Register Facility Help File

IESO
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Disclaimer

This document is for informational purposes only and contains the required attributes that need to be submitted in the process of registering a facility, its associated equipment, and resources through online IESO. If at any time you have questions or require clarifications on any of the attributes listed below please contact Market Registration via email at market.registration@ieso.ca

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1 Facility (Substation)

Facility is designated BPS/BES if at least one piece of equipment within the facility is designated as a BPS/BES element.

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Substation Name	**Purpose:** Unique name used to identify physical facility in communications by participant, transmitter or IESO.	Participant	Free text	Note this is one of the attributes that the IESO Market Registration department may override after consultation with the participant and transmitter.	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Provisional Facility Name	**Purpose:** Unique name used to pend a registration request to rename the facility. Provisional name to identify facility in communications by participant, transmitter or IESO. Expected in cases where the participant organization changes ownership (and where only that one participant owns equipment at the facility)	IESO	Free text	N/A	N/A	M

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Comments		Participant	Free text	N/A	N/A	O
Substation Class	**Purpose:** Indicate functional purpose of substation.	IESO	Drop Down	Generation, load, transmission, distribution	N/A	M
Substation Sub-Class	**Purpose:** Indicate functional purpose of substation.	IESO	Drop Down (dependent on substation class)	•Customer Generation Station (CGS) •Customer Transformer Station (CTS) •Distribution Station (DS) •Generation Station (GS) •Municipal Transformer Station (MTS) •Mobile Utility Station (MUS) •Transformer Station (TS) •Wind Generation Station (WGS) •Tie Line (TL)	N/A	M

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Sub-region	**Purpose:** Substation is organized by electrical area for Regional Planning purposes.	IESO	Drop Down	Burlington-to-Nanticoke, Greater Ottawa, GTA North, GTA West, Kitchener-Waterloo-Cambridge-Guelph, Metro Toronto, Northwest Ontario, Windsor-Essex, East Lake Superior, GTA East, London Area, Peterborough-to-Kingston, South Georgian Bay and Muskoka, Sudbury and Algoma, Chatham-Lambton-Sarnia, Greater Bruce Area, Niagara, North of Moosonee, North-East of Sudbury, Renfrew, St. Lawrence	N/A	M
Electrical Zone	**Purpose:** Substations is organized by electrical area for IESO Operations purposes.	System	Drop Down	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce	N/A	M

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Global Positioning System North	**Purpose:** Substation global position North (Latitude)	Participant	Numeric Text (North is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 43°N,23 minutes ,00 seconds Would be entered as 43.38333	Decimal Degrees	O

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Global Positioning System West	**Purpose:** Substation global position West (Longitude)	Participant	Numeric Text (West is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 79° W,42 minutes, 00 seconds Would be entered as 79.7000	Decimal Degrees	O
Connection Type	**Purpose:** Defines type of connection to the IESO-controlled grid	IESO	Drop Down	Directly Connected/Embedded	N/A	M
Telemetry Performance Classification	**Purpose:** Defines telemetry quality/performance based on market rules	IESO	Drop Down	High, Medium, Low, N/A	N/A	M
Telemetry Size Classification	**Purpose:** Defines telemetry quality/performance based on size market rules	IESO	Drop Down	Small, Significant, Major, Minor, Small, N/A	N/A	M
Special Protection System (SPS)/Remedial Action Scheme (RAS) Participation	**Purpose:** Defines whether the substation will/has installed physical equipment that allows participation in a specific SPS/RAS	IESO	Drop Down	Y/N, N/A	N/A	M

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**

Key Restoration Facility	Substation is used to establish a basic minimum power system following a system blackout. These facilities are essential to the restoration of the area and include:
	• Generating stations having black start units
	• Other selected generating stations
	• Transmission elements that are part of the basic minimum power system
	• Participant control centres
	• Telecommunication centres:
	  ○ Telecommunication facilities that are necessary to support protection and control facilities
	  ○ Voice and data between control centres
	  ○ Voice and data between control centres and key generating/transmission substations
		IESO	Boolean	Y/N	N/A	M

Address 1	Substation address line 1	Participant	Free text	N/A	N/A	M
Address 2	Substation address line 2	Participant	Free text	N/A	N/A	O
Address 3	Substation address line 3	Participant	Free text	N/A	N/A	O
Postal Code/Zip Code	Postal code of the substation	Participant	Applicable code format	Based on Country selected	N/A	M
City	City where substation resides	Participant	Free text	N/A	N/A	M
Province/State	Province where substation resides	Participant	Drop down	Default Ontario	N/A	M

Facility (Substation)						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Country	Country where substation resides	Participant	Drop Down	Default Canada	N/A	M
Ground DC Resistance	**Purpose:** Substation grounding DC resistance.	Participant	Decimal number	≥0	Ohms	M
RG Flag	**Purpose:** Method used to specify grounding DC resistance value.	Participant	Dropdown	Assumed, measured, calculated, ungrounded	N/A	M
GIC Comment	**Purpose:** Participant supplied comments.	Participant	Text	N/A	N/A	O

1.1 Supporting Documents

The Supporting documents are not equipment and will not have op nom or equipment name.

Supporting Documents						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Supporting Document Type	**Purpose:** The type of supporting document (see value range)	System	Drop down	1. Connection agreement 2. Control schemes description 3. Operating Philosophy Document 4. Protection system description 5. Restoration Plan Attachment 6. Single line diagram 7. Telemetry workbook 8. Elapsed Time to Dispatch 9. PCG supporting technical information	N/A	M

Supporting Documents						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Supporting Document	**Purpose:** One of a document set that provides additional documentation for a facility and organization (see value range)	Participant	Upload Document	**Connection Agreement:** This is the agreement between the transmitter or the distributor with the participant **Control Schemes Description Document:** This is a document that details the method of controlling the equipment outputs in relation to changes in input quantities **Operating Philosophy Document:** This is a document that details how the facility/substation operates **Protection System Description Document**: A document that details how the protections operate at a facility substation. **Restoration Plan Attachment**: Document submitted at an organizational level	N/A	M

Supporting Documents						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
				that documents their restoration plan (i.e. outlines how they will meet obligations to support the OPSRP). **Single Line Diagram (facility):** This is the distributor/transmitter approved single line diagram **Telemetry Workbook**: An excel workbook that defines the status, and analog telemetering points the participant shall provide to the IESO (defined by IESO, completed by participant) **Elapsed Time to Dispatch**: This is a document that describes in detail the minimum amount of time, in minutes, between the time at which a start-up sequence is initiated for a generation unit and the time at which it becomes dispatchable by reaching its minimum loading point.		

Supporting Documents						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
				PCG Supporting Technical Information: Mandatory if participating in PCG program (formerly form 1552) This is a technical document that supports the registration values submitted for MRT, MGBRT, and MLP by the participant.		
Supporting document comments	**Purpose:** IESO supplied comments.	IESO	Text			O

1.2 Facility Contact

The relationship between a contact and a facility role. Specifically, it is the point of contact for a person or organization section fulfilling a particular facility role.

Facility Contact						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Selected Phone Number	An indication of which phone number the person would like to be contacted at for this particular facility contact. The possible values are: Main Phone, Alternate Phone 1 or Alternate Phone 2.	Participant	Text	N/A		M

Facility Contact						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Selected Email	An indication of which email the person would like to be contacted at for this particular facility contact. The possible values are: Main Email, Alternate Email 1 or Alternate Email 2.	Participant	Number	N/A		M

1.3 Restoration Plan Attachment

Restoration Plan Attachments are not equipment and will not have op nom or equipment name.

Restoration Plan Attachment						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Restoration Plan Attachment	**Purpose:** Document submitted at an organizational level that documents their restoration plan (i.e. outlines how they will meet obligations to support the OPSRP). Required if the organization is designated as a restoration participant during the SIA process. Based on this, the Compliance Assurance SME will require an RPA during Register Equipment.	Participant	Upload Document	N/A	N/A	M
Organization Id	**Purpose:** Id of the organization providing the RPA	System	Integer	N/A	N/A	M

1.4 UFLS Area

Ontario is divided into 3 UFLS areas for the purpose of UFLS implementation.

UFLS Area						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
UFLS Area Name	**Purpose:** Name used to identify the area in which a facility (containing at least one UFLS Relay Group) resides.	IESO	Text	North West Central The value is derived from electrical zone	N/A	M
UFLS Area Outage Margin	**Purpose:** The maximum allowable percentage of UFLS load that may be shed in an UFLS Area at the same time. It's used to conduct UFLS threshold validation for outage management.	IESO	Numeric	-100.00 to +100.00	%	M

1.5 Voltage Level

Voltage Level						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
System Voltage	**Purpose:** Base system voltage Please select the closest base system voltage to your equipment.	Participant	Drop Down	720, 500, 345, 230, 115, LT	N/A	M

1.6 Special Protection System (SPS)

Special protection systems ("SPS") have been installed in a number of locations on the IESO-controlled grid which automatically initiate one or more of the following control actions: load rejection, generation rejection, generation runback, shunt capacitor switching, shunt reactor switching, and cross-tripping.

Special Protection System (SPS)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	IESO	Free Text but must be unique	N/A	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M

Special Protection System (SPS)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
SPS Status	**Purpose:** Reflect the most recent update on the SPS. New: A completely new SPS is proposed. Modified: Last major change made to the SPS. It could be to incorporate a new facility or protection settings changed etc. Reclassified – SPS that had the NPCC SPS Classification (type) changed. For example, due to system changes, a Type III SPS might have to be reclassified as Type I. (NPCC Directory 7, 1.6.2.2.2) Retired – SPS retired from service and is no longer available.	System (new) IESO (confirm, enter or change)	Drop Down	New, Modified, Reclassified, Retired	N/A	M
Transmission Zone (electrical zone)	Zones corresponding to major interfaces, categorized geographically, and based on generation resources.	System from facility	Drop Down	Bruce, East, Essa, Niagara, Northeast, Northwest, Ottawa, Southwest, Toronto, West	N/A	M
SPS Design	**Purpose:** Selection of designed trigger(s) that initiate SPS action.	IESO	Drop Down (ability should be provided for selection of both)	Connectivity based; event based	N/A	M
SPS Classification	**Purpose:** To identify the impact and importance of the SPS.	IESO	Drop Down	RAS, NPCC Type 1, NPCC Type 2, NPCC Type 3	N/A	M

Special Protection System (SPS)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Facility Description Document	A document, published by Transmitter, describing with details the functioning and operation of SPS.	IESO	PDF (Upload document)	N/A	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

1.7 Control Centre

Market rules define Control Centres for Ontario facilities and for each external control area/Reliability Coordinator (e.g. HQ, MISO, NYISO).
A Control Centre for each external control area/Reliability Coordinator facilitates outage reporting of all facilities beyond the border as a single station that represents the area.
Business Rule: A control centre contact must be a 24x7 facility contact (section) with the same name as the control centre.
Control centre requires the following attributes to support outage management:

Control Centre						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Control Centre Name	**Purpose:** Unique name used to identify control centre in communications by participant, transmitter or IESO.	Participant	Text	N/A	N/A	M
Sub-region	**Purpose:** Control centres organized by electrical area for IESO operations purposes.	IESO	Dropdown	Burlington-to-Nanticoke, Greater Ottawa, GTA North, GTA West, Kitchener-Waterloo-Cambridge-Guelph, Metro Toronto, Northwest Ontario, Windsor-Essex, East Lake Superior, GTA East, London Area, Peterborough-to-Kingston, South Georgian Bay and Muskoka, Sudbury and Algoma, Chatham-Lambton-Sarnia, Greater Bruce Area, Niagara, North of Moosonee, North-East of Sudbury, Renfrew, St. Lawrence	N/A	M

Control Centre						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Electrical Zone	**Purpose:** Control centres are organized by electrical zone for IESO operations purposes.	IESO	Dropdown	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce (please use CDMS numbering system and 1 – N/A, 2 – Bruce, etc.)	N/A	M
Mailing Address 1	Control centre address line 1	Participant	Text	N/A	N/A	O
Mailing Address 2	Control centre address line 2	Participant	Text	N/A	N/A	O
Mailing Address 3	Control centre address line 3	Participant	Text	N/A	N/A	O
Mailing Address 4	Control centre address line 4	Participant	Text	N/A	N/A	O
City	City where control centre resides	Participant	Text	N/A	N/A	M
Province	Province where control centre resides	Participant	Dropdown	Default Ontario	N/A	O
Postal Code	Postal code of the control centre	Participant	Applicable code format	Based on Country selected	N/A	O
Country	Country where control centre resides	Participant	Dropdown	Default Canada	N/A	O
Registration status	**Purpose:** Indicates current registration status.	System and manual IESO	Dropdown	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M

1.8 GIC Bus

GIC bus is presented in the power flow model of the IESO base case. It is different from the bus (equipment within a physical facility) captured in Section 9.3. GIC bus is connected to equipment (e.g. transformer, circuit section), but itself is not a registered equipment.

GIC Bus						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
GIC Bus Number	**Purpose:** GIC bus identifier in the IESO base case.	IESO	Integer	150000-174999	N/A	M

1.9 Earth Model

Earth model represents the earth conductivity at a geographical location. A total of 50 earth models are allowed for GIC modelling in the IESO base case.

Earth Model						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Earth Model Name	**Purpose:** Earth model identifier in the IESO base case.	IESO	Text	N/A	N/A	M
Earth Model Scaling Factor	**Purpose:** Earth model scaling factor used when calculating branch induced electric field for Benchmark GMD event.	IESO	Decimal number	N/A	N/A	M
Earth Model Description	**Purpose:** Description of the earth model.	IESO	Text	N/A	N/A	M

1.10 Earth Model Layer

In a one-dimensional model of the earth conductivity structure, earth is described as a layered semi-infinite conductor with given conductivity values in each layer. A total of 25 layers are allowed for an earth model in the IESO base case.

