Table 89 shows all association ends of CurrentDroopControlFunctionTimePoint with other classes.

**Table 89 – Association ends of  
StateInstructionScheduleProfile::CurrentDroopControlFunctionTimePoint with other  
classes**

| mult from | name                                | mult to | type                                                | description                                 |
|-----------|-------------------------------------|---------|-----------------------------------------------------|---------------------------------------------|
| 1..*      | CurrentDroopControlFunctionSchedule | 1..1    | <a href="#">CurrentDroopControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.97 (abstract,NC) DCActivePowerControlFunction root class

Direct current active power control function is a function block that calculates operating point of the controlled equipment to achieve the target active power.

### 3.98 (NC) DCActivePowerControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCActivePowerControlFunction.

Table 90 shows all attributes of DCActivePowerControlFunctionSchedule.

**Table 90 – Attributes of  
StateInstructionScheduleProfile::DCActivePowerControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 91 shows all association ends of DCActivePowerControlFunctionSchedule with other classes.

**Table 91 – Association ends of  
StateInstructionScheduleProfile::DCActivePowerControlFunctionSchedule with other  
classes**

| mult from | name                         | mult to | type                                         | description                                       |
|-----------|------------------------------|---------|----------------------------------------------|---------------------------------------------------|
| 0..*      | DCActivePowerControlFunction | 1..1    | <a href="#">DCActivePowerControlFunction</a> | (NC) The control function that has this schedule. |

### 3.99 (NC) DCActivePowerControlFunctionTimePoint root class

Direct current active power control function value for a given point in time.

Table 92 shows all attributes of DCActivePowerControlFunctionTimePoint.

**Table 92 – Attributes of  
StateInstructionScheduleProfile::DCActivePowerControlFunctionTimePoint**

| name        | mult | type                        | description                                                                                                                                                  |
|-------------|------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                         |
| targetValue | 1..1 | <a href="#">ActivePower</a> | (NC) Target value for the active power that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 93 shows all association ends of DCActivePowerControlFunctionTimePoint with other classes.

**Table 93 – Association ends of  
StateInstructionScheduleProfile::DCActivePowerControlFunctionTimePoint with other  
classes**

| mult from | name                                 | mult to | type                                                 | description                                 |
|-----------|--------------------------------------|---------|------------------------------------------------------|---------------------------------------------|
| 1..*      | DCActivePowerControlFunctionSchedule | 1..1    | <a href="#">DCActivePowerControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.100 (abstract,NC) DCCurrentControlFunction root class

DC current control function is a function block that calculates the operating point of the controlled equipment to achieve the target current.

**3.101 (NC) DCCurrentControlFunctionSchedule**

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCCurrentControlFunction.

Table 94 shows all attributes of DCCurrentControlFunctionSchedule.

**Table 94 – Attributes of  
StateInstructionScheduleProfile::DCCurrentControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 95 shows all association ends of DCCurrentControlFunctionSchedule with other classes.

**Table 95 – Association ends of  
StateInstructionScheduleProfile::DCCurrentControlFunctionSchedule with other  
classes**

| mult from | name                     | mult to | type                                     | description                                       |
|-----------|--------------------------|---------|------------------------------------------|---------------------------------------------------|
| 0..*      | DCCurrentControlFunction | 1..1    | <a href="#">DCCurrentControlFunction</a> | (NC) The control function that has this schedule. |

**3.102 (NC) DCCurrentControlFunctionTimePoint root class**

DC current control function value for a given point in time.

Table 96 shows all attributes of DCCurrentControlFunctionTimePoint.

**Table 96 – Attributes of  
StateInstructionScheduleProfile::DCCurrentControlFunctionTimePoint**

| name              | mult | type                        | description                                                                                                                                             |
|-------------------|------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime            | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                    |
| droop             | 0..1 | <a href="#">PU</a>          | (NC) Droop constant. The pu value is obtained as $D [kV/MW] \times S_b / U_{bdc}$ . The attribute shall be a positive value.                            |
| droopCompensation | 0..1 | <a href="#">Resistance</a>  | (NC) Compensation constant. Used to compensate for voltage drop when controlling voltage at a distant bus. The attribute shall be a positive value.     |
| targetValue       | 1..1 | <a href="#">CurrentFlow</a> | (NC) Target value for the current that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 97 shows all association ends of DCCurrentControlFunctionTimePoint with other classes.

**Table 97 – Association ends of  
StateInstructionScheduleProfile::DCCurrentControlFunctionTimePoint with other  
classes**

| mult from | name                             | mult to | type                                             | description                                 |
|-----------|----------------------------------|---------|--------------------------------------------------|---------------------------------------------|
| 1..*      | DCCurrentControlFunctionSchedule | 1..1    | <a href="#">DCCurrentControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.103 (abstract,NC) DCEquivalentInjection root class

This class represents direct current equivalent injections (generation or load).

### 3.104 (abstract,NC) DCExtinctionAngleControlFunction root class

Direct current extinction angle control function is a function block that calculates operating point of the controlled equipment to achieve the target extinction angle.

### 3.105 (NC) DCExtinctionAngleControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCExtinctionAngleControlFunction.

Table 98 shows all attributes of DCExtinctionAngleControlFunctionSchedule.

**Table 98 – Attributes of  
StateInstructionScheduleProfile::DCExtinctionAngleControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 99 shows all association ends of DCExtinctionAngleControlFunctionSchedule with other classes.

**Table 99 – Association ends of  
StateInstructionScheduleProfile::DCExtinctionAngleControlFunctionSchedule with  
other classes**

| mult from | name                             | mult to | type                                             | description                                       |
|-----------|----------------------------------|---------|--------------------------------------------------|---------------------------------------------------|
| 0..*      | DCExtinctionAngleControlFunction | 1..1    | <a href="#">DCExtinctionAngleControlFunction</a> | (NC) The control function that has this schedule. |

### 3.106 (NC) DCExtinctionAngleControlFunctionTimePoint root class

Direct current extinction angle control function value for a given point in time.

Table 100 shows all attributes of DCExtinctionAngleControlFunctionTimePoint.

**Table 100 – Attributes of  
StateInstructionScheduleProfile::DCExtinctionAngleControlFunctionTimePoint**

| name   | mult | type                     | description                          |
|--------|------|--------------------------|--------------------------------------|
| atTime | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for. |

| name        | mult | type                         | description                                                                                                                                                      |
|-------------|------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| targetValue | 1..1 | <a href="#">AngleDegrees</a> | (NC) Target value for the extinction angle that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 101 shows all association ends of DCExtinctionAngleControlFunctionTimePoint with other classes.

**Table 101 – Association ends of  
StateInstructionScheduleProfile::DCExtinctionAngleControlFunctionTimePoint with  
other classes**

| mult from | name                                     | mult to | type                                                     | description                                 |
|-----------|------------------------------------------|---------|----------------------------------------------------------|---------------------------------------------|
| 1..*      | DCExtinctionAngleControlFunctionSchedule | 1..1    | <a href="#">DCExtinctionAngleControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.107 (abstract,NC) DCFiringAngleControlFunction root class

Direct current firing angle control function is a function block that calculates operating point of the controlled equipment to achieve the target firing angle.

### 3.108 (NC) DCFiringAngleControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCFiringAngleControlFunction.

Table 102 shows all attributes of DCFiringAngleControlFunctionSchedule.

**Table 102 – Attributes of  
StateInstructionScheduleProfile::DCFiringAngleControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 103 shows all association ends of DCFiringAngleControlFunctionSchedule with other classes.

**Table 103 – Association ends of  
StateInstructionScheduleProfile::DCFiringAngleControlFunctionSchedule with other  
classes**

| mult from | name                         | mult to | type                                         | description                                       |
|-----------|------------------------------|---------|----------------------------------------------|---------------------------------------------------|
| 0..*      | DCFiringAngleControlFunction | 1..1    | <a href="#">DCFiringAngleControlFunction</a> | (NC) The control function that has this schedule. |

### 3.109 (NC) DCFiringAngleControlFunctionTimePoint root class

Direct current firing angle control function value for a given point in time.

Table 104 shows all attributes of DCFiringAngleControlFunctionTimePoint.

**Table 104 – Attributes of  
StateInstructionScheduleProfile::DCFiringAngleControlFunctionTimePoint**

| name        | mult | type                         | description                                                                                                                                                  |
|-------------|------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>     | (NC) The time the data is valid for.                                                                                                                         |
| targetValue | 1..1 | <a href="#">AngleDegrees</a> | (NC) Target value for the firing angle that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 105 shows all association ends of DCFiringAngleControlFunctionTimePoint with other classes.

**Table 105 – Association ends of  
StateInstructionScheduleProfile::DCFiringAngleControlFunctionTimePoint with other  
classes**

| mult from | name                                 | mult to | type                                                 | description                                 |
|-----------|--------------------------------------|---------|------------------------------------------------------|---------------------------------------------|
| 1..*      | DCFiringAngleControlFunctionSchedule | 1..1    | <a href="#">DCFiringAngleControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.110 (abstract,NC) DCPole root class

The direct current (DC) system pole (IEC 60633) is part of a DC system consisting of all the equipment in the DC substations and the interconnecting transmission lines, if any, which during normal operation exhibit a common direct voltage polarity with respect to earth.

It includes active power, reactive power and participation factor to be able to schedule top down (using DCTieCorridor and participation factor to provide schedule on the DCPole) and bottom up (aggregation of DCPole to DCTieCorridor). Only one approach can be used at a time.

### 3.111 (abstract,NC) DCPulseWidthModulationControlFunction root class

Direct current pulse width modulation control function is a function block that calculates operating point of the controlled equipment to achieve the target pulse width modulation.

### 3.112 (NC) DCPulseWidthModulationControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCPulseWidthModulationControlFunction.

Table 106 shows all attributes of DCPulseWidthModulationControlFunctionSchedule.

**Table 106 – Attributes of  
StateInstructionScheduleProfile::DCPulseWidthModulationControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 107 shows all association ends of DCPulseWidthModulationControlFunctionSchedule with other classes.

**Table 107 – Association ends of  
StateInstructionScheduleProfile::DCPulseWidthModulationControlFunctionSchedule  
with other classes**

| mult from | name                                  | mult to | type                                                  | description                                       |
|-----------|---------------------------------------|---------|-------------------------------------------------------|---------------------------------------------------|
| 0..*      | DCPulseWidthModulationControlFunction | 1..1    | <a href="#">DCPulseWidthModulationControlFunction</a> | (NC) The control function that has this schedule. |

### 3.113 (NC) DCPulseWidthModulationControlFunctionTimePoint root class

Direct current pulse width modulation control function value for a given point in time.  
Table 108 shows all attributes of DCPulseWidthModulationControlFunctionTimePoint.

**Table 108 – Attributes of  
StateInstructionScheduleProfile::DCPulseWidthModulationControlFunctionTimePoint**

| name        | mult | type                     | description                                                                                                                                                        |
|-------------|------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                               |
| targetValue | 1..1 | <a href="#">Float</a>    | (NC) Target value for the pulse width factor that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 109 shows all association ends of DCPulseWidthModulationControlFunctionTimePoint with other classes.

**Table 109 – Association ends of  
StateInstructionScheduleProfile::DCPulseWidthModulationControlFunctionTimePoint  
with other classes**

| mult from | name                                          | mult to | type                                                          | description                                 |
|-----------|-----------------------------------------------|---------|---------------------------------------------------------------|---------------------------------------------|
| 1..*      | DCPulseWidthModulationControlFunctionSchedule | 1..1    | <a href="#">DCPulseWidthModulationControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.114 (abstract,NC) DCVoltageControlFunction root class

DC voltage control function is a function block that calculate the operating point of the controlled equipment to achieve the target voltage.

### 3.115 (NC) DCVoltageControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for DCVoltageControlFunction.

Table 110 shows all attributes of DCVoltageControlFunctionSchedule.

**Table 110 – Attributes of  
StateInstructionScheduleProfile::DCVoltageControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

| name | mult | type                   | description                                      |
|------|------|------------------------|--------------------------------------------------|
| name | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 111 shows all association ends of DCVoltageControlFunctionSchedule with other classes.

**Table 111 – Association ends of  
StateInstructionScheduleProfile::DCVoltageControlFunctionSchedule with other  
classes**

| mult from | name                     | mult to | type                                     | description                                       |
|-----------|--------------------------|---------|------------------------------------------|---------------------------------------------------|
| 0..*      | DCVoltageControlFunction | 1..1    | <a href="#">DCVoltageControlFunction</a> | (NC) The control function that has this schedule. |

### 3.116 (NC) DCVoltageControlFunctionTimePoint root class

DC voltage control function value for a given point in time.

Table 112 shows all attributes of DCVoltageControlFunctionTimePoint.