Earth Model Layer						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Earth Model Layer Resistivity	**Purpose:** Resistivity of an earth model layer.	IESO	Decimal number	N/A	Ohm-m	M

Earth Model Layer						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Earth Model Layer Thickness	**Purpose:** Thickness of an earth model layer.	IESO	Integer	N/A	Km	M

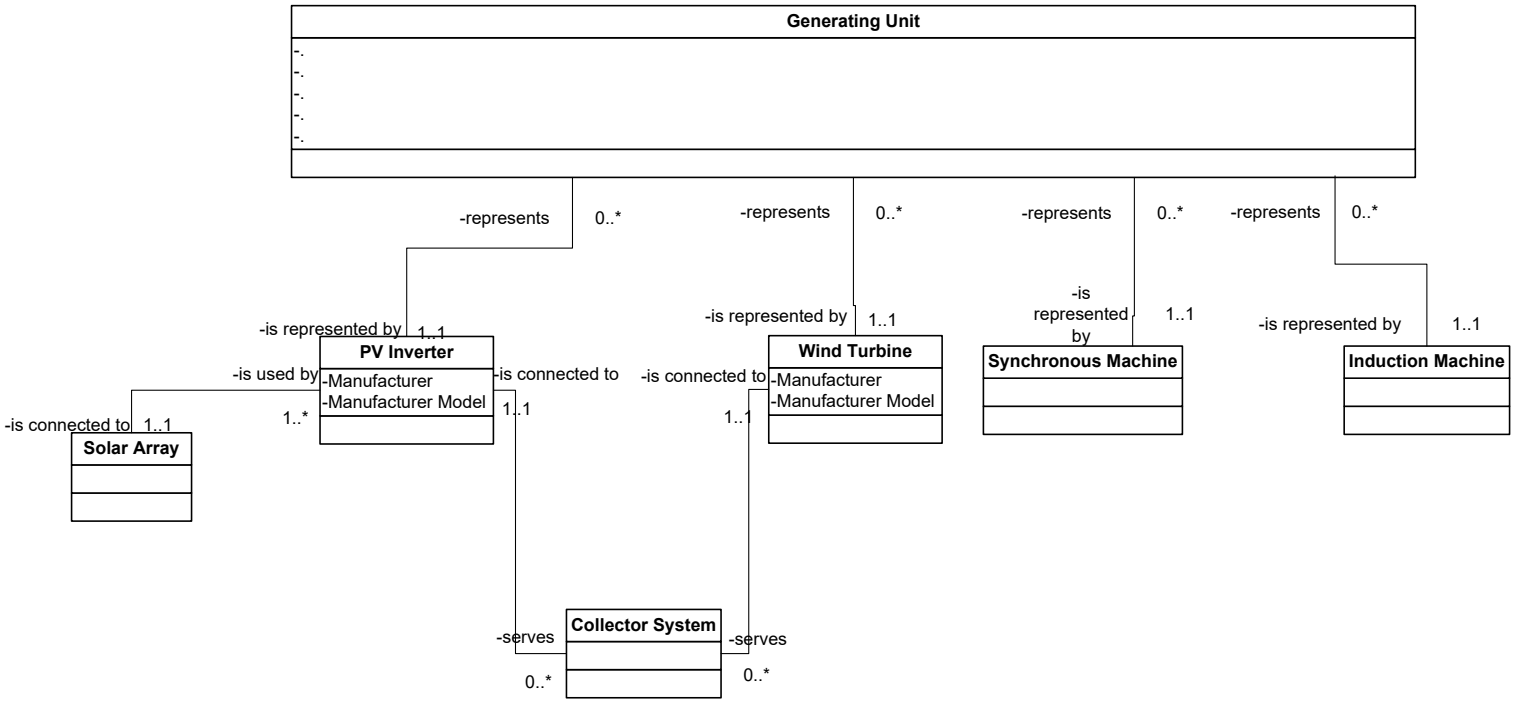
2 Generating Unit

Generating unit is a single machine for converting mechanical power into electric power.

Notes:

1. The current business rules is that a generating unit can only have one active instance of PV Inverter, Wind Turbine, Synchronous Machine or Induction Unit associated with it. Per the CIM model and for potential future use, the relationship has been modelled as 0..*.
2. Based on the current business rule/requirement, operating nomenclature, BES flag and BPS flag are all retained on the generating unit (not the machine type. Future analysis will determine where these identity and communication attributes should reside if multiple machines are needed for a generating unit.
3. Given the potential for allowing many machines for a generating unit, the manufacturer, model and nameplate photo reside on the machine type.

View 4a-Generating Unit



Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration status	**Purpose:** Indicate current registration status	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered[1] (system), IESO maintained (system)	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** To indicate if part of the North American Electric Reliability Corporation (NERC) defined Bulk Electric System (BES)	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** To indicate if part of the Northeast Power Coordinating Council, Inc. (NPPC) defined Bulk Power System (BPS)	IESO	Boolean	Y/N	N/A	M
Primary Fuel Type	**Purpose:** The primary fuel used for the generating unit	Participant	Drop down	Bio Fuel, Coal, Gas, Oil, Steam, Uranium, Water, Wind, Solar, Electricity, Other, Demand	N/A	M
Alternate Fuel Type	**Purpose:** The secondary fuel used for the generating unit	Participant	Drop down	Bio Fuel, Coal, Gas, Oil, Steam, Uranium, Water, Wind, Solar, Electricity, Other, Demand	N/A	O
Rated Speed	**Purpose:** The speed for which the device has been designed.	Participant	Integer number	0 to 3600	RPM	M
Machine Base	**Purpose:** The MVA base of the machine which impedances are measured at.	Participant	Decimal number	0 to 9999	MVA	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number	0 to 9999	kV	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Rated Active Power	**Purpose:** Rated active power is the smaller output at either rated ambient conditions (e.g. temperature, head, wind speed, solar radiation) or 90% of rated apparent power. To satisfy steady-state reactive power requirements, active power reductions to rated active power are permitted. Note for wind turbines that have apparent power equal to turbine capability the rated active power of the turbine is equal to the turbine capability.	Participant	Decimal number with validation	0 to 9999	MW	M
Maximum Continuous Active Power (-10 C ambient)	**Purpose**: Maximum Generator Unit Capability during specified ambient conditions without station service being supplied by the unit. (-10°C ambient).	Participant	Decimal number with validation	0-9999	MW	M
Maximum continuous Active Power (0°C ambient)	**Purpose**: Maximum Generator Unit Capability during specified ambient conditions without station service being supplied by the unit. (0°C ambient).	Participant	Decimal number with validation	0-9999	MW	M
Maximum continuous Active Power (winter)	**Purpose:** Maximum Generator Unit Capability during specified ambient conditions without station service being supplied by the unit. (10°C ambient).	Participant	Decimal number with validation	0-9999	MW	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum continuous Active Power (20°C ambient)	**Purpose**: Maximum Generator Unit Capability during specified ambient conditions without station service being supplied by the unit. (20°C ambient).	Participant	Decimal number with validation	0-9999	MW	M
Maximum continuous Active Power (summer)	**Purpose**: Maximum Generator Unit Capability during specified ambient conditions without station service being supplied by the unit (35ºC ambient (at or south of Barrie) or 30ºC ambient (north of Barrie)).	Participant	Decimal number with validation	0-9999	MW	M
Maximum Active Power Capability	**Purpose:** Maximum active power capability under any conditions without station service being supplied by the unit. This value will be used to calculate the energy resource's maximum offer capability.	Participant	Decimal number with validation	0-9999	MW	M
Steam Turbine Duct Firing Capacity	**Purpose:** Duct firing capacity is the capacity available from the duct firing of a physical steam turbine. For registration purposes, a single value of duct firing capacity will be provided and captured for a steam turbine resource.	Participant	Decimal number with validation	0-999	MW	O

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Minimum Loading Point	**Purpose:** Minimum active power output that can be produced under stable conditions without ignition support.	Participant	Participant needs to upload supporting documentation and numeric text	0 to 9999	MW	M
Minimum Active Power Capability (Summer)	**Purpose:** The minimum output the generating unit must be at without station service being supplied by the unit to ensure it does not become unstable. (35ºC ambient (at or south of Barrie) or 30ºC ambient (north of Barrie)).	Participant	Decimal number with validation default is 0 MW	0-9999	MW	M
Minimum Active Power Capability (Winter)	**Purpose:** The minimum output the generating unit must be at without station service being supplied by the unit to ensure it does not become unstable. (10°C ambient).	Participant	Decimal number with validation default is 0 MW	0-9999	MW	M
Maximum Reactive Power (Qmax)at Rated Active Power	**Purpose:** Maximum amount of reactive power the machine can supply continuously while producing rated active power.	Participant	Decimal number with validation	-0 to 9999	Mvar	M
Minimum Reactive Power (Qmin) at Rated Active Power	**Purpose:** Minimum amount of reactive power the machine can supply continuously while producing rated active power.	Participant	Decimal number with validation	-9999 to 0	Mvar	M
Maximum Reactive Power (Qmax) at Active Power = 0	**Purpose:** Maximum amount of reactive power the machine can supply continuously while at zero active power production.	Participant	Decimal number	0 to 9999	Mvar	M
Minimum Reactive Power (Qmin) at Active Power = 0	**Purpose:** Minimum amount of reactive power the machine can supply continuously while at zero active power production.	Participant	Decimal number	-9999 to 0	Mvar	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Reactive Power (Qmax) at Minimum Loading Point (MLP)	Maximum amount of reactive power the machine can supply continuously while at minimum loading point	Participant	Decimal Number	0 to 9999	Mvar	M
Minimum Reactive Power (Qmin) at Minimum Loading Point (MLP)	Minimum amount of reactive power the machine can supply continuously while at minimum loading point	Participant	Decimal Number	-9999 to 0	Mvar	M
Maximum Voltage limit (Umax)(pu)	**Purpose:** Maximum terminal voltage that the unit and auxiliaries can continuously operate at. Note: Rated Voltage = 1 pu	Participant	Decimal number with validation	1 to 2	pu	M
Minimum Voltage limit (Umin)(pu)	**Purpose:** Minimum terminal voltage that the unit and auxiliaries can continuously operate at. Note: Rated Voltage = 1 pu	Participant	Decimal number with validation	0 to 1	pu	M
Rated Power Factor Lagging	**Purpose:** Power factor that the unit can continuously operate at when at rated ambient conditions.	Participant	Decimal number	0 to 1	PF	M
Rated Power Factor Leading	**Purpose:** Power factor that the unit can continuously operate at when at rated ambient conditions.	Participant	Decimal number	0 to 1	PF	M
Station Service MW Load for this Unit at Summer MCR (MW)	**Purpose:** Maximum station service active power load supplied prior to unit synchronizing breaker.	Participant	Decimal number	0 to 9999	MW	M
Station Service Mvar Load for this Unit at Summer MCR (Mvar)	**Purpose:** Maximum station service active power load supplied prior to unit synchronizing breaker.	Participant	Decimal number	0 to 9999	Mvar	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Unit Eligible Energy Limited Generation Unit	**Purpose:** An energy limited generation unit is unable to deliver energy equal to the resource capacity for each and every hour of the day due to shortage of water or fuel. This declaration indicates whether this generating unit is eligible for limited energy resubmission at the resource level. This is typically only applicable to hydro-electric units and is used to derive the resource's EELR.	Participant	Boolean	Y/N	N/A	M
Voltage Control Point Reference bus	**Purpose:** Regulated bus Note: This is to determine whether the generator will control the low or the high side of its main output transformer.	Participant	Free text	N/A	N/A	M
Quick Start Flag	**Purpose:** To determine if the unit should be modelled with its associated breaker closed to ensure it is eligible for 10 minute spinning reserve and be able to be dispatched up in real-time from an open breaker status.	IESO	Boolean	Y/N	N/A	O
Minimum Ramp Rate	**Purpose:** Lowest ramp rate that the generating unit can reduce/increase at.	Participant	Integer	0-9999	MW/min	O
Minimum Shutdown Time	**Purpose:** The minimum number of minutes a generating unit requires between the time the generating unit has shutdown (generating unit breaker opened) to synchronizing to the grid (generating unit breaker closed)	Participant	Integer	0-1000	Minutes	M

Generating Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Ramp Rate	**Purpose:** Maximum ramp rate that the generating unit can reduce/increase at. Will be used to calculate resource maximum offer ramp rate capability.	Participant	Integer	0-9999	MW/min	M
Start Up Time	**Purpose:** Time associated with the initialization of the start-up process, breaker closing and unit operation up to the minimum loading point.	Participant	Integer	0-500	Minutes	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Outage Report Public Flag	**Purpose:** Indicate whether equipment outage information can be viewed publicly. This is used to determine outage information included on public reports. Mandatory when Outage Reporting Required Flag = "Y".	IESO	Boolean	Y/N	N/A	O

2.1 Synchronous Machine

Synchronous Machine						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	M
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate.	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
Synchronous Machine Type	**Purpose:** Indicate synchronous machine type	Participant	Drop down	Salient Pole/Round Rotor	N/A	M
Armature Resistance (Ra) [equivalent to Positive Sequence Resistance R1]	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ R1 ≥ 0	pu	M
Negative Sequence Resistance R2	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ R2 ≥ 0	pu	M
Zero Sequence Resistance R0	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ R0 ≥ 0	pu	M
Synchronous Reactance [equivalent to positive sequence reactance X1]	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ X1 ≥ 0	pu	M

Synchronous Machine						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Negative Sequence Reactance X2	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ X2 ≥ 0	pu	M
Zero Sequence Reactance X0	**Purpose:** Value at rated voltage and machine base.	Participant	Decimal number with validation	1 ≥ X0 ≥ 0	pu	M
Field Resistance (Rfd)	**Purpose:** Resistance of the field winding at operating temperature, 75°C for hydraulic, 100°C for thermal.	Participant	Decimal number with validation	≥ 0	Ohms	M
Base Field Current	**Purpose:** The intersection of the air-gap line and rated terminal voltage at rated speed and open circuit.	Participant	Decimal number with validation	N/A	A	M
Base Field Voltage	**Purpose:** Field winding voltage when operating at base field current and field resistance.	Participant	Decimal number with validation	N/A	V	M
Open Circuit Saturation Curve	**Purpose:** A figure showing the characteristic of the open-circuit stator terminal voltage as a function of field current at rated speed.	Participant	Upload document	N/A	N/A	M
Short Circuit Curve	**Purpose:** A figure showing the characteristic of the short-circuit stator terminal voltage as a function of field current at rated speed.	Participant	Upload document	N/A	N/A	O
V Curve	**Purpose:** A figure showing the relation of armature current as a function of field current.	Participant	Upload document	N/A	N/A	O

Synchronous Machine						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Capability Curve	**Purpose:** A figure showing generator capability, equipment limitations and protective functions if operated at rated voltage.	Participant	Upload document	N/A	N/A	M

2.2 Induction Machine

Induction Machine						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	M
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
Rated Torque	**Purpose**: Torque required to produce the rated power of the electrical machine at full-load speed.	Participant	Real	0-9999	pu	M
Rated Slip	**Purpose**: The difference between the synchronous speed of the magnetic field, and the shaft rotating speed	Participant	Real	0-9999	pu	M

Induction Machine						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Starting Torque	**Purpose**: The rated machine torque capability during start at rated voltage and frequency.	Participant	Real	0-9999	pu	M
Starting Current	**Purpose**: The current required by the machine during the starting process to accelerate the machine and load to operating speed. Maximum starting current at rated voltage is drawn at the time of energizing. Expressed in pu of rated current.	Participant	Real	0-9999	pu	M
Starting Power Factor	**Purpose**: The power factor of the machine during the starting process at rated voltage and frequency.	Participant	Real	-1 to 1	pu	M
Pullout Torque	**Purpose**: The maximum torque a machine will carry without an abrupt drop in speed	Participant	Real	0-9999	pu	M
Locked Rotor Current	**Purpose**: The steady-state machine current with the rotor locked, when supplied from a source at rated voltage and frequency. Expressed in pu of rated current.	Participant	Real	0-9999	pu	M

2.3 Wind Turbine

Note: GPS coordinates reside on the facility meteorological coverage map.