**Table 112 – Attributes of  
StateInstructionScheduleProfile::DCVoltageControlFunctionTimePoint**

| name        | mult | type                     | description                                                                                                                                             |
|-------------|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                    |
| targetValue | 1..1 | <a href="#">Voltage</a>  | (NC) Target value for the voltage that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 113 shows all association ends of DCVoltageControlFunctionTimePoint with other classes.

**Table 113 – Association ends of  
StateInstructionScheduleProfile::DCVoltageControlFunctionTimePoint with other  
classes**

| mult from | name                             | mult to | type                                             | description                                 |
|-----------|----------------------------------|---------|--------------------------------------------------|---------------------------------------------|
| 1..*      | DCVoltageControlFunctionSchedule | 1..1    | <a href="#">DCVoltageControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.117 (NC) EnablingTimePoint root class

Enabling instruction value at a given point in time.

Table 114 shows all attributes of EnablingTimePoint.

**Table 114 – Attributes of StateInstructionScheduleProfile::EnablingTimePoint**

| name    | mult | type                     | description                                                                                |
|---------|------|--------------------------|--------------------------------------------------------------------------------------------|
| atTime  | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                       |
| enabled | 1..1 | <a href="#">Boolean</a>  | (NC) It identifies if the element is enabled. True means enabled, False means not enabled. |

Table 115 shows all association ends of EnablingTimePoint with other classes.

**Table 115 – Association ends of StateInstructionScheduleProfile::EnablingTimePoint with other classes**

| mult from | name                    | mult to | type                                    | description                                                         |
|-----------|-------------------------|---------|-----------------------------------------|---------------------------------------------------------------------|
| 1..*      | GenericEnablingSchedule | 1..1    | <a href="#">GenericEnablingSchedule</a> | (NC) The enabling schedule which belongs to the enabling timepoint. |

### 3.118 (abstract,NC) EnergyBlockOrder root class

The energy block order is a block (an amount) of energy that forms the sequence of orders that are going to be distributed to an energy block component.

### 3.119 (abstract,NC) EnergyResourceGroupCapacity root class

An aggregation of energy resources having common energy characteristics for which installed, available, or effective capacity is represented.

Note: EnergyResourceGroupCapacity groups energy resources for capacity modelling, forecasting, scenario analysis and aggregation. The group may be characterised by an energy kind, energy source, technology, location, scenario, weather condition or other modelling context.

The aggregated capacity may be represented by static values or by time-series values describing forecast, scheduled, actual or hindcast conditions. An EnergyComponent represents the part of an aggregated value associated with a particular underlying unit or resource. The aggregated value of the EnergyResourceGroupCapacity may therefore be distributed among its associated EnergyComponents, for example in proportion to the capability of the corresponding units or according to an ordered block-based allocation.

Weather or other environmental information may be referenced where it is relevant to the capacity or availability of the grouped resources/

### 3.120 (NC) EnergyResourceGroupCapacityRegularSchedule

Inheritance path = [BaseRegularIntervalSchedule](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Regular schedule for EnergyResourceGroupCapacity.

Table 116 shows all attributes of EnergyResourceGroupCapacityRegularSchedule.

**Table 116 – Attributes of StateInstructionScheduleProfile::EnergyResourceGroupCapacityRegularSchedule**

| name               | mult | type                        | description                                                                                                                                                                                                                                                                    |
|--------------------|------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| availabilityFactor | 0..1 | <a href="#">PerCent</a>     | (NC) The ratio (in percent) between the effective available capacity and the installed capacity over a defined time interval. For weather-dependent resources, the value reflects climate-driven availability as derived from meteorological or hydrological conditions.       |
| availableCapacityP | 0..1 | <a href="#">ActivePower</a> | (NC) The weather or condition-dependent active power capacity that is realistically available for operation at a given time. This value reflects reductions due to climatic, hydrological, or operational constraints.                                                         |
| installedCapacityP | 0..1 | <a href="#">ActivePower</a> | (NC) The nominal installed active power capacity of the energy type, independent of weather or operating conditions. This is the maximum technical power rating under standard design assumptions and optimum operation condition.                                             |
| p                  | 0..1 | <a href="#">ActivePower</a> | (NC) The effective active power capacity for the resource at the specified time, after considering all applied deratings, outages, operational limits, or weather influences. This value represents the usable capacity that can be delivered or consumed, effective capacity. |

| name                     | mult | type                                        | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityAllocationFactor | 0..n | <a href="#">Float</a>                       | (NC) The relative weighting used to allocate an aggregate capacity requirement to this energy resource group on a time-series basis.<br><br>Note: The values provide context-specific top-down capacity allocation weightings and may override normalCapacityAllocationFactor. Each value applies to the corresponding time interval represented by the time-series context. The factors are relative weights and are not required to represent percentages or to sum to 1. The allocation algorithm may normalize or otherwise adjust the applicable factors according to availability, existing capacity and other modelling constraints. |
| participationFactor      | 0..1 | <a href="#">Float</a>                       | (NC) Participation factor for the power group in relation to scheduling area. Must be a positive value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| dayOfWeek                | 0..1 | <a href="#">DayOfWeekKind</a>               | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| intervalStartTime        | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| intervalEndTime          | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| interpolationKind        | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| timeSeriesKind           | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| actionMethod             | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| description              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| mRID                     | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| name                     | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 117 shows all association ends of EnergyResourceGroupCapacityRegularSchedule with other classes.

**Table 117 – Association ends of  
StateInstructionScheduleProfile::EnergyResourceGroupCapacityRegularSchedule with  
other classes**

| mult from | name                        | mult to | type                                        | description                                                          |
|-----------|-----------------------------|---------|---------------------------------------------|----------------------------------------------------------------------|
| 0..*      | EnergyResourceGroupCapacity | 1..1    | <a href="#">EnergyResourceGroupCapacity</a> | (NC) The energy resource group capacity that has a regular schedule. |
| 0..*      | Season                      | 0..1    | <a href="#">Season</a>                      | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>     |
| 0..*      | HourPattern                 | 0..1    | <a href="#">HourPattern</a>                 | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>     |

### 3.121 (NC) EnergyResourceGroupCapacitySchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The irregular schedule for the energy resource capacity group.

Table 118 shows all attributes of EnergyResourceGroupCapacitySchedule.

**Table 118 – Attributes of  
StateInstructionScheduleProfile::EnergyResourceGroupCapacitySchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 119 shows all association ends of EnergyResourceGroupCapacitySchedule with other classes.

**Table 119 – Association ends of  
StateInstructionScheduleProfile::EnergyResourceGroupCapacitySchedule with other  
classes**

| mult from | name                        | mult to | type                                        | description |
|-----------|-----------------------------|---------|---------------------------------------------|-------------|
| 0..*      | EnergyResourceGroupCapacity | 1..1    | <a href="#">EnergyResourceGroupCapacity</a> | (NC)        |

### 3.122 (NC) EnergyResourceGroupCapacityTimePoint root class

Energy resource group capacity value at a given point in time.

Table 120 shows all attributes of EnergyResourceGroupCapacityTimePoint.

**Table 120 – Attributes of  
StateInstructionScheduleProfile::EnergyResourceGroupCapacityTimePoint**

| name               | mult | type                        | description                                                                                                                                                                                                                                                                    |
|--------------------|------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime             | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                                                                                                                                           |
| availabilityFactor | 0..1 | <a href="#">PerCent</a>     | (NC) The ratio (in percent) between the effective available capacity and the installed capacity over a defined time interval. For weather-dependent resources, the value reflects climate-driven availability as derived from meteorological or hydrological conditions.       |
| availableCapacityP | 0..1 | <a href="#">ActivePower</a> | (NC) The weather or condition-dependent active power capacity that is realistically available for operation at a given time. This value reflects reductions due to climatic, hydrological, or operational constraints.                                                         |
| installedCapacityP | 0..1 | <a href="#">ActivePower</a> | (NC) The nominal installed active power capacity of the energy type, independent of weather or operating conditions. This is the maximum technical power rating under standard design assumptions and optimum operation condition.                                             |
| p                  | 0..1 | <a href="#">ActivePower</a> | (NC) The effective active power capacity for the resource at the specified time, after considering all applied deratings, outages, operational limits, or weather influences. This value represents the usable capacity that can be delivered or consumed, effective capacity. |

| name                     | mult | type                  | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------|------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| capacityAllocationFactor | 0..1 | <a href="#">Float</a> | (NC) The relative weighting used to allocate an aggregate capacity requirement to this energy resource group on a time-series basis.<br><br>Note: The values provide context-specific top-down capacity allocation weightings and may override normalCapacityAllocationFactor. Each value applies to the corresponding time interval represented by the time-series context. The factors are relative weights and are not required to represent percentages or to sum to 1. The allocation algorithm may normalize or otherwise adjust the applicable factors according to availability, existing capacity and other modelling constraints. |
| participationFactor      | 0..1 | <a href="#">Float</a> | (NC) Participation factor for the power group in relation to scheduling area. Must be a positive value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Table 121 shows all association ends of EnergyResourceGroupCapacityTimePoint with other classes.

**Table 121 – Association ends of  
StateInstructionScheduleProfile::EnergyResourceGroupCapacityTimePoint with other  
classes**

| mult from | name                                | mult to | type                                                | description                                                          |
|-----------|-------------------------------------|---------|-----------------------------------------------------|----------------------------------------------------------------------|
| 1..*      | EnergyResourceGroupCapacitySchedule | 1..1    | <a href="#">EnergyResourceGroupCapacitySchedule</a> | (NC) The energy resource capacity schedule that has this time point. |

### 3.123 (abstract,NC) FrequencyControlFunction root class

Frequency control function is a function block that calculate the operating point of the controlled equipment to achieve the target frequency.

### 3.124 (NC) FrequencyControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for FrequencyControlFunction.

Table 122 shows all attributes of FrequencyControlFunctionSchedule.

**Table 122 – Attributes of  
StateInstructionScheduleProfile::FrequencyControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 123 shows all association ends of FrequencyControlFunctionSchedule with other classes.

**Table 123 – Association ends of  
StateInstructionScheduleProfile::FrequencyControlFunctionSchedule with other  
classes**

| mult from | name                     | mult to | type                                     | description                                       |
|-----------|--------------------------|---------|------------------------------------------|---------------------------------------------------|
| 0..*      | FrequencyControlFunction | 1..1    | <a href="#">FrequencyControlFunction</a> | (NC) The control function that has this schedule. |

### 3.125 (NC) FrequencyControlFunctionTimePoint root class

Frequency control function value for a given point in time.

Table 124 shows all attributes of FrequencyControlFunctionTimePoint.

**Table 124 – Attributes of  
StateInstructionScheduleProfile::FrequencyControlFunctionTimePoint**

| name          | mult | type                      | description                                                                                                                                               |
|---------------|------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime        | 1..1 | <a href="#">DateTime</a>  | (NC) The time the data is valid for.                                                                                                                      |
| frequencyBias | 0..1 | <a href="#">Float</a>     | (NC) Frequency bias that the control function is using to achieve by adjusting the operational setting to the controlled equipment.                       |
| targetValue   | 1..1 | <a href="#">Frequency</a> | (NC) Target value for the frequency that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 125 shows all association ends of FrequencyControlFunctionTimePoint with other classes.

**Table 125 – Association ends of  
StateInstructionScheduleProfile::FrequencyControlFunctionTimePoint with other  
classes**

| mult from | name                             | mult to | type                                             | description                                 |
|-----------|----------------------------------|---------|--------------------------------------------------|---------------------------------------------|
| 1..*      | FrequencyControlFunctionSchedule | 1..1    | <a href="#">FrequencyControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.126 (abstract,NC) FuelStorage root class

Fuel storage. e.g. pile of coal that can be shared between multiple thermal generating units.

### 3.127 (NC) FuelStorageSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Fuel storage schedule for elements.

Table 126 shows all attributes of FuelStorageSchedule.

**Table 126 – Attributes of StateInstructionScheduleProfile::FuelStorageSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

| name | mult | type                   | description                                      |
|------|------|------------------------|--------------------------------------------------|
| name | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 127 shows all association ends of FuelStorageSchedule with other classes.

**Table 127 – Association ends of StateInstructionScheduleProfile::FuelStorageSchedule with other classes**

| mult from | name        | mult to | type                        | description                                      |
|-----------|-------------|---------|-----------------------------|--------------------------------------------------|
| 0..*      | FuelStorage | 1..1    | <a href="#">FuelStorage</a> | (NC) Fuel storgae of this fuel storage schedule. |

### 3.128 (NC) FuelStorageTimePoint root class

Fuel storage values for a given point in time.

Table 128 shows all attributes of FuelStorageTimePoint.

**Table 128 – Attributes of StateInstructionScheduleProfile::FuelStorageTimePoint**

| name          | mult | type                       | description                                     |
|---------------|------|----------------------------|-------------------------------------------------|
| atTime        | 0..1 | <a href="#">DateTime</a>   | (NC) The time the data is valid for.            |
| energyStorage | 0..1 | <a href="#">RealEnergy</a> | (NC) Amount of energy available in the storage. |

Table 129 shows all association ends of FuelStorageTimePoint with other classes.

**Table 129 – Association ends of StateInstructionScheduleProfile::FuelStorageTimePoint with other classes**

| mult from | name                | mult to | type                                | description                                              |
|-----------|---------------------|---------|-------------------------------------|----------------------------------------------------------|
| 1..*      | FuelStorageSchedule | 1..1    | <a href="#">FuelStorageSchedule</a> | (NC) The fuel storage schedule that has this time point. |

### 3.129 (abstract,NC) FunctionBlock root class

Function block is a function described as a set of elementary blocks. The blocks describe the function between input variables and output variables.

### 3.130 (abstract,NC) GateInputPin root class

Input pin for a logical gate. The condition described in the input pin gives a logical true or false. The result from measurement and calculation are converted to a true or false.

### 3.131 (NC) GenericAvailableSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for the availability of elements.

Table 130 shows all attributes of GenericAvailableSchedule.

**Table 130 – Attributes of StateInstructionScheduleProfile::GenericAvailableSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

| name | mult | type                   | description                                      |
|------|------|------------------------|--------------------------------------------------|
| mRID | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 131 shows all association ends of GenericAvailableSchedule with other classes.

**Table 131 – Association ends of  
StateInstructionScheduleProfile::GenericAvailableSchedule with other classes**

| mult from | name           | mult to | type                           | description                                         |
|-----------|----------------|---------|--------------------------------|-----------------------------------------------------|
| 0..*      | RemedialAction | 0..1    | <a href="#">RemedialAction</a> | (NC) Remedial action which has available schedules. |

### 3.132 (NC) GenericEnablingSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for the enabling of elements.

Table 132 shows all attributes of GenericEnablingSchedule.

**Table 132 – Attributes of StateInstructionScheduleProfile::GenericEnablingSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 133 shows all association ends of GenericEnablingSchedule with other classes.

**Table 133 – Association ends of  
StateInstructionScheduleProfile::GenericEnablingSchedule with other classes**

| mult from | name                              | mult to | type                                              | description                                                             |
|-----------|-----------------------------------|---------|---------------------------------------------------|-------------------------------------------------------------------------|
| 0..*      | AssessedElementWithContingency    | 0..1    | <a href="#">AssessedElementWithContingency</a>    | (NC) Assessed element with contingency that has enabling schedules.     |
| 0..*      | AssessedElementWithRemedialAction | 0..1    | <a href="#">AssessedElementWithRemedialAction</a> | (NC) Assessed element with remedial action that has enabling schedules. |
| 0..*      | AutomationFunction                | 0..1    | <a href="#">AutomationFunction</a>                | (NC) Automation function which has enabling schedules.                  |
| 0..*      | ContingencyWithRemedialAction     | 0..1    | <a href="#">ContingencyWithRemedialAction</a>     | (NC) Contingency with remedial action which has enabling schedules.     |
| 0..*      | FunctionBlock                     | 0..1    | <a href="#">FunctionBlock</a>                     | (NC) Function block which has enabling schedules.                       |
| 0..*      | CrossBorderRelevance              | 0..1    | <a href="#">CrossBorderRelevance</a>              | (NC) Cross border relevant that has enabling schedules.                 |
| 0..*      | GateInputPin                      | 0..1    | <a href="#">GateInputPin</a>                      | (NC) Gate input pin that has a schedule.                                |
| 0..*      | RemedialActionDependency          | 0..1    | <a href="#">RemedialActionDependency</a>          | (NC) Remedial action dependency which has enabling schedules.           |

| mult from | name                  | mult to | type                                  | description                                                        |
|-----------|-----------------------|---------|---------------------------------------|--------------------------------------------------------------------|
| 0..*      | PowerTransferCorridor | 0..1    | <a href="#">PowerTransferCorridor</a> | (NC) Power transfer corridor which has generic enabling schedules. |

### 3.133 (NC) GenericSequenceSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Schedule for sequence.

Table 134 shows all attributes of GenericSequenceSchedule.

**Table 134 – Attributes of StateInstructionScheduleProfile::GenericSequenceSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 135 shows all association ends of GenericSequenceSchedule with other classes.

**Table 135 – Association ends of StateInstructionScheduleProfile::GenericSequenceSchedule with other classes**

| mult from | name             | mult to | type                             | description                                                   |
|-----------|------------------|---------|----------------------------------|---------------------------------------------------------------|
| 0..*      | EnergyBlockOrder | 0..1    | <a href="#">EnergyBlockOrder</a> | (NC) Energy block order which has generic sequence schedules. |

### 3.134 (NC) GenericValueSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Time series represent irregular generic value at given points in time. The type of value is given by the reference association.

Table 136 shows all attributes of GenericValueSchedule.

**Table 136 – Attributes of StateInstructionScheduleProfile::GenericValueSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 137 shows all association ends of GenericValueSchedule with other classes.

**Table 137 – Association ends of  
StateInstructionScheduleProfile::GenericValueSchedule with other classes**

| mult from | name            | mult to | type                            | description                                           |
|-----------|-----------------|---------|---------------------------------|-------------------------------------------------------|
| 0..*      | RangeConstraint | 0..1    | <a href="#">RangeConstraint</a> | (NC) Range constraint for the generic value schedule. |

### 3.135 (NC) GenericValueTimePoint root class

Generic value for a given point in time.

Table 138 shows all attributes of GenericValueTimePoint.

**Table 138 – Attributes of StateInstructionScheduleProfile::GenericValueTimePoint**

| name   | mult | type                     | description                                                                                                                                                                                                                                                                              |
|--------|------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                                                                                                                                                     |
| value  | 1..1 | <a href="#">Float</a>    | (NC) The value at the time. The meaning of the value is defined by the derived type of the associated schedule. The value can be integer, float or boolean. In case of boolean 1.0 equals true and 0.0 equals false. In case of integer the 0 should be included as a decimal, e.g. 2.0. |

Table 139 shows all association ends of GenericValueTimePoint with other classes.

**Table 139 – Association ends of  
StateInstructionScheduleProfile::GenericValueTimePoint with other classes**

| mult from | name                 | mult to | type                                 | description                                        |
|-----------|----------------------|---------|--------------------------------------|----------------------------------------------------|
| 1..*      | GenericValueSchedule | 1..1    | <a href="#">GenericValueSchedule</a> | (NC) Time series the time point values belongs to. |

### 3.136 (abstract,NC) GridPowerCapacity root class

Grid power capacity defines the active power capacity that can be imported, exported, generated, consumed, or transferred within a defined power system area, or a combination of multiple areas (e.g. a bidding zone), considering relevant grid constraints required for secure and reliable operation.

Note: Grid power capacity represents a power system or network-constrained capacity, not the technical installed capacity of individual resources or groups of resources. It may describe limits on generation, consumption, import, export, or power transfer resulting from operational security limits, network constraints, capacity allocation, forecasted grid availability, planned outages, remedial actions, or market-relevant transmission limitations.

### 3.137 (NC) GridPowerCapacityRegularSchedule

Inheritance path = [BaseRegularIntervalSchedule](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Regular schedule for GridPowerCapacity.

Table 140 shows all attributes of GridPowerCapacityRegularSchedule.

**Table 140 – Attributes of  
StateInstructionScheduleProfile::GridPowerCapacityRegularSchedule**

| name           | mult | type                        | description                                                                                                                                                                       |
|----------------|------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| maxInterchange | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Positive sign means flow into the bidding zone. |

| name                      | mult | type                                        | description                                                                                                                                                                                                                                                  |
|---------------------------|------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| minImportP                | 0..1 | <a href="#">ActivePower</a>                 | (NC) Minimum imported active power requirement.                                                                                                                                                                                                              |
| minInterchange            | 0..1 | <a href="#">ActivePower</a>                 | (NC) Minimum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Negative sign means flow out of the bidding zone.                                                                          |
| netACInterchange          | 0..1 | <a href="#">ActivePower</a>                 | (NC) The netted aggregation of all AC external schedules of an area. Positive sign means flow into the area (Import).                                                                                                                                        |
| netACInterchangeTolerance | 0..1 | <a href="#">Float</a>                       | (NC) The area AC Net Position tolerance.                                                                                                                                                                                                                     |
| netDCInterchange          | 0..1 | <a href="#">ActivePower</a>                 | (NC) The netted aggregation of all DC external schedules of an area. Positive sign means flow into the area.                                                                                                                                                 |
| regulatingDownAllocation  | 0..1 | <a href="#">ActivePower</a>                 | (NC) The balancing capacity allocated for regulating down, by decreasing the production, increasing the direct current export, decreasing direct current import or increasing the consumption of energy in the bidding zone. This must be a positive number. |
| regulatingUpAllocation    | 0..1 | <a href="#">ActivePower</a>                 | (NC) The balancing capacity allocated for regulating up, by increasing the production, decreasing the direct current export, increasing direct current import or reducing the consumption of energy in the bidding zone. This must be a positive number.     |
| dayOfWeek                 | 0..1 | <a href="#">DayOfWeekKind</a>               | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                             |
| intervalStartTime         | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                             |
| intervalEndTime           | 0..1 | <a href="#">DateTime</a>                    | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a>                                                                                                                                                                                             |
| interpolationKind         | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                          |
| timeSeriesKind            | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                          |
| actionMethod              | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>                                                                                                                                                                                                          |
| description               | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                             |
| mRID                      | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                             |
| name                      | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                                                                                                                                                                                             |

Table 141 shows all association ends of GridPowerCapacityRegularSchedule with other classes.

**Table 141 – Association ends of  
StateInstructionScheduleProfile::GridPowerCapacityRegularSchedule with other  
classes**

| mult from | name              | mult to | type                              | description                                                      |
|-----------|-------------------|---------|-----------------------------------|------------------------------------------------------------------|
| 0..*      | GridPowerCapacity | 1..1    | <a href="#">GridPowerCapacity</a> | (NC) The grid power capacity that has a regular schedule.        |
| 0..*      | Season            | 0..1    | <a href="#">Season</a>            | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |
| 0..*      | HourPattern       | 0..1    | <a href="#">HourPattern</a>       | (NC) inherited from: <a href="#">BaseRegularIntervalSchedule</a> |

1988

1989 **3.138 (NC) GridPowerCapacitySchedule**1990 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

1991 The irregular schedule for the capacity.

1992 Table 142 shows all attributes of GridPowerCapacitySchedule.

1993 **Table 142 – Attributes of StateInstructionScheduleProfile::GridPowerCapacitySchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

1994

1995 Table 143 shows all association ends of GridPowerCapacitySchedule with other classes.

1996 **Table 143 – Association ends of**  
1997 **StateInstructionScheduleProfile::GridPowerCapacitySchedule with other classes**

| mult from | name              | mult to | type                              | description                                                          |
|-----------|-------------------|---------|-----------------------------------|----------------------------------------------------------------------|
| 0..*      | GridPowerCapacity | 1..1    | <a href="#">GridPowerCapacity</a> | (NC) Grid Power Capacity which is referred by the capacity schedule. |

1998

1999 **3.139 (NC) GridPowerCapacityTimePoint root class**

2000 Capacity instruction value at a given point in time.

2001 Table 144 shows all attributes of GridPowerCapacityTimePoint.

2002 **Table 144 – Attributes of StateInstructionScheduleProfile::GridPowerCapacityTimePoint**

| name                      | mult | type                        | description                                                                                                                                                                         |
|---------------------------|------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime                    | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                                                                |
| maxInterchange            | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Positive sign means flow into the bidding zone.   |
| minImportP                | 0..1 | <a href="#">ActivePower</a> | (NC) Minimum imported active power requirement.                                                                                                                                     |
| minInterchange            | 0..1 | <a href="#">ActivePower</a> | (NC) Minimum total active power (AC and DC) that the net position for the bidding zone can have to maintain operational security. Negative sign means flow out of the bidding zone. |
| netACInterchange          | 0..1 | <a href="#">ActivePower</a> | (NC) The netted aggregation of all AC external schedules of an area. Positive sign means flow into the area (Import).                                                               |
| netACInterchangeTolerance | 0..1 | <a href="#">Float</a>       | (NC) The area AC Net Position tolerance.                                                                                                                                            |
| netDCInterchange          | 0..1 | <a href="#">ActivePower</a> | (NC) The netted aggregation of all DC external schedules of an area. Positive sign means flow into the area.                                                                        |

| name                     | mult | type                        | description                                                                                                                                                                                                                                                  |
|--------------------------|------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| regulatingDownAllocation | 0..1 | <a href="#">ActivePower</a> | (NC) The balancing capacity allocated for regulating down, by decreasing the production, increasing the direct current export, decreasing direct current import or increasing the consumption of energy in the bidding zone. This must be a positive number. |
| regulatingUpAllocation   | 0..1 | <a href="#">ActivePower</a> | (NC) The balancing capacity allocated for regulating up, by increasing the production, decreasing the direct current export, increasing direct current import or reducing the consumption of energy in the bidding zone. This must be a positive number.     |

Table 145 shows all association ends of GridPowerCapacityTimePoint with other classes.