Wind Turbine Generator						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	M
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate. Note for wind turbines it is acceptable to upload one nameplate photo to represent all turbines that have the same data except for serial number.	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
Wind Turbine Generator Type	**Purpose:** To determine the type of wind turbine.	Participant	Drop Down	Type 1 – Induction; Type 2 – Induction with variable rotor resistance; Type 3 – Doubly-Fed Induction; Type 4 – Full size Converter	N/A	M
Capability Curve	**Purpose:** A figure showing generator capability, equipment limitations and protective functions if operated at rated voltage.	Participant	Upload document	N/A	N/A	M
Power Curve	**Purpose:** A figure showing generator active power output vs. wind speed.	Participant	Upload document	N/A	N/A	M

Wind Turbine Generator						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Cut In Speed (technical limitations of turbines)	**Purpose:** The value expressed in m/s that indicates when the wind turbine would begin generating (cut in) (minimum amount of wind speed needed).	Participant	Integer	0-999	m/s	M
Cut Out Speed (technical limitations of turbines)	**Purpose:** Continuous Wind speed at which wind turbines will be shut down to avoid damage	Participant	Integer	0-999	m/s	M
Cut Out Maximum Temperature(technical limitations of turbines)	**Purpose:** The value expressed in °C indicates the high-temperature cut out of the wind turbine generator	Participant	Integer		°C	M
Cut Out Minimum Temperature (technical limitations of turbines)	**Purpose:** The value expressed in °C indicates the low-temperature cut out of the wind turbine generator	Participant	Integer		°C	M
Generator Padmount Transformer Voltage Ratio	**Purpose:** High-voltage / low-voltage [kV/kV] e.g. for a 34.5kV HV and 0.690kV LV enter 34.5/0.690.	Participant	Ratio of Decimal number/decimal number	0-9999.99/0-9999.99	kV/kV	M
Generator Padmount Transformer nameplate rating	**Purpose:** The maximum continuous loading of the transformer.	Participant	Decimal number	0-9999	MVA	M
Generator Padmount Transformer Impedance R	**Purpose:** Positive sequence impedance at nameplate rating & rated voltage.	Participant	Decimal number	0-1	pu	M
Generator Padmount Transformer Impedance X	**Purpose:** Positive sequence impedance specified at nameplate rating & rated voltage.	Participant	Decimal number	0-1	pu	M

Solar Generation Devices

2.4 PV Inverter

PV Inverter						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	M
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
Rated Voltage	**Purpose:** Equipment data	Participant	Decimal number with validation	0 to 9999	kV	M
Id" (Sub-transient/Maximum Short Circuit Current)	**Purpose:** Sub-transient/maximum short circuit current	Participant	Decimal number with validation Value Range: 1.0~3.0	1.0 to 3.0	N/A	pu
Capability Curve	**Purpose:** A figure showing maximum reactive power capabilities.	Participant	Upload document	PDF format	N/A	M

2.5 Solar Array

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility-pvInverter.solarArray1	N/A	M
Manufacturer	The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	M
Equipment Nameplate Photo	Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Array Latitude	Physical location (GPS coordinates) of each solar array (North) The physical location should be representative of the GPS coordinates at the centre of each solar array such that every solar panel within that array is within 5km of the GPS coordinates. .	Participant	Numeric Text (North is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 43°N,23 minutes ,00 seconds Would be entered as 43.38333	Decimal Degrees	M
Array Longitude	Physical location (GPS coordinates) of each solar array (West). The physical location should be representative of the GPS coordinates at the centre of each solar array such that every solar panel within that array is within 5km of the GPS coordinates.	Participant	Numeric Text (West is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 79° W,42 minutes, 00 seconds Would be entered as 79.7000	Decimal Degrees	M

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Height from Ground	Height from ground level of solar array, The height should be the same regardless of the tilt angle of the panels. The height from the ground to the centre of the array should be used for fixed panels or from the ground to the axis of rotation of the panels for facilities with tracking. Typical heights are in the range of 0.8 -1.5 metres.	Participant	Numeric Text	0-600	Meters	M
Tilt Angle - Horizontal Plane	Tilt (angle with horizontal plane) The tilt angle is only required for facilities without tracking, ones with tracking will experience a variable tilt angle. Facilities in Ontario have a typical tilt angle of 30 degrees. Business rule: If they don't have tracking than they must have a tilt angle.	Participant	Numeric Text		Degrees	O

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Azimuth Angle	Azimuth is defined as a horizontal angle measured clockwise from a north base line or meridian. Azimuth has also been more generally defined as a horizontal angle measured clockwise from any fixed reference plane or easily established base direction line. The solar azimuth angle is most often defined as the angle from due north in a clockwise direction. Panels in the northern hemisphere will typically be pointed south (180 degrees).	Participant	Numeric Text		Degrees	M
Nameplate Capacity (kW)	The capacity of each array should be given in kW DC and should be the sum of all solar panels' power ratings in the array.	Participant	Numeric Text		kW	M

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	Each panel is rated by its DC output power under standard test conditions, and typically ranges from 100 to 320 watts. Solar Panel manufacturers use what is called Standard Test Conditions (STC). This means they put the solar panels in a flash tester in their factory that has been calibrated to deliver the equivalent of 1000 watts per square meter of sunlight intensity, hold a cell temperature of 25'C, and assume an air mass of 1.5. This value is given in Watts DC. The conversion from MW DC to MW AC results in a loss of approximately 15%. The nameplate facility rating in AC should equal roughly the sum of the DC ratings before the inverters multiplied by 0.85. Some solar facilities may have installed panels totaling more than their facility nameplate rating to increase the output when the sun is not at maximum, however the inverters will limit the output to not exceed the facility nameplate rating.					

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Mounting Type	**Purpose**: To determine how the array is mounted. The mounting type could be either ground or roof. Larger facilities are typically ground mounted due to space requirements.	Participant	Dropdown Reported mounting type is roof and facility is > 5 MW question result.	Ground, roof, not mounted	N/A	M
Tracking	**Purpose**: To determine how the solar array track.	Participant	Dropdown	Single axis, dual axis, none)	N/A	M
Wind Protection	**Purpose**: Facilities that have tracking systems can also have wind protection that will level out the panels horizontal to the ground to protect them from excessive winds. The wind speed at which this is done will depend on the facility.	Participant	Yes/No and if yes Numeric Text Wind protection is reported as No, or wind protection is reported as Yes with the speed at which wind protection will activate and tracking is Yes		Yes/No	M

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Module Type	**Purpose**: The most prevalent material for solar cells is crystalline silicon. These are efficient but more expensive. Thin-film technologies reduce the amount of material required; most thin film solar cells are sandwiched between two panes of glass to make a module. Since silicon solar panels only use one pane of glass, thin film panels are approximately twice as heavy as crystalline silicon panels. Concentrated photovoltaic (CPV) technology uses optics such as lenses or curved mirrors to concentrate a large amount of sunlight onto a small area.	Participant	Dropdown	Crystalline, Thin-Film	N/A	M

Solar Array						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Temperature Coefficient	**Purpose**: The solar panel temperature affects the maximum power output directly, the warmer the solar panel the less power it can produce. Typically, at the maximum power point solar panels will have a temperature coefficient in the –0.2% to -0.5% range (thin film is around -0.2%, crystalline is around -0.5%). The temperature coefficient measures the efficiency of the panel at temperatures higher than 25 degrees. With a coefficient of -0.48%, for each degree over 25˚C the maximum power of the panel is reduced by 0.48%.	Participant	Reported temperature coefficient is within expected range (-0.2% - -0.5%)		%	M

2.6 Collector System

Collector System						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M

Collector System						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Collector System Name	**Purpose:** Name of collector system	Participant	Free text	C1, C2, C3, C4…. C10	N/A	M
Total Active Power per Collector System	**Purpose:** Sum of all power inverters related to it	System			MW	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number with validation	0-1000	kV	M
Equivalent Positive-Sequence Resistance R1 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M
Equivalent Positive-Sequence Reactance X1 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M
Equivalent Positive-Sequence Susceptance B1 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M
Equivalent Zero-Sequence Resistance R0 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M

Collector System						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equivalent Zero-Sequence Reactance X0 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M
Equivalent Zero-Sequence Susceptance B0 at rated voltage and 100 MVA (pu)	**Purpose:** Circuit Parameters	Participant	Decimal number with validation	0-1	pu	M

3 Load

Virtual load equipment associated to a DR resource requires only EMS equipment id and Registration status.

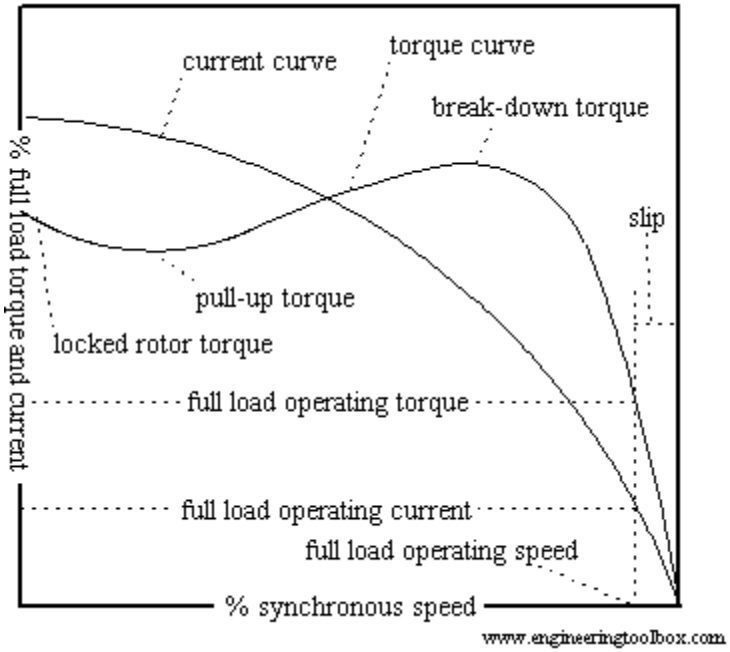
Load						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Text		N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	O
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	O

Load						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO Maintained	N/A	M
Peak Season	**Purpose:** The season in which the peak station load occurs. DR Not required for virtual load since not used by DR resource	Participant	Drop down	Summer, Winter	N/A	O
Total peak load - Active Power	**Purpose:** For UFLS and power system modeling. DR Not required for virtual load since DR resource will use capability from commitment period	Participant	Real	0 to 999	MW	O
Total peak load - Reactive Power	**Purpose:** For power system modeling. DR Not required for virtual load since not used by DR resource	Participant	Real	-999 to 999	Mvar	O
Maximum Registered Ramp Rate	**Purpose:** Maximum ramp rate that the load can reduce/increase at. Will be used to calculate load resource capability.	Participant	Integer	0-9999	MW/min	M

Load						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Requirement for Dual Supply	**Purpose:** To identify situations where a single supply is not capable of supplying all load due to bus, transformer or other limitations.	Participant	Boolean	Y/N	N/A	O
Unusual consequences of power outages Description Document	**Purpose:** Document describing particular loads which have negative or unusual consequences when subjected to power outages.	Participant	Upload document	N/A	N/A	O
Unusual sensitivity to voltage or frequency fluctuation Description Document	**Purpose:** Document describing particular loads which have negative or unusual consequences to voltage or frequency fluctuations.	Participant	Upload document	N/A	N/A	O
Induction motor rated between 500 and 13,500 HP	**Purpose:** The total capacity of Induction motors rated between 500 and 13,500 HP that are associated with the load. Rationale: provides ability to confirm participant's intentions with the equipment registered.	Computed Values–not recorded attributes	Real	0 to 999	MW	O
Induction motor rated higher 13,500 HP	**Purpose:** The total capacity of Induction motors rated higher than 13,500 HP that are associated with the load. Rationale: provides ability to confirm participant's intentions with the equipment registered.	Computed Values–not recorded attributes	Real	0 to 999	MW	O

Load						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Synchronous motor rated between 500 and 13,500 HP	**Purpose:** The total capacity of Synchronous motors rated between 500 and 13,500 HP that are associated with the load. Rationale: provides ability to confirm participant's intentions with the equipment registered.	Computed Values–not recorded attributes	Real	0 to 999	MW	O
Synchronous motor rated higher 13,500 HP	**Purpose:** The total capacity of Synchronous motors rated higher than 13,500 HP that are associated with the load. Rationale: provides ability to confirm participant's intentions with the equipment registered.	Computed Values–not recorded attributes	Real	0 to 999	MW	O
Remaining Load other than large motors	**Purpose:** To determine the remaining load other than large motors.	Participant	Real	0 to 999	MW	O
Industrial load	**Purpose:** The amount of station loading which is comprised of industrial load.	Participant	Real	0-999	MW	O
Commercial load	**Purpose:** The amount of station loading which is comprised of commercial load.	Participant	Real	0-999	MW	O
Residential load	**Purpose:** The amount of station loading which is comprised of residential load.	Participant	Real	0-999	MW	O
Variable speed drives)	**Purpose:** The amount of industrial variable speed drives load.	Participant	Real	0-999	MW	O
Welding equipment	**Purpose:** The amount of industrial welding equipment load.	Participant	Real	0-999	MW	O
Static converters	**Purpose:** The amount of industrial static converter load.	Participant	Real	0-999	MW	O
Furnace	**Purpose:** The amount of industrial furnace load.	Participant	Real	0-999	MW	O

3.1 Induction Motor (≥ 500 HP)



Induction Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility	Solution (no manual override)	Text	E.g. inductionMotor1	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Text	N/A	N/A	M

Induction Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Text	N/A	N/A	M
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate. Note for wind turbines it is acceptable to upload one nameplate photo to represent all turbines that have the same data except for serial number.	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Real	0-9999	kV	M
Rated Capability	**Purpose:** Rated Machine power.	Participant	Real		MW	M
Rated Speed	**Purpose:** Full load Speed of the Motor	Participant	Real	0-9999	rpm	M
Rated Power Factor	**Purpose:** Motor Power Factor at rated voltage and rated load.	Participant	Real	-1 to 1	pu	M
Starting Method	**Purpose:** Method in which the motor will be started.	Participant	Text	Full-voltage, Resistive, Reduced Voltage, Delta-wye	N/A	O

Induction Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Number of Starts per Day	**Purpose:** Expected number of motor starts per day.	Participant	Integer	0-100	N/A	O