**Table 145 – Association ends of  
StateInstructionScheduleProfile::GridPowerCapacityTimePoint with other classes**

| mult from | name                      | mult to | type                                      | description                                                         |
|-----------|---------------------------|---------|-------------------------------------------|---------------------------------------------------------------------|
| 1..*      | GridPowerCapacitySchedule | 1..1    | <a href="#">GridPowerCapacitySchedule</a> | (NC) The capacity schedule which belongs to the capacity timepoint. |

### 3.140 (abstract,NC) GridStateAlteration root class

Grid state alteration is a change of values describing state (operating point) of one element in the grid model compared to the base case.

### 3.141 (NC) GridStateAlterationSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)  
Schedule for a grid state alteration.

Table 146 shows all attributes of GridStateAlterationSchedule.

**Table 146 – Attributes of StateInstructionScheduleProfile::GridStateAlterationSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 147 shows all association ends of GridStateAlterationSchedule with other classes.

**Table 147 – Association ends of  
StateInstructionScheduleProfile::GridStateAlterationSchedule with other classes**

| mult from | name                | mult to | type                                | description                                                           |
|-----------|---------------------|---------|-------------------------------------|-----------------------------------------------------------------------|
| 0..*      | GridStateAlteration | 1..1    | <a href="#">GridStateAlteration</a> | (NC) Grid state alteration which has grid state alteration schedules. |

### 3.142 (NC) GridStateAlterationTimePoint root class

Grid state alteration at a given point in time.

2023 Table 148 shows all attributes of GridStateAlterationTimePoint.

2024 **Table 148 – Attributes of StateInstructionScheduleProfile::GridStateAlterationTimePoint**

| name                | mult | type                     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime              | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| enabled             | 0..1 | <a href="#">Boolean</a>  | (NC) The status of the GridStateAlteration set by an operation or by a signal resulting from a control action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| participationFactor | 0..1 | <a href="#">PerCent</a>  | (NC) Participation factor describing the entity part of the active power provided by a collection of entities (e.g. an active power forecast to a collection of entities is divided to each of the member entity according to the participation factor). Must be a positive value.<br><br>In the case of a sharing strategy, the distribution is following entities value (V) equals aggregated value (T) divided by sum of participation factors (PF), i.e. $V=T/\text{sum}(PF)$ .<br><br>In the case of priority strategy, the item with the lowest number gets allocated energy first.<br><br>e.g. If 0 this grid alteration does not participate. The sum of all participation factors for all grid state alterations associated with same remedial action shall be equal to 100%. |

2025

2026 Table 149 shows all association ends of GridStateAlterationTimePoint with other classes.

2027

2028 **Table 149 – Association ends of StateInstructionScheduleProfile::GridStateAlterationTimePoint with other classes**

| mult from | name                        | mult to | type                                        | description                                              |
|-----------|-----------------------------|---------|---------------------------------------------|----------------------------------------------------------|
| 1..*      | GridStateAlterationSchedule | 1..1    | <a href="#">GridStateAlterationSchedule</a> | (NC) Grid state alteration schedule that has time point. |

2029

### 2030 3.143 (NC) GridStateIntensitySchedule

2031 Inheritance path = [GenericValueSchedule](#) : [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2032 Defines the intensity applied for a given grid state alteration. It is primarily used in exchanges related to the remedial action schedule. The value provided by the schedule replaces the value of the attribute to which the schedule refers to.

2036 Table 150 shows all attributes of GridStateIntensitySchedule.

2037 **Table 150 – Attributes of StateInstructionScheduleProfile::GridStateIntensitySchedule**

| name              | mult | type                                        | description                                                                     |
|-------------------|------|---------------------------------------------|---------------------------------------------------------------------------------|
| valueKind         | 0..1 | <a href="#">ValueOffsetKind</a>             | (NC) The kind of value1 and value2 of the associated IrregularIntervalSchedule. |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>                             |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>                             |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>                             |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                |

2038

2039 Table 151 shows all association ends of GridStateIntensitySchedule with other classes.

2040 **Table 151 – Association ends of**  
2041 **StateInstructionScheduleProfile::GridStateIntensitySchedule with other classes**

| mult from | name            | mult to | type                            | description                                               |
|-----------|-----------------|---------|---------------------------------|-----------------------------------------------------------|
| 0..*      | RangeConstraint | 0..1    | <a href="#">RangeConstraint</a> | (NC) inherited from: <a href="#">GenericValueSchedule</a> |

2042

2043 **3.144 (NC) HourPattern**

2044 Inheritance path = [IdentifiedObject](#)

2045 Pattern of hourly period in a day with the same kind of intensity.

2046 Table 152 shows all attributes of HourPattern.

2047 **Table 152 – Attributes of StateInstructionScheduleProfile::HourPattern**

| name             | mult | type                               | description                                                   |
|------------------|------|------------------------------------|---------------------------------------------------------------|
| peakKind         | 0..1 | <a href="#">PeakKind</a>           | (NC) Type of peak or intensity that the pattern is valid for. |
| energyDemandKind | 0..1 | <a href="#">EnergyScenarioKind</a> | (NC) Type of energy demand that the pattern is valid for.     |
| description      | 0..1 | <a href="#">String</a>             | inherited from: <a href="#">IdentifiedObject</a>              |
| mRID             | 1..1 | <a href="#">String</a>             | inherited from: <a href="#">IdentifiedObject</a>              |
| name             | 0..1 | <a href="#">String</a>             | inherited from: <a href="#">IdentifiedObject</a>              |

2048

2049 **3.145 (NC) HourPeriod root class**

2050 Period of hours in a day.

2051 Table 153 shows all attributes of HourPeriod.

2052 **Table 153 – Attributes of StateInstructionScheduleProfile::HourPeriod**

| name      | mult | type                   | description                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------|------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mRID      | 1..1 | <a href="#">String</a> | (NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.<br><br>For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements. |
| startTime | 1..1 | <a href="#">Time</a>   | (NC) Time the period start and including, e.g. 12:00 which means it include the time of 12:00.                                                                                                                                                                                                                                                                                                                     |
| endTime   | 1..1 | <a href="#">Time</a>   | (NC) Time the period end and not including, e.g. 13:00 which means it does not include the time of 13:00 but 12:59.                                                                                                                                                                                                                                                                                                |

2053

2054 Table 154 shows all association ends of HourPeriod with other classes.

**Table 154 – Association ends of StateInstructionScheduleProfile::HourPeriod with other classes**

| mult from | name        | mult to | type                        | description                                   |
|-----------|-------------|---------|-----------------------------|-----------------------------------------------|
| 1..*      | HourPattern | 1..1    | <a href="#">HourPattern</a> | (NC) HourPattern which has some hour periods. |

**3.146 (abstract,NC) ImpedanceControlFunction root class**

Impedance control function is a function block that calculates the operating point of the controlled equipment to achieve the target impedance.

**3.147 (NC) ImpedanceControlFunctionSchedule**

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for ImpedanceControlFunction.

Table 155 shows all attributes of ImpedanceControlFunctionSchedule.

**Table 155 – Attributes of StateInstructionScheduleProfile::ImpedanceControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 156 shows all association ends of ImpedanceControlFunctionSchedule with other classes.

**Table 156 – Association ends of StateInstructionScheduleProfile::ImpedanceControlFunctionSchedule with other classes**

| mult from | name                     | mult to | type                                     | description                                       |
|-----------|--------------------------|---------|------------------------------------------|---------------------------------------------------|
| 0..*      | ImpedanceControlFunction | 1..1    | <a href="#">ImpedanceControlFunction</a> | (NC) The control function that has this schedule. |

**3.148 (NC) ImpedanceControlFunctionTimePoint root class**

Impedance control function value for a given point in time.

Table 157 shows all attributes of ImpedanceControlFunctionTimePoint.

**Table 157 – Attributes of StateInstructionScheduleProfile::ImpedanceControlFunctionTimePoint**

| name        | mult | type                      | description                                                                                                                                               |
|-------------|------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>  | (NC) The time the data is valid for.                                                                                                                      |
| targetValue | 1..1 | <a href="#">Impedance</a> | (NC) Target value for the impedance that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 158 shows all association ends of ImpedanceControlFunctionTimePoint with other classes.

**Table 158 – Association ends of StateInstructionScheduleProfile::ImpedanceControlFunctionTimePoint with other classes**

| mult from | name                             | mult to | type                                             | description                                 |
|-----------|----------------------------------|---------|--------------------------------------------------|---------------------------------------------|
| 1..*      | ImpedanceControlFunctionSchedule | 1..1    | <a href="#">ImpedanceControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.149 (abstract,NC) InfeedLimit root class

Infeed limit set constraints fed in to the network by two or more terminals.

### 3.150 (NC) InfeedLimitSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for an infeed limit.

Table 159 shows all attributes of InfeedLimitSchedule.

**Table 159 – Attributes of StateInstructionScheduleProfile::InfeedLimitSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 160 shows all association ends of InfeedLimitSchedule with other classes.

**Table 160 – Association ends of StateInstructionScheduleProfile::InfeedLimitSchedule with other classes**

| mult from | name        | mult to | type                        | description                                        |
|-----------|-------------|---------|-----------------------------|----------------------------------------------------|
| 0..*      | InfeedLimit | 1..1    | <a href="#">InfeedLimit</a> | (NC) Infeed limit which has infeed limit schedule. |

### 3.151 (NC) InfeedLimitTimePoint root class

Infeed limit at a given point in time.

Table 161 shows all attributes of InfeedLimitTimePoint.

**Table 161 – Attributes of StateInstructionScheduleProfile::InfeedLimitTimePoint**

| name   | mult | type                        | description                                                                        |
|--------|------|-----------------------------|------------------------------------------------------------------------------------|
| atTime | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                               |
| valueW | 0..1 | <a href="#">ActivePower</a> | (NC) Value of active power limit. The attribute shall be a positive value or zero. |
| valueA | 0..1 | <a href="#">CurrentFlow</a> | (NC) Value of current limit. The attribute shall be a positive value or zero.      |

Table 162 shows all association ends of InfeedLimitTimePoint with other classes.

**Table 162 – Association ends of StateInstructionScheduleProfile::InfeedLimitTimePoint with other classes**

| mult from | name                | mult to | type                                | description                                     |
|-----------|---------------------|---------|-------------------------------------|-------------------------------------------------|
| 1..*      | InfeedLimitSchedule | 1..1    | <a href="#">InfeedLimitSchedule</a> | (NC) Infeed limit schedule that has time point. |

### 3.152 (NC,new) Irradiance datatype

Power carried by electromagnetic radiation incident on a surface per unit area.

Note: Intended for solar irradiance values such as global, direct and diffuse solar irradiance.

Table 163 shows all attributes of Irradiance.

**Table 163 – Attributes of StateInstructionScheduleProfile::Irradiance**

| name       | mult | type                           | description |
|------------|------|--------------------------------|-------------|
| multiplier | 0..1 | <a href="#">UnitMultiplier</a> |             |
| unit       | 0..1 | <a href="#">UnitSymbol</a>     |             |
| value      | 0..1 | <a href="#">Float</a>          |             |

### 3.153 (NC) ParticipationFactorTimePoint root class

Participation factor for a given point in time.

Table 164 shows all attributes of ParticipationFactorTimePoint.

**Table 164 – Attributes of StateInstructionScheduleProfile::ParticipationFactorTimePoint**

| name                | mult | type                     | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------|------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime              | 0..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| participationFactor | 0..1 | <a href="#">Float</a>    | (NC) Participation factor describing the entity part of the active power provided by a collection of entities (e.g. an active power forecast to a collection of entities is divided to each of the member entity according to the participation factor). Must be a positive value.<br><br>In the case of a sharing strategy, the distribution is following entities value (V) equals aggregated value (T) divided by sum of participation factors (PF), i.e. $V=T/\text{sum}(PF)$ .<br><br>In the case of priority strategy, the item with the lowest number gets allocated energy first. |

Table 165 shows all association ends of ParticipationFactorTimePoint with other classes.

**Table 165 – Association ends of StateInstructionScheduleProfile::ParticipationFactorTimePoint with other classes**

| mult from | name                  | mult to | type                                  | description                                                                            |
|-----------|-----------------------|---------|---------------------------------------|----------------------------------------------------------------------------------------|
| 0..*      | PowerShiftKeySchedule | 1..1    | <a href="#">PowerShiftKeySchedule</a> | (NC) The Power Shift Key schedule which belongs to the participation factor timepoint. |

2122 **3.154 (abstract,NC) PeerTemporalDependency root class**

2123 An abstract directed dependency between two peer instances of the same domain class that  
2124 defines temporal and operational constraints governing their relative execution or operation.