3.2 Large Induction Motor (≥ 13,500 HP)

Business rule: These additional attributes need to be provided if Type = Induction and Rated Capability = 13500 HP or more in 'Motor' entity

Large Induction Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Rated Torque	**Purpose:** Torque required to produce the rated power of the electrical motor at full-load speed.	Participant	Real	0-9999	pu	M
Rated Slip	**Purpose:** The difference between the synchronous speed of the magnetic field, and the shaft rotating speed.	Participant	Real	0-9999	pu	M
Starting Torque	**Purpose:** The rated motor torque capability during start at rated voltage and frequency.	Participant	Real	0-9999	pu	M
Starting Current	**Purpose:** The current required by the motor during the starting process to accelerate the motor and load to operating speed. Maximum starting current at rated voltage is drawn at the time of energizing. Expressed in pu of rated current.	Participant	Real	0-9999	pu	M
Starting Power Factor	**Purpose:** The power factor of the motor during the starting process at rated voltage and frequency.	Participant	Real	-1 to 1	pu	M

Large Induction Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Pullout Torque	**Purpose:** The maximum torque a motor will carry without an abrupt drop in speed.	Participant	Real	0-9999	pu	M
Locked rotor current	**Purpose:** The steady-state motor current with the rotor locked, when supplied from a source at rated voltage and frequency. Expressed in pu of rated current.	Participant	Real	0-9999	pu	M

3.3 Synchronous Motor (≥ 500 HP)

Business rule: Needs to be provided if Type = Synchronous and Rated Capability = 500 HP or more but less than 5000 HP in 'Motor' entity

Synchronous Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name Solution (no manual override)	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility).	Solution (no manual override)	Text	E.g. synchronousMotor1	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Text	N/A	N/A	M
Manufacturer Model	**Purpose:** refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Text	N/A	N/A	M

Synchronous Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate. Note for wind turbines it is acceptable to upload one nameplate photo to represent all turbines that have the same data except for serial number.	Participant	Upload document	PNG, PDF, GIF or JPEG file		M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Real	0-9999	kV	M
Rated Capability	Rated Machine power.	Participant	Real	0-9999	MVA	M
Rated Power Factor	Motor Power Factor at rate voltage and rated load.	Participant	Real	-1 to 1		M
Starting Method	**Purpose:** Method in which the motor will be started.	Participant	Text	Full-voltage, Resistive, Reduced Voltage, Delta-wye	N/A	O
Number of Starts per Day	**Purpose:** Expected number of motor starts per day.	Participant	Integer	0-100	N/A	O

3.4 Large Synchronous Motor (≥ 13500 HP)

Business rule: These additional attributes need to be provided if Type = Synchronous and Rated Capability = 13500 HP or more in 'Motor' entity

Large Synchronous Motor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Armature resistance (Ra) (pu based on machine base)	Positive Sequence Resistance	Participant	Real	0-100	per unit	M

4 Dynamic Model

Dynamic models represent the electrical and mechanical behaviour of equipment during transients and transitions from one steady state to another. Dynamic models are specified for different types of equipment (e.g. generating unit, STATCOM, SVC, motor). Dynamic models are not equipment.

Dynamic Model						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Id	**Purpose**: System derived numeric code based on the Dynamic model instance.	System	Integer	N/A	N/A	M
Bus Number	**Purpose**: Load flow program bus number of the equipment for which the dynamic model is associated with.	IESO	Integer	6 digit Integer	N/A	M
Bus Name	**Purpose**: Load flow program bus name of the equipment for which the dynamic model is associated with.	IESO	Free text	Limited to twelve characters	N/A	M
Machine Id	**Purpose**: Load flow program device id of the equipment for which the dynamic model is associated with.	IESO	Free text	Limited to two characters	N/A	M
Comments	**Purpose**: Comments provided by the participant to describe the user defined model.	Participant	Free text	N/A	N/A	O

Dynamic Model						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Block Diagram Document	**Purpose**: A file which shows the user defined model structure in block diagram format complete with input(s), output(s), states, vars, cons, and icons. Mandatory if UDM is selected.	Participant	Upload document	N/A	N/A	O
Source Code Document	**Purpose**: A Fortran document which has the source code which will describe the dynamic behaviour of the equipment. Mandatory if UDM is selected.	Participant	Upload document	N/A	N/A	O
Model Scope	**Purpose**: The equipment this model is associated with. Mandatory for all dynamic models. Collector and Facility values are only applicable to wind turbines and PV Inverters. All other equipment use 'unit'. Example does this represent one turbine, one collector's worth of turbines, or a whole facilities worth of turbines? This is derived based on the associated equipment type.	System Participant (wind turbine only)	Drop down	Unit, Collector or Facility	N/A	M

4.1 Technology Type

2. Synchronous machine
4. PV Inverter
3. Wind Turbine Generator
38. Induction machine
22. SVC
23. STATCOM

8. Induction Motor
10. Synchronous Motor

Technology Type						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Technology Type Id	**Purpose**: System derived numeric code based on the Technology type instance.	System	Integer	N/A	N/A	M
Technology Type Name	**Purpose**: System derived name based on the type of equipment the dynamic model is associated with.	System	Drop Down	Synchronous Machine PV Inverter Wind Turbine Generator Induction machine SVC STATCOM Induction Motor Synchronous Motor	N/A	M

4.2 Dynamic Model Type

1. Generator
2. Comp [Compensator]
3. Exciter [Excitation System]
4. Stabilizer
5. Governor [Turbine-Governor]
6. Electrical
7. Mechanical
8. Pitch Control
9. Aerodynamic
10. Auxiliary Control
11. SVC
12. STATCOM
13. Machine

Dynamic Model Type						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Type Id	**Purpose**: System derived numeric code based on the Dynamic model type instance.	System	Integer	N/A	N/A	M
Dynamic Model Type Name	**Purpose**: Specify the type of system the dynamic model represents within the technology type. E.g. a synchronous generator can have a dynamic model which represents the generator, compensator, excitation system, stabilizer, or the turbine-governor. The available choices are filtered based on technology type.	Participant	Drop Down	Generator Compensator Excitation System Stabilizer Turbine-Governor Electrical Mechanical Pitch Control Aerodynamic Auxiliary Control SVC STATCOM Machine	N/A	M

4.3 Dynamic Model Name

The name for one or more models. The model name can be shared among different model types and technology types.

Dynamic Model Name						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Name Id	**Purpose**: System derived numeric code based on the Dynamic model name instance.	System	Integer	N/A	N/A	M
Dynamic Model Name	**Purpose**: Model short name which is used by dynamic simulation software (PSS/E)	Participant	Free Text	Limited to six characters	N/A	M
Dynamic Model Description	**Purpose**: Model description, i.e. Model Long Name	Participant	Free Text	N/A	N/A	M

Dynamic Model Name						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
User Defined Model Flag	**Purpose**: y –user defined / n-standard	Participant	Boolean	Y/N	N/A	M

4.4 Dynamic Model Parameter

A parameter defined for exactly one model name.

Dynamic Model Parameter						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Parameter Id	**Purpose**: System derived numeric code based on the Dynamic model Parameter instance	System	Integer	N/A	N/A	M
Dynamic Model Parameter Type	**Purpose**: An identifier which specifies the type of each parameter.	Participant	Drop Down	ICON,CON,STATE,VAR	N/A	M
Dynamic Model Parameter Name	**Purpose**: A unique name which describes each of the ICONS and CONS associated with the standard model. A unique name which describes each of the ICONS, CONS, STATES, and VARS associated with the user defined model. Parameters will need to be entered in the same order in which the source code allocates their location.	For Participant	Free Text	N/A	N/A	M

Dynamic Model Parameter						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Parameter Order	**Purpose**: The order in which the dynamic model parameters are stored and used by dynamic simulation software. For user defined models the parameters will need to be entered in the same order in which the source code allocates their location. For the IESO database the ICONS must be first then CONS, then STATES and Finally Vars.	System	Integer	>=1	N/A	M

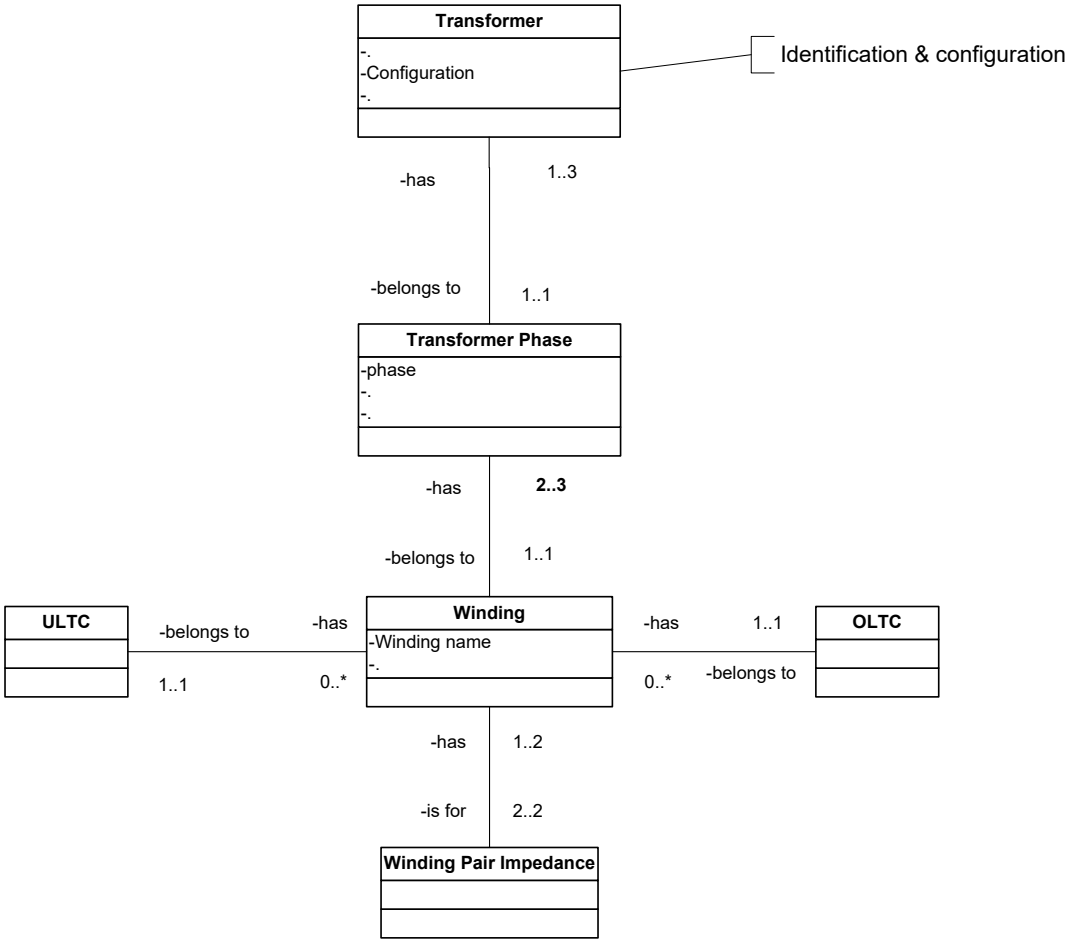
4.5 Dynamic Model Parameter Value

Dynamic Model Parameter Value						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Model Parameter Id	**Purpose**: System derived numeric code based on the Dynamic model Parameter instance	System	Integer	N/A	N/A	M
Dynamic Model Parameter value	**Purpose**: The value associated with the specified parameter. Mandatory for ICONS and CONS. ICONS are Text and CONS are decimal numbers Prohibited for STATES AND VARS	Participant	Decimal number for CONS, text for ICONS	N/A	N/A	O

5 Transformer

Power transformer entity is related to other entities as follows:

View 4d-Transformer



The following types of transformers will not be required to be registered:

- *Grounding transformers*
- *Excitation transformers*
- *Station Service transformers with all windings less than 100kV and are not part of a generating facility.*
    - *Eg: Load facility SS transformers which are connected to the LV bus.*

Transformer						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Transformer						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Type	**Purpose:** The purpose of this transformer.	Participant	Drop Down	Step up, Step down, auto, regulation, phase shifter	N/A	M
Configuration	**Purpose:** Define if the transformer is three single phase units or one three phase unit.	Participant	Drop Down	Three Phase, Single Phase	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M
CKT	**Purpose:** Transformer identifier in the IESO base case.	Participant	Text	N/A	N/A	M
Vector Group	**Purpose:** Transformer vector group based on transformer winding connections and phase angles.	Participant	Dropdown	N/A	N/A	M

Transformer						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Core	**Purpose:** Number of cores in transformer core design.	Participant	Integer	-1 for three phase shell form 0 for unknown core design 1 for single core design 3 for three phase 3-legged core form 5 for three phase 5-legged core form 7 for three phase 7-lagged core form	N/A	M
T Model	**Purpose:** Transformer model in GIC DC Network.	Participant	Integer	0 for two/three/auto transformer model as defined by its vector group 1 for transformer as T model in DC network	N/A	O
K Factor	**Purpose:** A factor to calculate transformer reactive power loss from GIC flowing its winding.	Participant	Decimal number	0.33 if GIC Core = -1 0.0 if GIC Core = 0 1.18 if GIC Core = 1 0.29 if GIC Core = 3 0.66 if GIC Core = 5 0.66 if GIC Core = 7	MVAR/AMP	M
GIC Comment	**Purpose:** Participant supplied comments.	Participant	Text	N/A	N/A	O

5.1 Transformer Phase

Transformer Phase						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	E.g. LEASIDE-230.T21.RedPhase	N/A	M
Phase	**Purpose:** Identifies one of three single phase units that are combined as an operational transformer or is 'Three' if configuration is set to 'three phase'	Participant	Drop Down	Red, White, Blue, Three Phase	N/A	M
Number of Windings	**Purpose:** Define the number of windings on the transformer, either two or three windings.	Participant	Drop Down	2,3	N/A	M
	Row/page intentionally left blank					

Transformer Phase						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Cooling Type 1	**Purpose:** Method of first stage of cooling.	Participant	Drop Down	ONAN[2] ONAF OFAF ODAF ODAN OFAN OFWF ANN AFN	N/A	M
Name Plate Rating for Cooling Type 1	**Purpose:** The name plate MVA rating associated with stage 1 cooling on.	Participant	Decimal number with validation	0-9999	MVA	M

[2] A participant may be able to select the same cooling type. I.e. they may select cooling type 1 – ONAN, cooling type 2 ONAF, cooling type 3 ONAF.

Table 1 – Cooling Class Letter Description

		Letter	Description
Internal	First Letter (Cooling medium)	O	Liquid with flash point less than or equal to 300°C
		K	Liquid with flash point greater than 300°C
		L	Liquid with no measurable flash point
	Second Letter (Cooling mechanism)	N	Natural convection through cooling equipment and windings
		F	Forced circulation through cooling equipment, natural convection in windings
		D	Forced circulation through cooling equipment, directed flow in man windings
External	Third letter (Cooling medium)	A	Air
		W	Water
	Fourth letter (Cooling medium)	N	Natural convection
		F	Forced circulation

Transformer Phase						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Cooling Type 2 - ONAF	**Purpose:** Method of second stage of cooling.	Participant	Drop Down	ONAN ONAF OFAF ODAF ODAN OFAN OFWF ANN AFN	N/A	M
Name Plate Rating for Cooling Type 2	**Purpose:** The name plate MVA rating associated with stage 2 cooling on.	Participant	Decimal number with validation	0-9999	MVA	M
Cooling Type 3 - OFAF	**Purpose:** Method of third stage of cooling.	Participant	Drop Down	ONAN ONAF OFAF ODAF ODAN OFAN OFWF ANN AFN	N/A	M
Name Plate Rating for Cooling Type 3	**Purpose:** The name plate MVA rating associated with stage 3 cooling on.	Participant	Decimal number with validation	0-9999	MVA	M
Continuous Summer Rating	**Purpose:** The maximum constant load that can be carried continuously without exceeding established temperature rise limitations. Ambient Temp= 35°C South of Barrie, 30°C north.	Participant	Decimal number with validation	0-9999	MVA	M

Transformer Phase						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
10 Day Summer Thermal Rating	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding established temperature rise limits. Ambient Temp= 35°C South of Barrie, 30°C north	Participant	Decimal number with validation	0-9999	MVA	M
15 Minute Summer Thermal Rating	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding established temperature rise limits. Ambient Temp= 35°C South of Barrie, 30°C north.	Participant	Decimal number with validation	0-9999	MVA	M
Continuous Winter Rating	**Purpose:** The maximum constant load that can be carried continuously without exceeding established temperature rise limitations. Ambient Temp: 10°C.	Participant	Decimal number with validation	0-9999	MVA	M
10 Day Winter Thermal Rating	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding established temperature rise limits. Ambient Temp: 10°C.	Participant	Decimal number with validation	0-9999	MVA	M
15 Minute Winter Thermal Rating	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding established temperature rise limits. Ambient Temp: 10°C.	Participant	Decimal number with validation	0-9999	MVA	M

Note: Transformer Three Phase Configuration does not have any unique attributes so there is no table

5.2 Winding

Winding						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility.parent.[parent…].equipment. E.g. FACILITY-230.T21.hWinding	N/A	M
Winding Connection	**Purpose:** Method in which the three winding phases are connected to the power system.	Participant	Drop down	Delta Buried Delta Wye Zigzag	N/A	M
Grounding Method	**Purpose:** Method in which the neutral terminal is connected to ground.	Participant	Drop down	Ungrounded Solidly Grounded Shunt Grounded	N/A	M
Grounding Impedance Resistive	**Purpose:** The resistive impedance value between the neutral terminal and ground.	Participant	Decimal number with validation	0-9999, Disabled on form and 'null' if 'grounding method' is ungrounded	ohm	M
Grounding Impedance Inductive	**Purpose:** The inductive impedance value between the neutral terminal and ground.	Participant	Decimal number with validation	0-9999, Disabled on form and 'null' if 'grounding method' is ungrounded	ohm	M
Rated Winding Voltage	**Purpose:** The voltage at which winding operating and performance characteristics are referred.	Participant	Decimal number with validation	0-1000	kV	M
Winding Type	**Purpose:** Winding type for two- and three-winding transformers.	Participant	Dropdown	Primary, secondary, tertiary	N/A	M
DC Winding Resistance	**Purpose:** DC resistance of a winding.	Participant	Decimal number	≥0	Ohms/phase	M
Ground DC Winding Resistance	**Purpose:** Grounding DC resistance of a winding.	Participant	Decimal number	≥0	Ohms	M

Winding						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Blocking Device	**Purpose:** Indicator of the presence of a neutral blocking device installed in the neutral path of a transformer.	Participant	Integer	0 indicates non GIC blocking device present 1 indicates GIC blocking device present	N/A	M

5.3 ULTC

Under Load Tap Changer						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M
Minimum Tap Position	**Purpose:** The lowest kV value of the transformer ULTC selector switch device.	Participant	Decimal number with validation	0-9999 Validation: must be less than 'Max Tap Position'.	kV	M
Maximum Tap Position	**Purpose:** The highest kV value of the transformer ULTC selector switch device.	Participant	Decimal number with validation	0 to 9999, Greater than the previous row	kV	M
Number of Steps	**Purpose:** The number of under load tap changer positions not including neutral tap switchover positions (I.E. 17a and 17c for a 33 tap position ULTC). Example if a transformer has 16 raise and 16 lower plus three neutral positions then number of steps is 33.	Participant	Integer	1-100	N/A	M
Voltage Control Point	**Purpose:** Bus at which tap changer logic is controlling within a bandwidth.	Participant	Drop Down	H, X, Y, Remote, No Regulation	N/A	M

5.4 OLTC

Off Load Tap Changer						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M
Position 1	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 1. If tap does not exist value =0.	Participant	decimal number with validation	0-1000	kV	M
Position 2	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 2. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 3	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 3. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 4	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 4. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 5	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 5. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 6	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 6. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 7	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 7. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O

Off Load Tap Changer						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Position 8	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 8. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 9	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 9. If tap does not exist value =0.	Participant	Decimal number with validation	0-1000	kV	O
Position 10	**Purpose:** The kV value of the transformer winding OLTC selector switch device which represents tap 10. If tap does not exist value =0.	Participant	decimal number with validation	0-1000	kV	O
In-Service Position	Tap number which the transformer was left in.	Participant	Integer	1 - 10		M

5.5 Winding Pair Impedance

Winding Pair Impedance						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility.parent.[parent…].equipment. E.g. -FACILITY-230.T21.hxImpedance	N/A	M
Positive Sequence Impedance R (pu associated with impedance Base MVA and rated winding voltage)	**Purpose:** The measured positive sequence resistance between the designated windings.	Participant	Decimal number with validation	0-100	pu	M

Winding Pair Impedance						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Positive Sequence Impedance X (pu associated with impedance Base MVA and rated winding voltage)	**Purpose:** The measured positive sequence reactance between the designated windings.	Participant	Decimal number with validation	0-100	pu	M
Positive Sequence Impedance Base (MVA)	**Purpose:** The MVA base at which the per unit impedance value is measured at.	Participant	Decimal number with validation	0-1000	MVA	M
Status of Tertiary Winding for Zero Sequence Impedance Measurements	**Purpose:** The status of tertiary/third Winding for Zero Sequence Impedance measurements.	Participant	Drop down	Range: Open, Closed Applicable if 'Number of Windings' = 3		O
Zero Sequence Impedance R (pu associated with impedance Base MVA and rated winding voltage))	**Purpose:** The measured zero sequence resistance between the designated windings.	Participant	Decimal number with validation	0-100	pu	M
Zero Sequence Impedance X (pu associated with impedance Base MVA and rated winding voltage))	**Purpose:** The measured zero sequence reactance between the designated terminals.	Participant	Decimal number with validation	0-100	pu	M

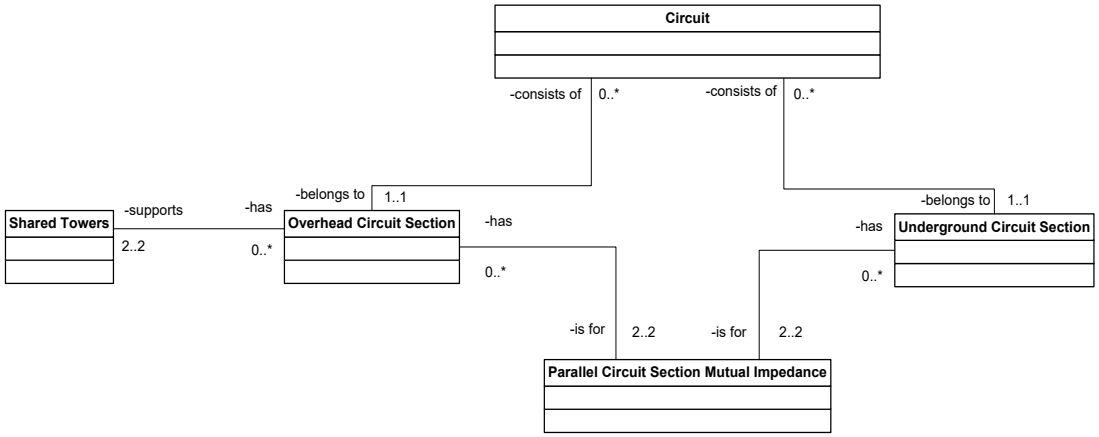
Winding Pair Impedance						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Zero Sequence Impedance Base (MVA)	**Purpose:** The MVA base at which the per unit impedance value is measured at.	Participant	Decimal number with validation	0-1000	MVA	M

6 Circuit

The circuit entity has other entities linked to it as shown below:

Circuit

Given that it was not feasible to copy Hydro One PSDB data to CDMS, there will be Hydro One circuits without sections.



Circuit						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M

Circuit						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Start of Circuit	**Purpose:** Identify the originating terminal station or junction.	Participant	Free Text	N/A	N/A	M
End of Circuit	**Purpose:** Identify the ending terminal station or junction.	Participant	Free Text	N/A	N/A	M
Thermal Limit Lookup Data	**Purpose**: A CSV file that provides multiple thermal ratings for various ambient conditions.	Participant	Upload Document	N/A	N/A	O
Comments		Participant	Free Text	N/A	N/A	O
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

Circuit						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

6.1 Overhead Circuit Section

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Start of Section	**Purpose:** Identify the starting junction or terminal to indicate its electrical positioning.	Participant	Free Text	Substation or Junction name	N/A	M
End of Section	**Purpose:** Identify the ending junction or terminal to indicate its electrical positioning.	Participant	Free Text	Substation or Junction name	N/A	M
Section Length	**Purpose:** Indicate the physical dimensions of the overhead conductor.	Participant	Decimal number	0 to 9999	km	M
Conductor Size	**Purpose:** The circular mills of the conductor.	Participant	Integer number	0 to 99999	kcml	M
Conductor Stranding	**Purpose:** description of the number of conducing strands and number of reinforcing strands.	Participant	Integer (allow for special characters)	N/A	N/A	M
Conductor Type	**Purpose:** Description of the conductor, e.g. ACSR, AAC, ACAR etc.	Participant	Free Text	N/A	N/A	M
Conductors per bundle	**Purpose:** the number of conductors bundled together per phase.	Participant	Integer	0 to 9999	N/A	M
Rated Voltage	**Purpose:** line to line voltage at which impedances are calculated	Participant	Integer	0 to 9999	kV	M
Positive Sequence Resistance R1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Positive Sequence Reactance X1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Positive Sequence Susceptance B1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Resistance Ro at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Reactance Xo at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Susceptance Bo at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Wind Speed for Rating	**Purpose:** Wind speed used to derive circuit loading ratings.	Participant	Integer	Default = 4 Range: 0 to 4 km/hr	km/h	M
Summer Ambient Temperature for Rating (X°C)	**Purpose:** Ambient temperature used to derive circuit loading ratings. Summer Ambient temperature is based on location.	Participant	Integer	Default = 35ºC south of Barrie Default = 30ºC north of Barrie Range: 0 to 500	ºC	M
Operating Ratings						
Winter (10°C ambient) Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Conductor Temperature for Winter Continuous Rating (°C)	**Purpose:** The conductor Sag temperature or the lessor of the conductor Sag temperature or 93°C for HAC conductors.	Participant	Integer	0 to 500	°C	M
Winter (10°C ambient) 15 minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Winter 15 min. STE Rating (°C)	**Purpose:** The conductor Sag temperature or the lessor of the conductor Sag temperature or 127°C for HAC conductors.	Participant	Integer	0 to 500	°C	M
Pre-load for Winter 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	Range: 0 to 9999	A	M
Summer (X °C ambient) Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer Continuous Rating (°C)	**Purpose:** The conductor Sag temperature or the lessor of the conductor Sag temperature or 93°C for HAC conductors.	Participant	Integer	0 to 500	°C	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Summer (X °C ambient) 15 minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer 15 minute STE Rating (°C)	**Purpose:** The conductor Sag temperature or the lessor of the conductor Sag temperature or 127°C for HAC conductors.	Participant	Integer	0 to 500	°C	M
Pre-load for Summer 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	Range: 0 to 9999	A	M
Planning						
Conductor Temperature for Winter Continuous Rating (ºC)	**Purpose:** The lessor of 93°C or the conductor Sag temperature used to establish the corresponding rating.	Participant	Integer	Default = 93 Typically 93ºC or sag temperature if lower Range: 0 to 500	ºC	M
Conductor Temperature for Winter Long-Term Emergency (LTE) Rating (ºC)	**Purpose:** The lessor of 127°C or the conductor Sag temperature used to establish the corresponding rating.	Participant	Integer	Default = 127 (Typically 127ºC or sag temperature if lower) Long-Term Emergency Rating is limited to 50 hours per year Range: 0 to 500	ºC	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Conductor Temperature for 15-minute Winter Short Term Emergency (STE) Rating (ºC)	**Purpose:** The lessor of 150°C or the conductor Sag temperature used to establish the corresponding rating.	Participant	Integer	Default = 150 (Typically 150ºC or sag temperature if lower; 127ºC for HAC conductors) Short-Term Rating limited to 15 minutes Range: 0 to 500	ºC	M
Winter (10ºC ambient) Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M
Winter (10ºC ambient) Long-Term Emergency (LTE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M
Winter (10ºC ambient) 15-minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M
Pre-load for Winter (10ºC ambient) 15-minute STE Rating(A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	Range: 0 to 9999	A	M
Conductor Temperature for Summer Continuous Rating (ºC)	**Purpose:** The lessor of 93°C or the conductor Sag temperature used to establish the corresponding rating.	Participant.	Integer	Default = 93 Typically 93ºC or sag temperature if lower Range: 0 to 500	°C	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Summer (X ºC ambient) Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M
Conductor Temperature for Summer Long-term Emergency (LTE) Rating (ºC)	**Purpose:** The lessor of 127°C or the conductor Sag temperature used to establish the corresponding rating.	Participant.	Integer	Default = 127 (Typically 127ºC or sag temperature if lower) Long-Term Emergency Rating is limited to 50 hours per year Range: 0 to 500	°C	M
Summer (X ºC ambient) Long-Term Emergency (LTE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M
Conductor Temperature for 15-minute Summer Short-term Emergency (STE) Rating (ºC)	**Purpose:** The lessor of 150°C or the conductor Sag temperature used to establish the corresponding rating.	Participant.	Integer	Default = 150 (Typically 150ºC or sag temperature if lower; 127ºC for HAC conductors) Short-Term Rating limited to 15 minutes Range: 0 to 500	°C	M
Summer (X ºC ambient) 15-minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	Range: 0 to 9999	A	M