2125 Note: Temporal lag constraints relate the next applicable transition of the dependent to the  
2126 latest applicable transition of the dependee. A dependee transition remains applicable while the  
2127 dependee remains in the state resulting from that transition. If the dependee subsequently  
2128 changes state before the corresponding transition of the dependent occurs, the previous  
2129 transition is superseded and the constraint is evaluated from the next applicable transition.  
2130 Once the corresponding transition of the dependent has occurred, the lag constraint is satisfied  
2131 for that operating cycle.

2132 Each lag is qualified by its corresponding ReferenceValueKind, which specifies whether the lag  
2133 represents an exact, minimum, or maximum temporal constraint.

2134 Table 166 shows all attributes of PeerTemporalDependency.

2135 **Table 166 – Attributes of StateInstructionScheduleProfile::PeerTemporalDependency**

| name                  | mult | type                               | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------|------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| mRID                  | 1..1 | <a href="#">String</a>             | (NC) Master resource identifier issued by a model authority. The mRID is unique within an exchange context. Global uniqueness is easily achieved by using a UUID, as specified in RFC 4122, for the mRID. The use of UUID is strongly recommended.<br><br>For CIMXML data files in RDF syntax conforming to IEC 61970-552, the mRID is mapped to rdf:ID or rdf:about attributes that identify CIM object elements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| finishToFinishLag     | 0..1 | <a href="#">Duration</a>           | (NC) The duration constraining the next finish or deactivation of the dependent relative to the latest applicable finish or deactivation of the dependee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| finishToFinishLagKind | 0..1 | <a href="#">ReferenceValueKind</a> | (NC) Specifies whether finishToFinishLag is an exact, minimum, or maximum temporal constraint.<br><br>Note: This attribute shall be specified when finishToFinishLag is provided.<br><br>Example: finishToFinishLag = 2D1H30M is interpreted together with finishToFinishLagKind:<br>- exact: the dependent finishes exactly 2 days, 1 hour and 30 minutes after the latest applicable finish of the dependee.<br>- minimum: the dependent may finish no earlier than 2 days, 1 hour and 30 minutes after the latest applicable finish of the dependee.<br>- maximum: the dependent shall finish no later than 2 days, 1 hour and 30 minutes after the latest applicable finish of the dependee.<br><br>In all cases, the dependee finish remains applicable only while the dependee remains in the state resulting from that finish. If the dependee subsequently changes state before the dependent finishes, the applicability of the previous finish is re-evaluated. |
| finishToStartLag      | 0..1 | <a href="#">Duration</a>           | (NC) The duration constraining the next start or activation of the dependent relative to the latest applicable finish or deactivation of the dependee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| finishToStartLagKind  | 0..1 | <a href="#">ReferenceValueKind</a> | (NC) Specifies whether finishToStartLag is an exact, minimum, or maximum temporal constraint.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| name                | mult | type                               | description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------|------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     |      |                                    | <p>Note: This attribute shall be specified when finishToStartLag is provided.</p> <p>Example: finishToStartLag = 20M is interpreted together with finishToStartLagKind:</p> <ul style="list-style-type: none"> <li>- exact: the dependent starts exactly 20 minutes after the latest applicable finish of the dependee.</li> <li>- minimum: the dependent may start no earlier than 20 minutes after the latest applicable finish of the dependee.</li> <li>- maximum: the dependent shall start no later than 20 minutes after the latest applicable finish of the dependee.</li> </ul> <p>In all cases, the dependee finish remains applicable only while the dependee remains in the state resulting from that finish. If the dependee subsequently changes state before the dependent starts, the constraint is evaluated from the next applicable finish of the dependee.</p>                                     |
| overlap             | 0..1 | <a href="#">Duration</a>           | (NC) The duration constraining the period for which the dependee and dependent are simultaneously active or effective.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| overlapKind         | 0..1 | <a href="#">ReferenceValueKind</a> | <p>(NC) Specifies whether overlap is an exact, minimum, or maximum duration of simultaneous activity or effectiveness.</p> <p>Note: This attribute shall be specified when overlap is provided.</p> <p>Example: overlap = 1H28M45S is interpreted together with overlapKind:</p> <ul style="list-style-type: none"> <li>- exact: the dependee and dependent are simultaneously active or effective for exactly 1 hour, 28 minutes, and 45 seconds.</li> <li>- minimum: the dependee and dependent shall be simultaneously active or effective for at least 1 hour, 28 minutes, and 45 seconds.</li> <li>- maximum: the dependee and dependent shall be simultaneously active or effective for no more than 1 hour, 28 minutes, and 45 seconds.</li> </ul> <p>Unlike the lag attributes, overlap constrains the duration of a simultaneous state rather than the temporal separation between two state transitions.</p> |
| startToStartLag     | 0..1 | <a href="#">Duration</a>           | (NC) The duration constraining the next start or activation of the dependent relative to the latest applicable start or activation of the dependee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| startToStartLagKind | 0..1 | <a href="#">ReferenceValueKind</a> | <p>(NC) Specifies whether startToStartLag is an exact, minimum, or maximum temporal constraint.</p> <p>Note: This attribute shall be specified when startToStartLag is provided.</p> <p>Example: startToStartLag = 2H is interpreted together with startToStartLagKind:</p> <ul style="list-style-type: none"> <li>- exact: the dependent starts exactly 2 hours after the latest applicable start of the dependee.</li> <li>- minimum: the dependent may start no earlier than 2 hours after the latest applicable start of the dependee.</li> <li>- maximum: the dependent shall start no later than 2 hours after the latest applicable start of the dependee.</li> </ul> <p>In all cases, the dependee start remains applicable only while the dependee remains in the state resulting from that start. If the</p>                                                                                                 |

| name           | mult | type                                     | description                                                                                                                                                                                                                                                               |
|----------------|------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |      |                                          | dependee subsequently changes state before the dependent starts, the constraint is evaluated from the next applicable start of the dependee.                                                                                                                              |
| constraintKind | 1..1 | <a href="#">DependencyConstraintKind</a> | (NC) The kind of temporal or operational constraint defined between the dependee and the dependent.<br><br>Note: Certain dependency constraint kinds may require or prohibit the use of temporal constraint attributes, depending on the semantics of the specialization. |

2136

2137 **3.155 (abstract,NC) PhaseControlFunction root class**

2138 Phase control function is a function block that calculate the operating point of the controlled  
2139 equipment to achieve the target voltage.

2140 **3.156 (NC) PhaseControlFunctionSchedule**

2141 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2142 The schedule for PhaseControlFunction.

2143 Table 167 shows all attributes of PhaseControlFunctionSchedule.

2144

**Table 167 – Attributes of  
StateInstructionScheduleProfile::PhaseControlFunctionSchedule**

2145

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2146

2147 Table 168 shows all association ends of PhaseControlFunctionSchedule with other classes.

2148 **Table 168 – Association ends of**2149 **StateInstructionScheduleProfile::PhaseControlFunctionSchedule with other classes**

| mult from | name                 | mult to | type                                 | description                                       |
|-----------|----------------------|---------|--------------------------------------|---------------------------------------------------|
| 0..*      | PhaseControlFunction | 1..1    | <a href="#">PhaseControlFunction</a> | (NC) The control function that has this schedule. |

2150

2151 **3.157 (NC) PhaseControlFunctionTimePoint root class**

2152 Phase control function value for a given point in time.

2153 Table 169 shows all attributes of PhaseControlFunctionTimePoint.

2154 **Table 169 – Attributes of**2155 **StateInstructionScheduleProfile::PhaseControlFunctionTimePoint**

| name        | mult | type                         | description                                                                                      |
|-------------|------|------------------------------|--------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>     | (NC) The time the data is valid for.                                                             |
| targetValue | 1..1 | <a href="#">AngleDegrees</a> | (NC) Target value for the phase that the control function is calculating to achieve by adjusting |

| name | mult | type | description                                          |
|------|------|------|------------------------------------------------------|
|      |      |      | the operational setting to the controlled equipment. |

Table 170 shows all association ends of PhaseControlFunctionTimePoint with other classes.

**Table 170 – Association ends of  
StateInstructionScheduleProfile::PhaseControlFunctionTimePoint with other classes**

| mult from | name                         | mult to | type                                         | description                                 |
|-----------|------------------------------|---------|----------------------------------------------|---------------------------------------------|
| 1..*      | PhaseControlFunctionSchedule | 1..1    | <a href="#">PhaseControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.158 (NC) PowerBidDependency

Inheritance path = [PeerTemporalDependency](#)

A peer temporal dependency that defines temporal or operational constraints between two power bid schedules.

Note: The dependency constrains activation or deactivation of the dependent power bid schedule relative to activation or deactivation of the dependee power bid schedule. Lag constraints are evaluated from the latest applicable activation or deactivation of the dependee. A subsequent state change of the dependee supersedes the previous reference transition if the corresponding transition of the dependent has not yet occurred.

Example:

- startToStartLag = 15M, startToStartLagKind = exact: the dependent bid is activated exactly 15 minutes after activation of the dependee bid, provided the dependee has not subsequently changed state.

- finishToStartLag = 30M, finishToStartLagKind = minimum: the dependent bid may be activated no earlier than 30 minutes after deactivation of the dependee bid.

- finishToFinishLag = 15M, finishToFinishLagKind = maximum: the dependent bid shall be deactivated no later than 15 minutes after deactivation of the dependee bid.

Table 171 shows all attributes of PowerBidDependency.

**Table 171 – Attributes of StateInstructionScheduleProfile::PowerBidDependency**

| name                  | mult | type                                     | description                                                 |
|-----------------------|------|------------------------------------------|-------------------------------------------------------------|
| mRID                  | 1..1 | <a href="#">String</a>                   | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| finishToFinishLag     | 0..1 | <a href="#">Duration</a>                 | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| finishToFinishLagKind | 0..1 | <a href="#">ReferenceValueKind</a>       | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| finishToStartLag      | 0..1 | <a href="#">Duration</a>                 | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| finishToStartLagKind  | 0..1 | <a href="#">ReferenceValueKind</a>       | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| overlap               | 0..1 | <a href="#">Duration</a>                 | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| overlapKind           | 0..1 | <a href="#">ReferenceValueKind</a>       | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| startToStartLag       | 0..1 | <a href="#">Duration</a>                 | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| startToStartLagKind   | 0..1 | <a href="#">ReferenceValueKind</a>       | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |
| constraintKind        | 1..1 | <a href="#">DependencyConstraintKind</a> | (NC) inherited from: <a href="#">PeerTemporalDependency</a> |

Table 172 shows all association ends of PowerBidDependency with other classes.

**Table 172 – Association ends of StateInstructionScheduleProfile::PowerBidDependency with other classes**

| mult from | name                      | mult to | type                             | description                                                                                                                 |
|-----------|---------------------------|---------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 0..*      | DependentPowerBidSchedule | 1..1    | <a href="#">PowerBidSchedule</a> | (NC) The power bid schedule whose activation, deactivation, or execution is constrained by the dependee power bid schedule. |
| 0..*      | DependeePowerBidSchedule  | 1..1    | <a href="#">PowerBidSchedule</a> | (NC) The power bid schedule upon which the dependent power bid schedule depends.                                            |

**3.159 (NC) PowerBidSchedule**

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Power bid or offer related to a redispatch or countertrading measures. In the case of market place for economic efficiency of the bids and offers, this is equivalent to BidTimeSeries class in 62325 package.

Table 173 shows all attributes of PowerBidSchedule.

**Table 173 – Attributes of StateInstructionScheduleProfile::PowerBidSchedule**

| name               | mult | type                                          | description                                                                                                                                                                               |
|--------------------|------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| isOffer            | 0..1 | <a href="#">Boolean</a>                       | (NC) Indicates if the power bid is an offer or not. True, means that the bid is an offer. False, means that the bid is not an offer.                                                      |
| totalMaximumEnergy | 0..1 | <a href="#">RealEnergy</a>                    | (NC) Maximum total energy that can be activated by the bid.                                                                                                                               |
| direction          | 0..1 | <a href="#">MarketRegulationDirectionKind</a> | (NC) Define the direction of the energy adjustment.                                                                                                                                       |
| currency           | 0..1 | <a href="#">Currency</a>                      | (NC) Currency of the bid.                                                                                                                                                                 |
| totalMinimumEnergy | 0..1 | <a href="#">RealEnergy</a>                    | (NC) Minimum total energy that has to be activated by the bid.                                                                                                                            |
| priority           | 0..1 | <a href="#">Integer</a>                       | (NC) The numeric local priority given to a bid. Lower numeric values will have higher priority.                                                                                           |
| maximumUptime      | 0..1 | <a href="#">Duration</a>                      | (NC) Maximum duration the action needs to be remain active after startup.                                                                                                                 |
| minimumUptime      | 0..1 | <a href="#">Duration</a>                      | (NC) Minimum duration the action needs to be remain active after startup.                                                                                                                 |
| activationCost     | 0..1 | <a href="#">Decimal</a>                       | (NC) Cost to activate the bid.                                                                                                                                                            |
| shutdownCost       | 0..1 | <a href="#">Decimal</a>                       | (NC) Total shutdown cost incurred for all the units involved in the bid. This overrides any cost on the specific unit.                                                                    |
| leadTime           | 0..1 | <a href="#">Duration</a>                      | (NC) Time it takes for the bid to be called upon until it is active.                                                                                                                      |
| minimumOffTime     | 0..1 | <a href="#">Duration</a>                      | (NC) Minimum time interval between activation of the bid involving startup and shutdown. This value overrides any value on the unit.                                                      |
| isFixed            | 0..1 | <a href="#">Boolean</a>                       | (NC) Indicates if the power bid schedule is fixed, meaning that all the different power bid schedule values need to be taken without changes. e.g. It is a take-it-or-leave-it bid offer. |
| maxRampDownP       | 0..1 | <a href="#">ActivePower</a>                   | (NC) Maximum decrease of the active power change from one time point to the next.                                                                                                         |

| name              | mult | type                                        | description                                                                       |
|-------------------|------|---------------------------------------------|-----------------------------------------------------------------------------------|
| maxRampUpP        | 0..1 | <a href="#">ActivePower</a>                 | (NC) Maximum increase of the active power change from one time point to the next. |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a>                               |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a>                               |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a>                               |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                  |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                  |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>                                  |

Table 174 shows all association ends of PowerBidSchedule with other classes.