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Pre-load for Summer 15-minute STE Rating(A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	Range: 0 to 9999	A	M
Shares a common structure	**Purpose:** Identifies that this Overhead Circuit Section shares a common structure with another Overhead Circuit Section for more than 1 mile.	Participant	Boolean	Y/N	N/A	M
CKT	**Purpose:** Circuit section identifier in the IESO base case.	Participant	Text	N/A	N/A	M
DC Circuit Section Resistance	**Purpose:** Circuit section DC resistance.	Participant	Decimal number	≥0	Ohms/phase	M
INDVP	**Purpose:** Real part of total circuit section GMD-induced electric field. INDUCEDV = INDVP + j INDVQ volts • When INDUCEDV is not specified, GIC activity calculates this according to its options specified • When INDUCEDV is specified, it is used as GMD induced on that branch • When INDUCEDV is specified as INDVP = 0.0 and INDVQ = 0.0, then that branch is treated as part of the GIC DC network but does not have GMD induced voltage, like "underground pipe-type cables (cables enclosed in the steel pipe)."	Participant	Decimal number	N/A	Volts	O

Overhead Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
INDVQ	**Purpose:** Imaginary part of total circuit section GMD-induced electric field. INDUCEDV = INDVP + j INDVQ volts • When INDUCEDV is not specified, GIC activity calculates this according to its options specified • When INDUCEDV is specified, it is used as GMD induced on that branch • When INDUCEDV is specified as INDVP = 0.0 and INDVQ = 0.0, then that branch is treated as part of the GIC DC network but does not have GMD induced voltage, like "underground pipe-type cables (cables enclosed in the steel pipe)."	Participant	Decimal number	N/A	Volts	O
DC Line Shunt Resistance at Bus I End of Circuit Section	**Purpose:** DC resistance of the line shunt at the bus I (from bus) end of a circuit section.	Participant	Decimal number	≥0	Ohms/phase	O
DC Line Shunt Resistance at Bus J End of Circuit Section	**Purpose:** DC resistance of the line shunt at the bus J (to bus) end of a circuit section.	Participant	Decimal number	N/A	Ohms/phase	O
GIC Circuit Section Comment	**Purpose:** Participant supplied comments.	Participant	Text	N/A	N/A	O

6.2 Underground Circuit Section

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Comments		Participant	Free Text	N/A	N/A	O
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Start of Section	**Purpose:** Identify the starting junction or terminal to indicate its electrical positioning.	Participant	Free Text	Substation or Junction name	N/A	M
End of Section	**Purpose:** Identify the ending junction or terminal to indicate its electrical positioning.	Participant	Free Text	Substation or Junction name	N/A	M
Section Length	**Purpose:** Indicate the physical dimensions of the underground conductor.	Participant	Decimal number	0 to 9999	km	M
Conductor Size	**Purpose:** Circular mils of the conductor.	Participant	Integer number	0 to 99999	kcmil	M
Cable Type	**Purpose:** Type of cable, e.g. XLPE	Participant	Free Text	N/A	N/A	M
Rated Voltage	**Purpose:** line to line voltage at which impedances are calculated	Participant	Integer	0 to 9999	kV	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Positive Sequence Resistance R1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Positive Sequence Reactance X1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Positive Sequence Susceptance B1 at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Resistance Ro at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Reactance Xo at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M
Zero Sequence Susceptance Bo at Rated Voltage and 100 MVA (PU)	**Purpose:** Circuit parameters	Participant	Decimal number	0 to 9999	PU	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Ratings						
Winter Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Winter Continuous Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Winter 15-minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Winter 15-minute STE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Pre-load for Winter 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	0 to 9999	A	M
Summer Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer Continuous Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Summer 15 - minute Short Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer 15-minute STE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Pre-load for Summer 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	0 to 9999	A	M
Planning						
Conductor Temperature for Winter Continuous Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Winter Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Winter X-Hour Long-Term Emergency Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Number of hours (X) used in Winter LTE Rating (hours)	**Purpose:** Specified period of time used in establishing the corresponding rating.	Participant	Integer	0 to 999	hours	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Conductor Temperature for Winter (X) hours LTE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Conductor Temperature for Winter STE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Pre-load for Winter 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	0 to 9999	A	M
Winter 15-Minute Short-Term Emergency Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer Continuous Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Summer Continuous Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Conductor Temperature for Summer (X) hour LTE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Summer X-Hour Long-Term Emergency Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Number of hours (X) used in Summer LTE Rating (hours)	**Purpose:** Specified period of time used in establishing the corresponding rating.	Participant	Integer	0 to 999	Hours	M
Conductor Temperature for Summer STE Rating (°C)	**Purpose:** The maximum conductor temperature used to establish the corresponding rating.	Participant	Integer	0 to 500	°C	M
Summer 15-Minute Short-Term Emergency (STE) Rating (A)	**Purpose:** The maximum constant load that can be carried for the specified time without exceeding temperature limits.	Participant	Integer	0 to 9999	A	M
Pre-load for Summer 15-minute STE Rating (A)	**Purpose:** The continuous load supplied by the circuit section prior to loading the circuit to the STE. This value is used in establishing the corresponding rating.	Participant	Integer	0 to 9999	A	M
CKT	**Purpose:** Circuit section identifier in the IESO base case.	Participant	Text	N/A	N/A	M
DC Circuit Section Resistance	**Purpose:** Circuit section DC resistance.	Participant	Decimal number	≥0	Ohms/phase	M

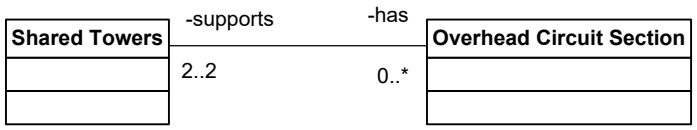
Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
INDVP	**Purpose:** Real part of total circuit section GMD-induced electric field. INDUCEDV = INDVP + j INDVQ volts • When INDUCEDV is not specified, GIC activity calculates this according to its options specified • When INDUCEDV is specified, it is used as GMD induced on that branch • When INDUCEDV is specified as INDVP = 0.0 and INDVQ = 0.0, then that branch is treated as part of the GIC DC network but does not have GMD induced voltage, like "underground pipe-type cables (cables enclosed in the steel pipe)."	Participant	Decimal number	N/A	Volts	M
INDVQ	**Purpose:** Imaginary part of total circuit section GMD-induced electric field. INDUCEDV = INDVP + j INDVQ volts • When INDUCEDV is not specified, GIC activity calculates this according to its options specified • When INDUCEDV is specified, it is used as GMD induced on that branch • When INDUCEDV is specified as INDVP = 0.0 and INDVQ = 0.0, then that branch is treated as part of the GIC DC network but does not have GMD induced voltage, like "underground pipe-type cables (cables enclosed in the steel pipe)."	Participant	Decimal number	N/A	Volts	M

Underground Circuit Section						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
DC Line Shunt Resistance at Bus I End of Circuit Section	**Purpose:** DC resistance of the line shunt at the bus I (from bus) end of a circuit section.	Participant	Integer	N/A	Ohms/phase	O
DC Line Shunt Resistance at Bus J End of Circuit Section	**Purpose:** DC resistance of the line shunt at the bus J (to bus) end of a circuit section.	Participant	Integer	N/A	Ohms/phase	O
GIC Circuit Section Comment	**Purpose:** Participant supplied comments.	Participant	Text	N/A	N/A	O

6.3 Parallel Circuit Section Mutual Impedance

Parallel Circuit Section Mutual Impedance						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Mutual Impedance Parallel Circuit Identifier	**Purpose:** Indicate any parallel circuit identifier per section (if applicable)	Participant	Free Text	N/A	N/A	O
Mutual Impedance Parallel Circuit Section Identifier	**Purpose:** Indicate any parallel circuit identifier per section (if applicable)	Participant	Free Text	N/A	N/A	O
Mutual Impedance Rm	**Purpose:** Equipment Data (if applicable, per section)	Participant	Decimal number	0 to 9999	Ohm	O
Mutual Impedance Xm	**Purpose:** Equipment Data (if applicable, per section)	Participant	Decimal number	0 to 9999	Ohm	O

6.4 Shared Towers



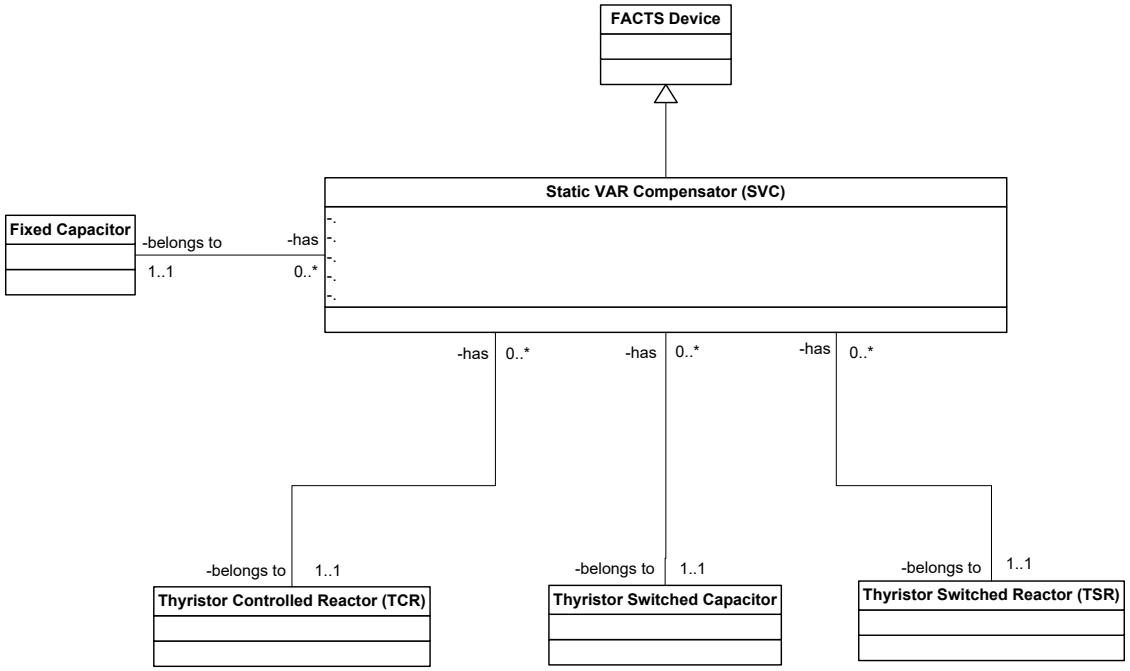
This is an entity that identifies that there are shared towers (and the number of towers). There is no registration of individual towers.

Shared Towers						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Number of Shared Towers	**Purpose:** Number of shared towers between a pair of circuit sections	Participant	Integer	0 to 9999	N/A	M
Comments		Participant	Free Text	N/A	N/A	O

7 FACTS Devices

There are many devices under this category that are related to each other as follows:

FACTS Device: Static VAR Compensator (SVC)



7.1 Static VAR Compensator (SVC)

SVC						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M

SVC						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	The rated voltage of the SVC, usually specified at the high side of Main Output Transformer	Participant	Decimal number with validation	[0.0 , 1500]	kV	M

SVC						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Continuous Rated Voltage	The maximum continuous rated voltage of the SVC, usually specified at the high side of Main Output Transformer	Participant	Decimal number with validation	[0.0 , 1500]	kV	M
Maximum Continuous Inductive Rating at Nominal Voltage	Max inductive rating of this SVC, usually measured at the Point of Common Coupling	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Continuous Capacitive Rating at Nominal Voltage	Max capacitive rating of this SVC, usually measured at the Point of Common Coupling	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Short-Term Inductive Rating at Nominal Voltage	Max short term inductive rating of this SVC	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Short-Term Inductive Rating Duration (s)	Duration of short-term inductive rating	Participant	Decimal number	[0,9999]	Seconds	M
Maximum Short-Term Capacitive Rating at Nominal Voltage	Max short term capacitive rating of this SVC	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Short-Term Capacitive Rating Duration	Duration of short-term capacitive rating	Participant	Decimal number	[0,9999]	Seconds	M

SVC						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Coupling Transformer Flag	The existence of a step down or a step up transformer in this SVC	Participant	Boolean	Y/N	N/A	M
Maximum Control Slope	The max droop allowed in the SVC control system	Participant	Decimal number	[0,100]	%	M
Minimum Control Slope	**Purpose**: The min droop allowed in the SVC control system	Participant	Decimal number	[0,100]	%	M
Number of Steps Control Slope	**Purpose**: The number of TSC steps for a TSC only SVC. I.E. the number of capacitor switches to go from 0 Mvar to full Mvar. If the SVC is continuous, this field should be blank.	Participant	Integer	[0, 999]	Step(s)	O
Capability Curve	**Purpose**: Reactive Power vs Voltage or voltage vs reactive power curves	Participant	Upload document	N/A	N/A	O
Total Filter Contribution at Nominal Voltage	**Purpose**: Total reactive power from harmonic filters	Participant	Decimal number	[-9999,9999]	Mvar	O
Single Line Diagram	**Purpose**: Single Line diagram of the SVC	Participant	Upload document	N/A	N/A	O
Voltage Control Point	**Purpose:** regulated bus (i.e. Name of Point)	Participant	Free text	N/A	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

SVC						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

7.1.1 Thyristor Controlled Reactor

Note: TCR retains registration status for consistency with all other SVC child entities (even though SVC must have exactly one TCR).

Thyristor Controlled Reactor (TCR)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	**Purpose**: Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility-svcName.TCR1 e.g. FACILITY-SVC2.TCR1	N/A	M
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	O
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Thyristor Controlled Reactor (TCR)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	The rated voltage of the SVC, usually specified at the high side of Main Output Transformer.	Participant	Decimal number with validation	[0.0 , 1500]	kV	M
Rated Reactive Power at Rated Voltage	The total reactive power from TSRs (Currently it is stored in NOMINAL_VOLTAGE column)	Participant	Decimal number	[0, 9999]	Mvar	M
Connection Type	The connection type of the TCRs	Participant	Drop down	Delta, Wye, Delta and Wye	N/A	M

7.1.2 Thyristor Switched Capacitor

Thyristor Switched Capacitor (TSC)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility-svcName.TSC1 e.g. ESSA-SVC2.TSC1	N/A	M

Thyristor Switched Capacitor (TSC)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	O
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	The rated voltage of the SVC, usually specified at the high side of Main Output Transformer	Participant	Decimal number with validation	[0.0 , 1500]	kV	M

Thyristor Switched Capacitor (TSC)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Rated Reactive Power at Rated Voltage	The total reactive power from TSRs (Currently it is stored in NOMINAL_VOLTAGE column)	Participant	Decimal number	[0, 9999]	Mvar	M
Connection Type	The connection type of the TSCs	Participant	Drop down	Delta, Wye, Delta and Wye	N/A	M
Dynamic Only Application Flag	This flag is set ON when this TSC is designed for a contingency, i.e. a SPS	Participant	Boolean	Y/N	N/A	O
Dynamic Duration(s)	The amount of time when TSCs are active after a contingency	Participant	Decimal number	[0, 9999]	seconds	O
Tuned Frequency	Each branch consists of thyristors, reactors, and capacitors. The tuned frequency is 1/(377*C*L)	Participant	Decimal number	[0, 9999]	Hz	O

7.1.3 Thyristor Switched Reactor

Thyristor Switched Reactor (TSR) is a special case of a TCR (section 11.1.1) and has only two states: Fully on or fully off.