**Table 174 – Association ends of StateInstructionScheduleProfile::PowerBidSchedule with other classes**

| mult from | name                | mult to | type                                | description                                                   |
|-----------|---------------------|---------|-------------------------------------|---------------------------------------------------------------|
| 0..*      | ScheduleResource    | 0..1    | <a href="#">ScheduleResource</a>    | (NC) Schedule resource which has several power bid schedules. |
| 0..*      | PowerRemedialAction | 0..1    | <a href="#">PowerRemedialAction</a> | (NC) Power remedial action for which the bid is given.        |

### 3.160 (NC) PowerBidScheduleTimePoint root class

Time series represent irregular values at given points in time.

Table 175 shows all attributes of PowerBidScheduleTimePoint.

**Table 175 – Attributes of StateInstructionScheduleProfile::PowerBidScheduleTimePoint**

| name               | mult | type                        | description                                                                                                                                    |
|--------------------|------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime             | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                                                                           |
| price              | 0..1 | <a href="#">Decimal</a>     | (NC) Price given in the time point.                                                                                                            |
| p                  | 0..1 | <a href="#">ActivePower</a> | (NC) Active power injection. Load sign convention is used, i.e. positive sign means flow out from a node.                                      |
| minimumActivationP | 0..1 | <a href="#">ActivePower</a> | (NC) Minimum active power given in the time point.                                                                                             |
| reservePrice       | 0..1 | <a href="#">Decimal</a>     | (NC) Price for reserving the step increment active power.                                                                                      |
| stepIncrementP     | 0..1 | <a href="#">ActivePower</a> | (NC) The minimum increment that can be applied for an increase in an activation request.                                                       |
| activationCost     | 0..1 | <a href="#">Decimal</a>     | (NC) Cost to activate the bid in the given time point.                                                                                         |
| shutdownCost       | 0..1 | <a href="#">Decimal</a>     | (NC) Total shutdown cost incurred for all the units involved in the bid given in the time point. This overrides any cost on the specific unit. |

Table 176 shows all association ends of PowerBidScheduleTimePoint with other classes.

**Table 176 – Association ends of  
StateInstructionScheduleProfile::PowerBidScheduleTimePoint with other classes**

| mult from | name             | mult to | type                             | description                                                           |
|-----------|------------------|---------|----------------------------------|-----------------------------------------------------------------------|
| 1..*      | PowerBidSchedule | 1..1    | <a href="#">PowerBidSchedule</a> | (NC) Power bid schedule that has many power bid schedule time points. |

### 3.161 (abstract,NC) PowerFactorControlFunction root class

Power factor control function is a function block that calculates the operating point of the controlled equipment to achieve the target power factor.

### 3.162 (NC) PowerFactorControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)  
the schedule for PowerFactorControlFunction.

Table 177 shows all attributes of PowerFactorControlFunctionSchedule.

**Table 177 – Attributes of  
StateInstructionScheduleProfile::PowerFactorControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 178 shows all association ends of PowerFactorControlFunctionSchedule with other classes.

**Table 178 – Association ends of  
StateInstructionScheduleProfile::PowerFactorControlFunctionSchedule with other classes**

| mult from | name                       | mult to | type                                       | description                                       |
|-----------|----------------------------|---------|--------------------------------------------|---------------------------------------------------|
| 0..*      | PowerFactorControlFunction | 1..1    | <a href="#">PowerFactorControlFunction</a> | (NC) The control function that has this schedule. |

### 3.163 (NC) PowerFactorControlFunctionTimePoint root class

Power factor control function value for a given point in time.

Table 179 shows all attributes of PowerFactorControlFunctionTimePoint.

**Table 179 – Attributes of  
StateInstructionScheduleProfile::PowerFactorControlFunctionTimePoint**

| name        | mult | type                     | description                                                                                                                                                  |
|-------------|------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                         |
| targetValue | 1..1 | <a href="#">Float</a>    | (NC) Target value for the power factor that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 180 shows all association ends of PowerFactorControlFunctionTimePoint with other classes.

**Table 180 – Association ends of  
StateInstructionScheduleProfile::PowerFactorControlFunctionTimePoint with other  
classes**

| mult from | name                               | mult to | type                                               | description                                 |
|-----------|------------------------------------|---------|----------------------------------------------------|---------------------------------------------|
| 1..*      | PowerFactorControlFunctionSchedule | 1..1    | <a href="#">PowerFactorControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.164 (abstract,NC) PowerRemedialAction root class

Energy remedial action describes actions to rearrange power schedules.

### 3.165 (NC) PowerRemedialActionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for a power remedial action.

Table 181 shows all attributes of PowerRemedialActionSchedule.

**Table 181 – Attributes of  
StateInstructionScheduleProfile::PowerRemedialActionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 182 shows all association ends of PowerRemedialActionSchedule with other classes.

**Table 182 – Association ends of  
StateInstructionScheduleProfile::PowerRemedialActionSchedule with other classes**

| mult from | name                | mult to | type                                | description                                                        |
|-----------|---------------------|---------|-------------------------------------|--------------------------------------------------------------------|
| 0..*      | PowerRemedialAction | 1..1    | <a href="#">PowerRemedialAction</a> | (NC) Power remedial action for the power remedial action schedule. |

### 3.166 (NC) PowerRemedialActionTimePoint root class

Regulating values at a given point in time.

Table 183 shows all attributes of PowerRemedialActionTimePoint.

**Table 183 – Attributes of  
StateInstructionScheduleProfile::PowerRemedialActionTimePoint**

| name              | mult | type                        | description                                                                         |
|-------------------|------|-----------------------------|-------------------------------------------------------------------------------------|
| atTime            | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                |
| maxRegulatingDown | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum net amount of active power that the remedial action can regulate down. |

| name            | mult | type                        | description                                                                       |
|-----------------|------|-----------------------------|-----------------------------------------------------------------------------------|
| maxRegulatingUp | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum net amount of active power that the remedial action can regulate up. |

Table 184 shows all association ends of PowerRemedialActionTimePoint with other classes.

**Table 184 – Association ends of StateInstructionScheduleProfile::PowerRemedialActionTimePoint with other classes**

| mult from | name                        | mult to | type                                        | description                                                       |
|-----------|-----------------------------|---------|---------------------------------------------|-------------------------------------------------------------------|
| 1..*      | PowerRemedialActionSchedule | 1..1    | <a href="#">PowerRemedialActionSchedule</a> | (NC) The power remedial action schedule that has this time point. |

### 3.167 (NC) PowerShiftKeyDistribution

Inheritance path = [IdentifiedObject](#)

Distribution of the bid action on the power shift keys.

Table 185 shows all attributes of PowerShiftKeyDistribution.

**Table 185 – Attributes of StateInstructionScheduleProfile::PowerShiftKeyDistribution**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 186 shows all association ends of PowerShiftKeyDistribution with other classes.

**Table 186 – Association ends of StateInstructionScheduleProfile::PowerShiftKeyDistribution with other classes**

| mult from | name                  | mult to | type                                  | description                                                             |
|-----------|-----------------------|---------|---------------------------------------|-------------------------------------------------------------------------|
| 0..*      | PowerBidSchedule      | 0..1    | <a href="#">PowerBidSchedule</a>      | (NC) Power bid schedule for the given distribution.                     |
| 0..1      | PowerShiftKeySchedule | 1..1    | <a href="#">PowerShiftKeySchedule</a> | (NC) Power Shift Key schedule in power shift key distribution.          |
| 0..*      | PowerShiftKeyStrategy | 0..1    | <a href="#">PowerShiftKeyStrategy</a> | (NC) Power Shift Key Strategy which has a Power Shift Key Distribution. |

### 3.168 (NC) PowerShiftKeySchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for Power Shift Keys.

Table 187 shows all attributes of PowerShiftKeySchedule.

**Table 187 – Attributes of StateInstructionScheduleProfile::PowerShiftKeySchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

| name | mult | type                   | description                                      |
|------|------|------------------------|--------------------------------------------------|
| mRID | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 188 shows all association ends of PowerShiftKeySchedule with other classes.

**Table 188 – Association ends of  
StateInstructionScheduleProfile::PowerShiftKeySchedule with other classes**

| mult from | name                        | mult to | type                                        | description                                                                                                                                 |
|-----------|-----------------------------|---------|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 0..*      | EnergyConsumer              | 0..1    | <a href="#">EnergyConsumer</a>              | (NC) The EnergyConsumer that has a Power Shift Key schedule.                                                                                |
| 0..*      | GeneratingUnit              | 0..1    | <a href="#">GeneratingUnit</a>              | (NC) The Generating Unit which has a Power Shift Key Schedule.                                                                              |
| 0..*      | HydroPump                   | 0..1    | <a href="#">HydroPump</a>                   | (NC) The Hydro Pump which has a Power Shift Key schedule.                                                                                   |
| 0..*      | PowerElectronicsUnit        | 0..1    | <a href="#">PowerElectronicsUnit</a>        | (NC) The Power Electronics Unit which has a Power Shift Key schedule.                                                                       |
| 0..*      | EnergyBlockOrder            | 0..1    | <a href="#">EnergyBlockOrder</a>            | (NC) An energy block order which has a Power Shift Key Schedule.                                                                            |
| 0..*      | EnergyResourceGroupCapacity | 0..1    | <a href="#">EnergyResourceGroupCapacity</a> | (NC) The energy group capacity which has a Power Shift Key Schedule.                                                                        |
| 0..*      | ScheduleResource            | 0..1    | <a href="#">ScheduleResource</a>            | (NC) The Schedule Resource which has a Power Shift Key schedule.                                                                            |
| 0..*      | EnergySource                | 0..1    | <a href="#">EnergySource</a>                | (deprecated,NC) The energy source which has a power shift key schedule. The renewable resources should be modelled as PowerElectronicsUnit. |
| 0..*      | EquivalentInjection         | 0..1    | <a href="#">EquivalentInjection</a>         | (NC) Equivalent injection which is part of a power shift key schedule.                                                                      |
| 0..*      | ExternalNetworkInjection    | 0..1    | <a href="#">ExternalNetworkInjection</a>    | (NC) The energy source which has a power shift key schedule.                                                                                |
| 0..*      | DCEquivalentInjection       | 0..1    | <a href="#">DCEquivalentInjection</a>       | (NC) DC equivalent injection that has this power shift key schedule.                                                                        |
| 0..*      | DCPole                      | 0..1    | <a href="#">DCPole</a>                      | (NC) A DC Pole which has a Power Shift Key Schedule.                                                                                        |
| 0..*      | SchedulingArea              | 0..1    | <a href="#">SchedulingArea</a>              |                                                                                                                                             |

### 3.169 (abstract,NC) PowerShiftKeyStrategy root class

Strategy of the power shift key.

### 3.170 (abstract,NC) PowerTransferCorridor root class

A power transfer corridor is defined as a set of circuits (transmission lines or transformers) separating two portions of the power system, or a subset of circuits exposed to a substantial portion of the transmission exchange between two parts of the system.

### 3.171 (abstract,NC) RangeConstraint

Inheritance path = [IdentifiedObject](#)

Defines the range constraint.

Table 189 shows all attributes of RangeConstraint.

2287 **Table 189 – Attributes of StateInstructionScheduleProfile::RangeConstraint**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

2288

2289 **3.172 (abstract,NC) ReactivePowerControlFunction root class**

2290 Reactive power control function is a function block that calculate the operating point of the  
 2291 controlled equipment to achieve the target reactive power.

2292 **3.173 (NC) ReactivePowerControlFunctionSchedule**

2293 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2294 The schedule for ReactivePowerControlFunction.