Thyristor Switched Reactor (TSR)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment name	Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility-svcName.TSR1 e.g. ESSA-SVC2.TSR1	N/A	M
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	O

Thyristor Switched Reactor (TSR)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The rated voltage of the SVC, usually specified at the high side of Main Output Transformer.	Participant	Decimal number with validation	[0.0 , 1500]	kV	M
Rated Reactive Power at Rated Voltage	**Purpose:** The total reactive power from TSRs (Currently it is stored in NOMINAL_VOLTAGE column)	Participant	Decimal number	[0, 9999]	Mvar	M
Connection Type	**Purpose:** The connection type or the internal connection of the TSRs	Participant	Drop down	Delta, Wye, Delta and Wye	N/A	M
Dynamic Only Application Flag	**Purpose:** This flag is set ON when this TSR is designed for a contingency, i.e. a SPS	Participant	Boolean	Y/N	N/A	O

Thyristor Switched Reactor (TSR)						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dynamic Duration	**Purpose:** The amount of time when TSRs are active after a contingency	Participant	Decimal number	[0, 9999]	seconds	O

7.1.4 Fixed Capacitor

Fixed Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility-svcName.FC1 e.g. FACILITY-SVC2.FixedCap1	N/A	M
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	O
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Fixed Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Tuned Frequency	Each branch consists of Thyristor, reactors, and capacitors. The tuned frequency is 1/(377*C*L) c=capacitance; l=inductance	Participant	Decimal number	[0, 9999]	Hz	O
Rated Voltage	The line to line rated voltage of the SVC, usually specified at the high side of Main Output Transformer	Participant	Decimal number with validation	[0.0 , 1500]	kV	M
Rated Reactive Power at Rated Voltage	Total Fixed Capacitor Rating at Nominal Voltage (Currently it is stored in NOMINAL_VOLTAGE RATING column)	Participant	Decimal number	[0,9999]	Mvar	M
Tuned Frequency	Each branch consists of Thyristor, reactors, and capacitors. The tuned frequency is 1/(377*C*L)	Participant	Decimal number	[0, 9999]	Hz	O
Connection Type	The connection type or the internal connection of the TSRs	Participant	Drop down	Delta, Wye, Delta and Wye	N/A	M

7.2 Static Synchronous Compensator (STATCOM)

STATCOM						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M

STATCOM						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rated voltage of the STATCOM	Participant	Decimal number with validation	[0.0 , 1500]	kV	M

STATCOM						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Continuous Rated Voltage	**Purpose:** The maximum continuous rated voltage of the STATCOM	Participant	Decimal number with validation	[0.0 , 1500]	kV	M
Maximum Continuous Inductive Rating at Nominal Voltage	**Purpose:** Max inductive rating of this STATCOM, i.e. without short term overloading capability	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Continuous Capacitive Rating at Nominal Voltage	**Purpose:** Max capacitive rating of this STATCOM, i.e. without short term overloading capability	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Short-Term Inductive Rating at Nominal Voltage	**Purpose:** Max short term inductive rating of this STATCOM	Participant	Decimal number	[0,9999]	Mvar	M
Maximum Short-Term Inductive Rating Duration	**Purpose:** Duration of short-term inductive rating	Participant	Decimal number	[0,9999]	Seconds	M
Maximum Short-Term Capacitive Rating at Nominal Voltage	**Purpose:** Max short term capacitive rating of this STATCOM	Participant	Decimal number	[0,9999]	Mvar	M

STATCOM						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Short-Term Capacitive Rating Duration	**Purpose:** Duration of short-term capacitive rating	Participant	Decimal number	[0,9999]	Seconds	M
Coupling Transformer Flag	**Purpose:** The existence of a step down or a step up transformer in this STATCOM	Participant	Boolean	Y/N	N/A	M
Maximum Control Slope	**Purpose:** The max droop allowed in the STATCOM control system	Participant	Decimal number	[0,100]	%	M
Minimum Control Slope	**Purpose:** The min droop allowed in the STATCOM control system	Participant	Decimal number	[0,100]	%	M
Capability Curve	**Purpose:** Reactive Power vs Voltage or voltage vs reactive power graphs	Participant	Upload document		N/A	O
Total Filter Contribution at Nominal Voltage	**Purpose:** Total reactive power from harmonic filters	Participant	Decimal number	[-9999,9999]	Mvar	O
Voltage Control Point	**Purpose:** regulated bus (i.e. Name of Point)	Participant	Free text	N/A	N/A	M
Single Line Diagram	**Purpose:** SLD of the STATCOM connections or the internal STATCOM	Participant	Upload document	N/A	N/A	O
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

STATCOM						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

7.3 Series Capacitor

Series Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free text	N/A	N/A	M
Manufacturer Name	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	Electronic photograph of the device's nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Series Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Maximum Continuous Operating Voltage	**Purpose:** The maximum continuous operating voltage of Series capacitor	Participant	Decimal number	[0, 9999]	kV	M
Rating, Qr at Nominal Voltage	**Purpose:** Reactive power from this Series capacitor at nominal voltage	Participant	Decimal number	[0, 9999]	Mvar	M
Degree of Compensation	**Purpose:** The ratio between the capacitor impedance and the line impedance	Participant	Decimal number	[-100,100]	%	M
Reactance, Xc	**Purpose:** The reactance of the series capacitor	Participant	Decimal number	[-9999, 9999]	Ohm	M
Maximum Continuous Rated Current, Ir	**Purpose:** The maximum continuous current of the series capacitor	Participant	Decimal number	[0, 9999]	A	O
LTE Rating - Long-term Emergency [2 hours]	**Purpose:** The limited time rating of the series capacitor	Participant	Decimal number	[0, 9999]	A	O
STE Rating -15 minute	**Purpose:** The limited time rating of the series capacitor	Participant	Decimal number	[0, 9999]	A	O
Segment Rated Voltage, Vr	**Purpose:** The line to line rated voltage of the series capacitor	Participant	Decimal number	[0, 9999]	kV	O

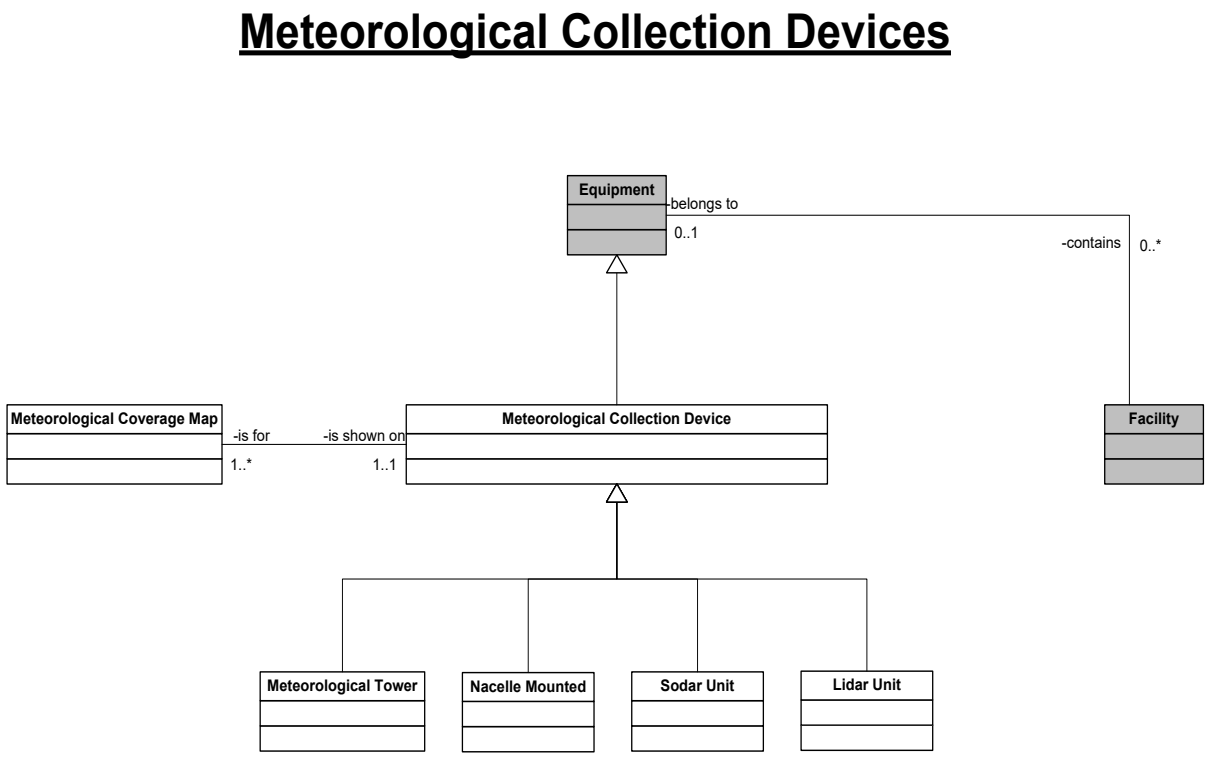
Series Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Rated Symmetrical Short Circuit Capability	**Purpose**: The highest value of the symmetrical component of fault current which the device will be required to interrupt at rated maximum voltage and on the standard operating duty.	Participant	Decimal number	[-9999, 9999]	kA	O
Series Capacitor Single Line Diagram	**Purpose:** The SLD of the series capacitor	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	O
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

8 Meteorological Collection Devices

Business rules:

A Meteorological Collection Device must belong to exactly one facility.

Meteorological Collection Devices are specific to only solar and wind generating facilities



Meteorological Collection Device						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Meteorological Collection Device Type	Purpose: The type of collection device.	Participant	Drop Down	Meteorological Tower Nacelle mounted SIDAR unit LIDAR unit		M
Equipment Name	Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility)	Solution (no manual override)	Text	Facility.metType1 Exception: Facility-NacMT-WindTurbine#	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Latitude	Physical location (GPS coordinates) of each device (North).	Participant	Numeric Text (North is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 43°N,23 minutes ,00 seconds Would be entered as 43.38333	Decimal Degrees	M

Meteorological Collection Device						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Longitude	Physical location (GPS coordinates) of each device (West).	Participant	Numeric Text (West is default) The latitude falls within 40-50 degrees N and the longitude falls within 70-90degrees W (see above for explanation of negative values, can be ok in some cases)	Example 79° W,42 minutes, 00 seconds Would be entered as 79.7000	Decimal Degrees	M
Measurement Height above Ground	Height from ground level of the measurement device.	Participant	Numeric Text	0-600	Meters	M
Measurement Elevation above Sea Level	Elevation above sea level of the measurement device.	Participant	Numeric Text	0-600	Meters	M

8.1 Meteorological Coverage Map

Meteorological Coverage Map						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Meteorological Coverage Map	**Purpose:** Participant will upload a map of where the meteorological devices are and the associated renewable generation units are. Only Mandatory for solar or wind facilities. Mandatory upload during the Submit MET Collection Device Tasks. Map shall also include an appendix that list the GPS coordinates (in Decimal Degree format), height above ground and elevation above sea level) of each turbine and MET collection device.	Participant	Upload Document	N/A	N/A	M

8.2 Meteorological Tower

Additional attributes for meteorological tower equipment.

Business Rules:

Facility Size	Total number of meteorological towers per facility
Less than 10MW	None
10MW to less than 100MW	1 minimum
100MW to less than 200MW	2 minimum
200MW to less than 300MW	3 minimum

300MW to less than 400MW 4 minimum

Meteorological Tower						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Wind Direction Measurement Type	All meteorological towers should measure wind direction accurately. Either this is provided at a Met Tower or at a Nacelle. Some nacelle mounted wind direction measurement devices are only able to provide hub direction. Hub direction is used in order to track the wind and does not continue tracking when the turbine is not generating. Wind direction measured at the nacelle may only be used if properly calibrated and if it continues to be provided when the turbine is not generating.	Participant	Numeric text	0-360	Degrees	O

8.3 Nacelle Mounted

This entity is specific to only solar and wind generating facilities.