2295 Table 190 shows all attributes of ReactivePowerControlFunctionSchedule.

2296

2297 **Table 190 – Attributes of StateInstructionScheduleProfile::ReactivePowerControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2298

2299 Table 191 shows all association ends of ReactivePowerControlFunctionSchedule with other  
 2300 classes.

2301 **Table 191 – Association ends of**

2302 **StateInstructionScheduleProfile::ReactivePowerControlFunctionSchedule with other**  
 2303 **classes**

| mult from | name                         | mult to | type                                         | description                                       |
|-----------|------------------------------|---------|----------------------------------------------|---------------------------------------------------|
| 0..*      | ReactivePowerControlFunction | 1..1    | <a href="#">ReactivePowerControlFunction</a> | (NC) The control function that has this schedule. |

2304

2305 **3.174 (NC) ReactivePowerControlFunctionTimePoint root class**

2306 Reactive power control function value for a given point in time.

2307 Table 192 shows all attributes of ReactivePowerControlFunctionTimePoint.

2308

2309 **Table 192 – Attributes of StateInstructionScheduleProfile::ReactivePowerControlFunctionTimePoint**

| name        | mult | type                          | description                                                                                                                                                    |
|-------------|------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>      | (NC) The time the data is valid for.                                                                                                                           |
| targetValue | 1..1 | <a href="#">ReactivePower</a> | (NC) Target value for the reactive power that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 193 shows all association ends of ReactivePowerControlFunctionTimePoint with other classes.

**Table 193 – Association ends of StateInstructionScheduleProfile::ReactivePowerControlFunctionTimePoint with other classes**

| mult from | name                                 | mult to | type                                                 | description                                 |
|-----------|--------------------------------------|---------|------------------------------------------------------|---------------------------------------------|
| 1..*      | ReactivePowerControlFunctionSchedule | 1..1    | <a href="#">ReactivePowerControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.175 (abstract,NC) RemedialAction

Inheritance path = [IdentifiedObject](#)

Remedial action describes one or more actions that can be performed on a given power system model situation to eliminate one or more identified breaches of constraints. The remedial action can be costly, and have a cost characteristic, or non costly.

Table 194 shows all attributes of RemedialAction.

**Table 194 – Attributes of StateInstructionScheduleProfile::RemedialAction**

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

### 3.176 (abstract,NC) RemedialActionDependency root class

Remedial action dependency is making two remedial actions depending on each other. Multiple dependency is done by multiple instances of this class. The dependency can arrive by having one of the following examples.

- The dependent remedial action is controlled by different system operator (Modeling Authority) (e.g. SIPS that goes across control area).

- The dependent remedial action is representing two or more remedial action that represent the same grid state alteration but with different modeling resolution (e.g. detail direct current model versus a simplified model).

- The remedial action can be combined with other remedial action without the need to create multiple remedial action with the same grid alteration for enabling dependency.

### 3.177 (abstract,NC) RemedialActionGroup root class

Grouping of remedial actions that can be operated together.

### 3.178 (NC) RemedialActionGroupSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for a remedial action group.

Table 195 shows all attributes of RemedialActionGroupSchedule.

**Table 195 – Attributes of StateInstructionScheduleProfile::RemedialActionGroupSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 196 shows all association ends of RemedialActionGroupSchedule with other classes.

**Table 196 – Association ends of  
StateInstructionScheduleProfile::RemedialActionGroupSchedule with other classes**

| mult from | name                | mult to | type                                | description                                                           |
|-----------|---------------------|---------|-------------------------------------|-----------------------------------------------------------------------|
| 0..*      | RemedialActionGroup | 1..1    | <a href="#">RemedialActionGroup</a> | (NC) Remedial action group which has remedial action group schedules. |

### 3.179 (NC) RemedialActionGroupTimePoint root class

Remedial action group at a given point in time.

Table 197 shows all attributes of RemedialActionGroupTimePoint.

**Table 197 – Attributes of  
StateInstructionScheduleProfile::RemedialActionGroupTimePoint**

| name              | mult | type                        | description                                                                                   |
|-------------------|------|-----------------------------|-----------------------------------------------------------------------------------------------|
| atTime            | 1..1 | <a href="#">DateTime</a>    | (NC) The time the data is valid for.                                                          |
| maxRegulatingDown | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum net amount of active power that the group of remedial actions can regulate down. |
| maxRegulatingUp   | 0..1 | <a href="#">ActivePower</a> | (NC) Maximum net amount of active power that the group of remedial actions can regulate up.   |

Table 198 shows all association ends of RemedialActionGroupTimePoint with other classes.

**Table 198 – Association ends of  
StateInstructionScheduleProfile::RemedialActionGroupTimePoint with other classes**

| mult from | name                        | mult to | type                                        | description                                              |
|-----------|-----------------------------|---------|---------------------------------------------|----------------------------------------------------------|
| 1..*      | RemedialActionGroupSchedule | 1..1    | <a href="#">RemedialActionGroupSchedule</a> | (NC) Remedial action group schedule that has time point. |

### 3.180 (abstract,NC) RemedialActionScheme root class

Remedial Action Scheme (RAS), Special Protection Schemes (SPS), System Protection Schemes (SPS) or System Integrity Protection Schemes (SIPS).

A Remedial Action Scheme consists of one or more stages that can trigger and execute a protection action.

### 3.181 (NC) RemedialActionSchemeSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for a remedial action scheme.

Table 199 shows all attributes of RemedialActionSchemeSchedule.

**Table 199 – Attributes of  
StateInstructionScheduleProfile::RemedialActionSchemeSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

Table 200 shows all association ends of RemedialActionSchemeSchedule with other classes.

**Table 200 – Association ends of  
StateInstructionScheduleProfile::RemedialActionSchemeSchedule with other classes**

| mult from | name                | mult to | type                                 | description                                              |
|-----------|---------------------|---------|--------------------------------------|----------------------------------------------------------|
| 0..*      | ArmedRemedialAction | 1..1    | <a href="#">RemedialActionScheme</a> | (NC) Armed remedial action for a remedial action scheme. |

### 3.182 (NC) RemedialActionSchemeTimePoint root class

Remedial action scheme at a given point in time.

Table 201 shows all attributes of RemedialActionSchemeTimePoint.

**Table 201 – Attributes of  
StateInstructionScheduleProfile::RemedialActionSchemeTimePoint**

| name      | mult | type                     | description                                                                                                                                                                                                         |
|-----------|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| armed     | 0..1 | <a href="#">Boolean</a>  | (NC) Defines the arming status of the remedial action scheme. It is set by operation or by signal.                                                                                                                  |
| atTime    | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                                                                                |
| inService | 0..1 | <a href="#">Boolean</a>  | (NC) Specifies the availability of the Remedial Action Scheme (RAS). If true, the RAS is available for contingency processing. If false, the RAS is treated by contingency processing as if it is not in the model. |

Table 202 shows all association ends of RemedialActionSchemeTimePoint with other classes.

**Table 202 – Association ends of  
StateInstructionScheduleProfile::RemedialActionSchemeTimePoint with other classes**

| mult from | name                         | mult to | type                                         | description                                               |
|-----------|------------------------------|---------|----------------------------------------------|-----------------------------------------------------------|
| 1..*      | RemedialActionSchemeSchedule | 1..1    | <a href="#">RemedialActionSchemeSchedule</a> | (NC) Remedial action scheme schedule that has time point. |

### 3.183 (NC) ReservoirSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

Reservoir schedule for elements.

Table 203 shows all attributes of ReservoirSchedule.

2389 **Table 203 – Attributes of StateInstructionScheduleProfile::ReservoirSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2390

2391 Table 204 shows all association ends of ReservoirSchedule with other classes.

2392 **Table 204 – Association ends of StateInstructionScheduleProfile::ReservoirSchedule**  
2393 **with other classes**

| mult from | name      | mult to | type                      | description                             |
|-----------|-----------|---------|---------------------------|-----------------------------------------|
| 0..*      | Reservoir | 1..1    | <a href="#">Reservoir</a> | (NC) The reservoir that has a schedule. |

2394

2395 **3.184 (NC) ReservoirTimePoint root class**

2396 Reservoir values for a given point in time.

2397 Table 205 shows all attributes of ReservoirTimePoint.

2398 **Table 205 – Attributes of StateInstructionScheduleProfile::ReservoirTimePoint**

| name          | mult | type                       | description                                     |
|---------------|------|----------------------------|-------------------------------------------------|
| atTime        | 0..1 | <a href="#">DateTime</a>   | (NC) The time the data is valid for.            |
| energyStorage | 0..1 | <a href="#">RealEnergy</a> | (NC) Amount of energy available in the storage. |

2399

2400 Table 206 shows all association ends of ReservoirTimePoint with other classes.

2401 **Table 206 – Association ends of StateInstructionScheduleProfile::ReservoirTimePoint**  
2402 **with other classes**

| mult from | name              | mult to | type                              | description                                           |
|-----------|-------------------|---------|-----------------------------------|-------------------------------------------------------|
| 1..*      | ReservoirSchedule | 1..1    | <a href="#">ReservoirSchedule</a> | (NC) The reservoir schedule that has this time point. |

2403

2404 **3.185 (abstract,NC) ScheduleResource root class**

2405 A schedule resource is a market-based method for handling participation of small units,  
2406 particularly located on the lower voltage level that is controlled by a Distributed System  
2407 Operator (DSO). It is a collection of units that can operate in the market by providing bids, offers  
2408 and a resulting committed operational schedule for the collection.

2409 **3.186 (abstract,NC) SchedulingArea root class**

2410 An area where production and/or consumption of energy can be forecasted, scheduled and  
2411 measured. The area is operated by only one system operator, typically a Transmission System  
2412 Operator (TSO). The area can consist of a sub area, which has the same definition as the main  
2413 area, but it can be operated by another system operator (typically Distributed System Operator  
2414 (DSO) or a Closed Distributed System Operator (CDSO)). This includes microgrid concept. A  
2415 substation is the smallest grouping that can be included in the area. The area size should be

2416 considered in terms of the possibility of accumulated reading (settlement metering) and the  
2417 capability of operating as an island.

### 2418 3.187 (NC) SequenceTimePoint root class

2419 Sequence at a given point in time.

2420 Table 207 shows all attributes of SequenceTimePoint.

2421 **Table 207 – Attributes of StateInstructionScheduleProfile::SequenceTimePoint**

| name     | mult | type                     | description                                                                                           |
|----------|------|--------------------------|-------------------------------------------------------------------------------------------------------|
| atTime   | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                  |
| sequence | 1..1 | <a href="#">Integer</a>  | (NC) Sequence needs to be ordered by the scheduling area. It has to be unique by the scheduling area. |

2422  
2423 Table 208 shows all association ends of SequenceTimePoint with other classes.

2424 **Table 208 – Association ends of StateInstructionScheduleProfile::SequenceTimePoint**  
2425 **with other classes**

| mult from | name                    | mult to | type                                    | description                                                         |
|-----------|-------------------------|---------|-----------------------------------------|---------------------------------------------------------------------|
| 1..*      | GenericSequenceSchedule | 1..1    | <a href="#">GenericSequenceSchedule</a> | (NC) The sequence schedule which belongs to the sequence timepoint. |

### 2426 2427 3.188 (abstract,NC) StageTrigger root class

2428 Stage that is triggered either by TriggerCondition or by gate condition within a stage.

### 2429 3.189 (NC) StageTriggerSchedule

2430 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2431 Schedule for a stage trigger.

2432 Table 209 shows all attributes of StageTriggerSchedule.

2433 **Table 209 – Attributes of StateInstructionScheduleProfile::StageTriggerSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2434  
2435 Table 210 shows all association ends of StageTriggerSchedule with other classes.

2436 **Table 210 – Association ends of StateInstructionScheduleProfile::StageTriggerSchedule**  
2437 **with other classes**

| mult from | name         | mult to | type                         | description                                           |
|-----------|--------------|---------|------------------------------|-------------------------------------------------------|
| 0..*      | StageTrigger | 1..1    | <a href="#">StageTrigger</a> | (NC) Stage trigger which has stage trigger schedules. |

2438

2439 **3.190 (NC) StageTriggerTimePoint root class**

2440 Stage trigger values at a given point in time.

2441 Table 211 shows all attributes of StageTriggerTimePoint.

2442 **Table 211 – Attributes of StateInstructionScheduleProfile::StageTriggerTimePoint**

| name      | mult | type                     | description                                                                                                                                                                                                         |
|-----------|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| armed     | 0..1 | <a href="#">Boolean</a>  | (NC) Defines the arming status of the remedial action scheme. It is set by operation or by signal.                                                                                                                  |
| atTime    | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                                                                                |
| inService | 0..1 | <a href="#">Boolean</a>  | (NC) Specifies the availability of the Remedial Action Scheme (RAS). If true, the RAS is available for contingency processing. If false, the RAS is treated by contingency processing as if it is not in the model. |

2443

2444 Table 212 shows all association ends of StageTriggerTimePoint with other classes.

2445 **Table 212 – Association ends of**2446 **StateInstructionScheduleProfile::StageTriggerTimePoint with other classes**

| mult from | name                 | mult to | type                                 | description                                      |
|-----------|----------------------|---------|--------------------------------------|--------------------------------------------------|
| 1..*      | StageTriggerSchedule | 1..1    | <a href="#">StageTriggerSchedule</a> | (NC) Stage trigger schedule that has time point. |

2447

2448 **3.191 (NC) UnitCostSchedule**2449 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2450 The schedule for a unit cost.

2451 Table 213 shows all attributes of UnitCostSchedule.

2452 **Table 213 – Attributes of StateInstructionScheduleProfile::UnitCostSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| currency          | 0..1 | <a href="#">Currency</a>                    | (NC) Currency the energy price is given in.         |
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2453

2454 Table 214 shows all association ends of UnitCostSchedule with other classes.

2455 **Table 214 – Association ends of StateInstructionScheduleProfile::UnitCostSchedule**  
2456 **with other classes**

| mult from | name           | mult to | type                           | description                                        |
|-----------|----------------|---------|--------------------------------|----------------------------------------------------|
| 0..*      | GeneratingUnit | 1..1    | <a href="#">GeneratingUnit</a> | (NC) GeneratingUnit which has unit cost schedules. |

2457

2458 **3.192 (NC) UnitCostTimePoint root class**

2459 Unit cost at a given point in time.

2460 Table 215 shows all attributes of UnitCostTimePoint.

2461 **Table 215 – Attributes of StateInstructionScheduleProfile::UnitCostTimePoint**

| name            | mult | type                     | description                                                                  |
|-----------------|------|--------------------------|------------------------------------------------------------------------------|
| atTime          | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                         |
| startupCost     | 0..1 | <a href="#">Decimal</a>  | (NC) The initial startup cost incurred for each start of the GeneratingUnit. |
| warmStartupCost | 0..1 | <a href="#">Decimal</a>  | (NC) The warm startup cost incurred for each start of the GeneratingUnit.    |
| shutdownCost    | 0..1 | <a href="#">Decimal</a>  | (NC) The shutdown cost incurred for each shutdown of the GeneratingUnit.     |

2462

2463 Table 216 shows all association ends of UnitCostTimePoint with other classes.

2464 **Table 216 – Association ends of StateInstructionScheduleProfile::UnitCostTimePoint**  
2465 **with other classes**

| mult from | name             | mult to | type                             | description                                      |
|-----------|------------------|---------|----------------------------------|--------------------------------------------------|
| 1..*      | UnitCostSchedule | 1..1    | <a href="#">UnitCostSchedule</a> | (NC) The unit cost schedule that has time point. |

2466

2467 **3.193 (abstract,NC) VoltageAngleControlFunction root class**2468 Voltage angle control function is a function block that calculates operating point of the controlled  
2469 equipment to achieve the target voltage angle.2470 **3.194 (NC) VoltageAngleControlFunctionSchedule**2471 Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

2472 The schedule for VoltageAngleControlFunction.

2473 Table 217 shows all attributes of VoltageAngleControlFunctionSchedule.

2474 **Table 217 – Attributes of**  
2475 **StateInstructionScheduleProfile::VoltageAngleControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| name              | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

2476

2477 Table 218 shows all association ends of VoltageAngleControlFunctionSchedule with other  
2478 classes.

**Table 218 – Association ends of  
StateInstructionScheduleProfile::VoltageAngleControlFunctionSchedule with other  
classes**

| mult from | name                        | mult to | type                                        | description                                       |
|-----------|-----------------------------|---------|---------------------------------------------|---------------------------------------------------|
| 0..*      | VoltageAngleControlFunction | 1..1    | <a href="#">VoltageAngleControlFunction</a> | (NC) The control function that has this schedule. |

### 3.195 (NC) VoltageAngleControlFunctionTimePoint root class

Voltage angle control function value for a given point in time.

Table 219 shows all attributes of VoltageAngleControlFunctionTimePoint.

**Table 219 – Attributes of  
StateInstructionScheduleProfile::VoltageAngleControlFunctionTimePoint**

| name        | mult | type                         | description                                                                                                                                                   |
|-------------|------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a>     | (NC) The time the data is valid for.                                                                                                                          |
| targetValue | 1..1 | <a href="#">AngleDegrees</a> | (NC) Target value for the voltage angle that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 220 shows all association ends of VoltageAngleControlFunctionTimePoint with other classes.

**Table 220 – Association ends of  
StateInstructionScheduleProfile::VoltageAngleControlFunctionTimePoint with other  
classes**

| mult from | name                                | mult to | type                                                | description                                 |
|-----------|-------------------------------------|---------|-----------------------------------------------------|---------------------------------------------|
| 1..*      | VoltageAngleControlFunctionSchedule | 1..1    | <a href="#">VoltageAngleControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.196 (abstract,NC) VoltageAngleLimit root class

Voltage angle limit between two terminals. The association end OperationalLimitSet.Terminal defines one end and the host of the limit. The association end VoltageAngleLimit.AngleReferenceTerminal defines the reference terminal.

### 3.197 (NC) VoltageAngleSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for a voltage angle.

Table 221 shows all attributes of VoltageAngleSchedule.

**Table 221 – Attributes of StateInstructionScheduleProfile::VoltageAngleSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description       | 0..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID              | 1..1 | <a href="#">String</a>                      | inherited from: <a href="#">IdentifiedObject</a>    |

| name | mult | type                   | description                                      |
|------|------|------------------------|--------------------------------------------------|
| name | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 222 shows all association ends of VoltageAngleSchedule with other classes.

**Table 222 – Association ends of  
StateInstructionScheduleProfile::VoltageAngleSchedule with other classes**

| mult from | name              | mult to | type                              | description                                                |
|-----------|-------------------|---------|-----------------------------------|------------------------------------------------------------|
| 0..*      | VoltageAngleLimit | 1..1    | <a href="#">VoltageAngleLimit</a> | (NC) Voltage angle limit which has voltage angle schedule. |

### 3.198 (NC) VoltageAngleTimePoint root class

Voltage angle at a given point in time.

Table 223 shows all attributes of VoltageAngleTimePoint.

**Table 223 – Attributes of StateInstructionScheduleProfile::VoltageAngleTimePoint**

| name   | mult | type                         | description                                                                                                                                                                                                                                               |
|--------|------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime | 1..1 | <a href="#">DateTime</a>     | (NC) The time the data is valid for.                                                                                                                                                                                                                      |
| value  | 1..1 | <a href="#">AngleDegrees</a> | (NC) The difference in angle degrees between referenced by the association end OperationalLimitSet.Terminal and the Terminal referenced by the association end VoltageAngleLimit.AngleReferenceTerminal. The value shall be positive (greater than zero). |

Table 224 shows all association ends of VoltageAngleTimePoint with other classes.

**Table 224 – Association ends of  
StateInstructionScheduleProfile::VoltageAngleTimePoint with other classes**

| mult from | name                 | mult to | type                                 | description                                          |
|-----------|----------------------|---------|--------------------------------------|------------------------------------------------------|
| 1..*      | VoltageAngleSchedule | 1..1    | <a href="#">VoltageAngleSchedule</a> | (NC) The voltage angle schedule that has time point. |

### 3.199 (abstract,NC) VoltageControlFunction root class

Voltage control function is a function block that calculate the operating point of the controlled equipment to achieve the target voltage.

### 3.200 (NC) VoltageControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for VoltageControlFunction.

Table 225 shows all attributes of VoltageControlFunctionSchedule.

**Table 225 – Attributes of  
StateInstructionScheduleProfile::VoltageControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| actionMethod      | 0..1 | <a href="#">String</a>                      | (NC) inherited from: <a href="#">BaseTimeSeries</a> |

| name        | mult | type                   | description                                      |
|-------------|------|------------------------|--------------------------------------------------|
| description | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| mRID        | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |
| name        | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a> |

Table 226 shows all association ends of VoltageControlFunctionSchedule with other classes.

**Table 226 – Association ends of  
StateInstructionScheduleProfile::VoltageControlFunctionSchedule with other classes**

| mult from | name                   | mult to | type                                   | description                                       |
|-----------|------------------------|---------|----------------------------------------|---------------------------------------------------|
| 0..*      | VoltageControlFunction | 1..1    | <a href="#">VoltageControlFunction</a> | (NC) The control function that has this schedule. |

### 3.201 (NC) VoltageControlFunctionTimePoint root class

Voltage control function value for a given point in time.

Table 227 shows all attributes of VoltageControlFunctionTimePoint.

**Table 227 – Attributes of  
StateInstructionScheduleProfile::VoltageControlFunctionTimePoint**

| name        | mult | type                     | description                                                                                                                                             |
|-------------|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                    |
| targetValue | 1..1 | <a href="#">Voltage</a>  | (NC) Target value for the voltage that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 228 shows all association ends of VoltageControlFunctionTimePoint with other classes.

**Table 228 – Association ends of  
StateInstructionScheduleProfile::VoltageControlFunctionTimePoint with other classes**

| mult from | name                           | mult to | type                                           | description                                 |
|-----------|--------------------------------|---------|------------------------------------------------|---------------------------------------------|
| 1..*      | VoltageControlFunctionSchedule | 1..1    | <a href="#">VoltageControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

### 3.202 (abstract,NC) VoltageInjectionControlFunction root class

Voltage injection control function is a function block that calculates the operating point of the controlled equipment to achieve the target voltage injection.

### 3.203 (NC) VoltageInjectionControlFunctionSchedule

Inheritance path = [BaseIrregularTimeSeries](#) : [BaseTimeSeries](#) : [IdentifiedObject](#)

The schedule for VoltageInjectionControlFunction.

Table 229 shows all attributes of VoltageInjectionControlFunctionSchedule.

**Table 229 – Attributes of  
StateInstructionScheduleProfile::VoltageInjectionControlFunctionSchedule**

| name              | mult | type                                        | description                                         |
|-------------------|------|---------------------------------------------|-----------------------------------------------------|
| interpolationKind | 1..1 | <a href="#">TimeSeriesInterpolationKind</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| timeSeriesKind    | 0..1 | <a href="#">BaseTimeSeriesKind</a>          | (NC) inherited from: <a href="#">BaseTimeSeries</a> |

| name         | mult | type                   | description                                         |
|--------------|------|------------------------|-----------------------------------------------------|
| actionMethod | 0..1 | <a href="#">String</a> | (NC) inherited from: <a href="#">BaseTimeSeries</a> |
| description  | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a>    |
| mRID         | 1..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a>    |
| name         | 0..1 | <a href="#">String</a> | inherited from: <a href="#">IdentifiedObject</a>    |

Table 230 shows all association ends of VoltageInjectionControlFunctionSchedule with other classes.

**Table 230 – Association ends of  
StateInstructionScheduleProfile::VoltageInjectionControlFunctionSchedule with other  
classes**

| mult<br>from | name                            | mult<br>to | type                                            | description                                       |
|--------------|---------------------------------|------------|-------------------------------------------------|---------------------------------------------------|
| 0..*         | VoltageInjectionControlFunction | 1..1       | <a href="#">VoltageInjectionControlFunction</a> | (NC) The control function that has this schedule. |

### 3.204 (NC) VoltageInjectionControlFunctionTimePoint root class

Voltage injection control function value for a given point in time.

Table 231 shows all attributes of VoltageInjectionControlFunctionTimePoint.

**Table 231 – Attributes of  
StateInstructionScheduleProfile::VoltageInjectionControlFunctionTimePoint**

| name        | mult | type                     | description                                                                                                                                             |
|-------------|------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| atTime      | 1..1 | <a href="#">DateTime</a> | (NC) The time the data is valid for.                                                                                                                    |
| targetValue | 1..1 | <a href="#">Voltage</a>  | (NC) Target value for the voltage that the control function is calculating to achieve by adjusting the operational setting to the controlled equipment. |

Table 232 shows all association ends of VoltageInjectionControlFunctionTimePoint with other classes.

**Table 232 – Association ends of  
StateInstructionScheduleProfile::VoltageInjectionControlFunctionTimePoint with other  
classes**

| mult<br>from | name                                    | mult<br>to | type                                                    | description                                 |
|--------------|-----------------------------------------|------------|---------------------------------------------------------|---------------------------------------------|
| 1..*         | VoltageInjectionControlFunctionSchedule | 1..1       | <a href="#">VoltageInjectionControlFunctionSchedule</a> | (NC) The schedule that has this time point. |

2573

**Annex A (informative): Sample data****A.1 General**

2575 This Annex is designed to illustrate the profile by using fragments of sample data. It is not meant  
2576 to be a complete set of examples covering all possibilities of using the profile. Defining a  
2577 complete set of test data is considered a separate activity to be performed for the purpose of  
2578 setting up interoperability testing and conformity related to this profile.

**A.2 Sample instance data**

2580 Test data files are available in the CIM EG SharePoint.

2581

2582