Nacelle Mounted						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Wind Turbine that has the nacelle mounted equipment	**Purpose:** Represent which wind turbine has the nacelle mounted equipment installed	Participant	Free text	N/A	N/A	M
Wind Direction Measurement Type	All meteorological towers should measure wind direction accurately. Some nacelle mounted wind direction measurement devices are only able to provide hub direction. Hub direction is used in order to track the wind and does not continue tracking when the turbine is not generating. Wind direction measured at the nacelle may only be used if properly calibrated and if it continues to be provided when the turbine is not generating.	Participant	Numeric text	0-360	Degrees	M

9 Other Equipment

9.1 Switch

9.1.1 Circuit Switcher

Circuit Switcher						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the “Bulk Electric System” (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the “Bulk Power System” (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Circuit Switcher						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number with validation	0-1000	kV	M
Maximum Continuous Voltage	**Purpose:** The highest rms line-to-line voltage at which the device is intended to operate.	Participant	Decimal number with validation	0-1000	kV	M
Rated Interrupting Time	**Purpose:** The maximum permissible interval between the energizing of the trip circuit at rated control voltage and rated fluid pressure of the operating mechanism and the interruption of the main circuit in all poles on an opening operation.	Participant	Decimal number with validation	0-1000	ms	M
Interrupting Medium	**Purpose:** The material used to facilitate the interruption of the arc during opening of a switching device.	Participant	Drop Down	SF6 Air Oil Vacuum	N/A	M
Rated Continuous Current	**Purpose**: Designated rms amperes at rated frequency which it shall be required to carry continuously without exceeding the limit of observable temperature rise for any of its parts.	Participant	Decimal number with validation	0-9999	A	M

Circuit Switcher						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Rated Symmetrical Short Circuit Capability	**Purpose**: The highest value of the symmetrical component of fault current which the device will be required to interrupt at rated maximum voltage and on the standard operating duty.	Participant	Decimal number with validation	0-1000	kA	M
Rated Asymmetrical Short Circuit Capability	**Purpose**: The highest value of the asymmetrical component of fault current which the device will be required to interrupt at rated maximum voltage and on the standard operating duty.	Participant	Decimal number with validation	0-1000	kA	M
Normally Open	**Purpose:** Is this equipment operated as normally open?	Participant	Boolean	Y/N	N/A	M
Contact Parting Time	**Purpose:** The interval between the time when the actuating quantity in the release circuit reaches the value causing actuation of the release and the instant when the primary arcing contacts have parted in all poles.	Participant	Decimal number with validation	0-1000	ms	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

Circuit Switcher						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.1.2 Disconnect Switch

Disconnect Switch						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Disconnect Switch						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	decimal number with validation	0-1000	kV	M
Maximum Continuous Voltage	**Purpose**: The highest rms line-to-line voltage at which the device is intended to operate.	Participant	decimal number with validation	0-1000	kV	M
Rated Continuous Current	**Purpose:** Designated rms amperes at rated frequency which it shall be required to carry continuously without exceeding the limit of observable temperature rise for any of its parts.	Participant	Decimal number with validation	0-9999	A	M
Short Circuit Withstand Capability	**Purpose**: A measurement of the rated short time symmetrical withstands current magnitude.	Participant	Decimal number with validation	0-9999	kA	M
Motorized	**Purpose:** Can this equipment be operated remotely?	Participant	Boolean	Y/N	N/A	M
Normally Open	**Purpose:** Is this equipment operated as normally open?	Participant	Boolean	Y/N	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

Disconnect Switch						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.1.3 Circuit Breaker

Circuit Breaker						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O

Circuit Breaker						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number with validation	0-1000	kV	M
Maximum Continuous Voltage	**Purpose:** Highest rms voltage for which the circuit breaker is designed and is the upper limit for operation.	Participant	decimal number with validation	0-1000	kV	M
Rated Interrupting Time	**Purpose**: The maximum permissible interval between the energizing of the trip circuit at rated control voltage and rated fluid pressure of the operating mechanism and the interruption of the main circuit in all poles on an opening operation.	Participant	Decimal number with validation	0-1000	ms	M

Circuit Breaker						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Interrupting Medium	**Purpose:** The material used to facilitate the interruption of the arc during opening of a switching device.	Participant	Drop Down	SF6 Air Oil Vacuum	N/A	M
Rated Continuous Current	**Purpose**: Designated rms amperes at rated frequency which it shall be required to carry continuously without exceeding the limit of observable temperature rise for any of its parts.	Participant	Decimal number with validation	0-9999	A	M
Rated Symmetrical Short Circuit Capability	**Purpose**: The highest value of the symmetrical component of fault current which the device will be required to interrupt at rated maximum voltage and on the standard operating duty.	Participant	Decimal number with validation	0-1000	kA	M
Rated Asymmetrical Short Circuit Capability	**Purpose**: The highest value of the asymmetrical component of fault current which the device will be required to interrupt at rated maximum voltage and on the standard operating duty.	Participant	Decimal number with validation	>0-1000	kA	M
Normally Open	**Purpose:** Is this equipment operated as normally open?	Participant	Boolean	Y/N	N/A	M
Contact Parting Time	**Purpose:** The interval between the time when the actuating quantity in the release circuit reaches the value causing actuation of the release and the instant when the primary arcing contacts have parted in all poles.	Participant	Decimal number with validation	0-1000	ms	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

Circuit Breaker						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.1.4 Opener

Opener						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Opener Type	**Purpose:** Specify the type of opener	Participant	Drop down list	Mid-span(MSO) Live-line (LLO) Temporary-line (TLO) Bolted (BO) Line-clamp (LC)	N/A	M

Opener						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number with validation	0-1000	kV	M
Maximum Continuous Voltage	**Purpose**: The highest rms line-to-line voltage at which the device is intended to operate.	Participant	Decimal number with validation	0-1000	kV	M
Rated Continuous Current	**Purpose:** Designated rms amperes at rated frequency which it shall be required to carry continuously without exceeding the limit of observable temperature rise for any of its parts.	Participant	Decimal number with validation	0-9999	A	M
Normal Open	**Purpose:** Is this equipment operated as normally open?	Participant	Boolean	Y/N	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

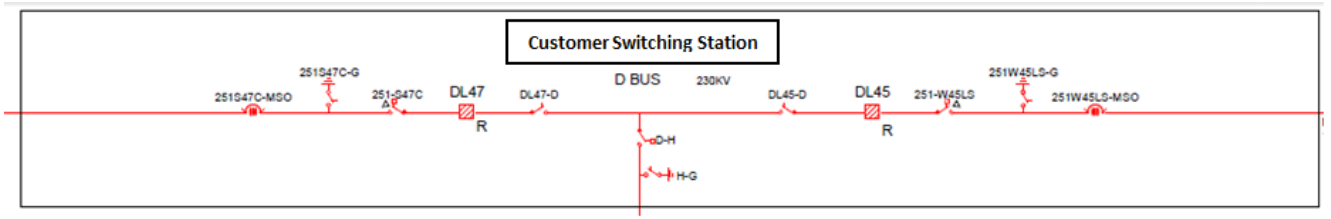
Opener						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.1.5 Switches excluded from online facility registration

The following types of equipment ***are not*** required to be registered and evaluated through the on-line facility registration process:

- Disconnect Switches (e.g. grounding disconnect switches, breaker disconnects or breaker isolating disconnect switches)
- Feeder Breakers

Diagram 1: Disconnect Switches

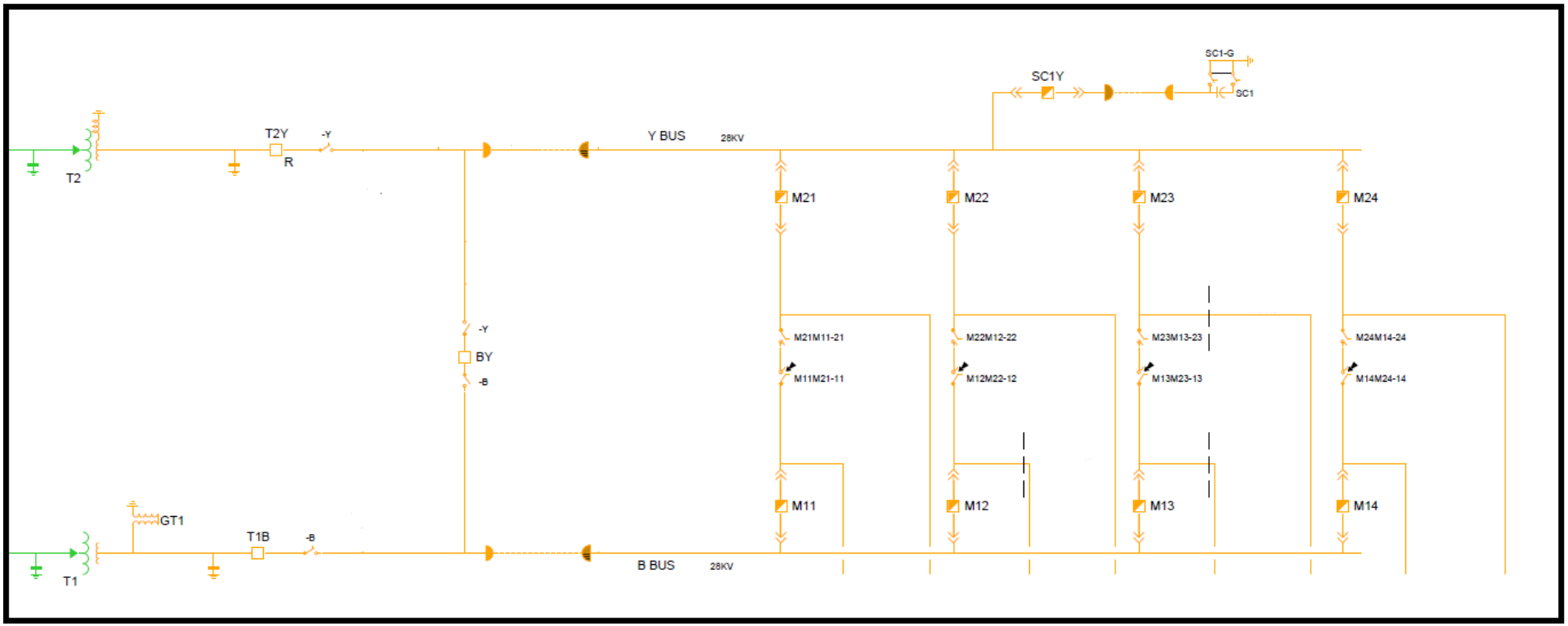


Switches of types found on Diagram 1, are not required to be registered. These are some examples:

- *Grounding disconnect switches*
  - 251S47C-G
  - 251W45LS-G
- *Breaker disconnects or breaker isolating disconnect switches*

- 251-S47C
- DL47-D
- DL45-D
- 251-W45LS

Diagram 2a: Feeder Breakers



Breakers in Diagram 2, are not required to be registered:

- M11
- M12
- M13
- M14
- M21
- M22
- M23

- M24

Exception: At generating facilities with feeder breakers, the feeder breakers are required to be registered.

9.2 Capacitors and Reactors

9.2.1 Shunt Capacitor

Shunt Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the manufacturer sells its goods directly to the end user of the product.	Participant	Free text	N/A	N/A	O
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Shunt Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	decimal number with validation	0-1000	kV	M
Rated reactive power,	**Purpose:** The reactive power at rated values of rated frequency and rated voltage.	Participant	decimal number with validation	0-1000	Mvar	M
Discharge Time	**Purpose:** Time delay required to discharge the capacitor bank prior to placing the capacitor bank back in service.	Participant	decimal number with validation	0-999999	ms	M
Current Limiting Reactor	**Purpose:** Value of the series inductance used to limit the severity of outrush currents from the capacitor bank into close-in line or bus faults.	Participant	decimal number with validation	0-9999	mH	M
Connection Configuration	**Purpose:** The method in which the three separate capacitor phases are connected to the power system.	Participant	Drop down	Wye Ungrounded Double Wye Ungrounded Delta	N/A	M
Automatic Switching Description	**Purpose:** Document providing details of automatic capacitor switching including triggers, measurement source, delays, etc.	Participant	Upload document	File Upload	N/A	O

Shunt Capacitor						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.2.2 Shunt Reactor

Shunt Reactor						
Shunt Reactor	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify device in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
Manufacturer	**Purpose:** The manufacturer is any natural or legal person who is responsible for designing and manufacturing a product with a view to placing it on the Community market "under his own name" (or trademark*).	Participant	Free text	N/A	N/A	M
Manufacturer Model	**Purpose:** Refers to a business model number in which the	Participant	Free text	N/A	N/A	O

Shunt Reactor						
Shunt Reactor	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	manufacturer sells its goods directly to the end user of the product.					
Equipment Nameplate Photo	**Purpose:** Electronic photograph of the device nameplate	Participant	Upload document	PNG, PDF, GIF or JPEG file	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Rated Voltage	**Purpose:** The line to line rms value of the alternating voltage for which the device has been designed.	Participant	Decimal number with validation	0-1000	kV	M
Rated reactive power	**Purpose:** The reactive power at rated values of rated frequency and rated voltage.	Participant	Decimal number with validation	0-1000	Mvar	M
Connection Configuration	**Purpose:** The method in which the three separate reactor phases are connected to the power system.	Participant	Drop down	Wye Grounded Wye Ungrounded	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

Shunt Reactor						
Shunt Reactor	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".					
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.3 Bus

Bus						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique operating name used to identify bus in communications by participant, transmitter or IESO.	Participant	Free Text	N/A	N/A	M
NERC-defined Bulk Electric System Flag	**Purpose:** Does this equipment meet the "Bulk Electric System" (BES) definition of electrical components?	IESO	Boolean	Y/N	N/A	M
NPCC-defined Bulk Power System Flag	**Purpose:** Does this equipment meet the "Bulk Power System" (BPS) definition of electrical components?	IESO	Boolean	Y/N	N/A	M

Bus						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System and manual IESO	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Summer Continuous Rated Current (A)	**Purpose:** The maximum constant load that can be carried continuously without exceeding established temperature rise limitations. Ambient Temp: 35°C South of Barrie, 30°C North.	Participant	Integer	0-100,000	A	M
Winter Continuous Rated Current (A)	**Purpose:** The maximum constant load that can be carried continuously without exceeding established temperature rise limitations. Ambient Temp: 10°C.	Participant	Integer	0-100,000	A	M
Maximum Continuous Rated Voltage (kV)	**Purpose:** The highest rms line-to-line voltage at which the device is intended to operate.	Participant	Integer	0-999	KV	M
Short Circuit Withstand Capability (kA)	**Purpose:** A measure of the short circuit current a device can tolerate without being damaged when a fault occurs	Participant	Integer	0-9999	kA	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

Bus						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O
Virtual Flag	**Purpose:** Indicate whether the equipment is virtual (non-physical).	IESO	Boolean	Y/N	N/A	M

9.4 Equipment Outage Viewer Group

A group of equipment/resource permitted for viewing by an external observer other than the IESO or the applicant (i.e. other than the owner or operator).

Equipment Outage Viewer Group						
Attribute	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Viewership All	**Purpose:** Indicates whether outage request details can be viewed publicly.	Participant	Boolean	Y/N	N/A	M

9.5 UFLS Relay Group

A group of UFLS relays used for the purpose of UFLS implementation. UFLS Relay Group is required if the criteria for participation in the UFLS program are met. As a type of equipment, multiple UFLS Relay Groups can be registered in a facility. UFLS Relay Group only requires the following attributes to support outage management.

UFLS Relay Group						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operating Nomenclature	**Purpose:** Unique name for the equipment.	IESO	Text	Format: ""UFLS" + Auto-assigned sequential number, i.e. UFLS 1	N/A	M
UFLS Relay Group Percentage	**Purpose:** The percentage of load that would be shed by the UFLS relay group. It's used to conduct UFLS threshold validation for outage management.	Participant	Numeric	0.00-100.00	%	M
Registration status	**Purpose:** Indicate current registration status.	System and manual IESO	Dropdown	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the equipment must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine equipment outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the equipment to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

9.6 Master data verification

The IESO has populated facility, equipment and resource data from previously submitted registration forms. Prior to making any changes for existing facilities, equipment and resources, market participants must verify the relevant data and provide the IESO with any missing data.

Master data verification						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Verified flag	**Purpose**: Identifies that the owner has verified the registration data for all owned equipment and the related entities (e.g. Resource, connection point, commitment period, dynamic model, document, facility, circuit, control centre, compliance aggregation models). Organization, contacts, lookup value lists and IESO defined entities are not verified by the participant (e.g. Technology type, electric zone, sub-region, balancing authority area/control area, UFLS Area, voltage levels)	Participant	Boolean	No Yes	N/A	M
Verification date	**Purpose**: that date when the owner verified the registered entity	System	Date time stamp	N/A	N/A	M

10 Resources

10.1 Connection Point

Note: these include internal Ontario connection points and boundary entities, intertie zones etc.

Note: as with circuit, connection point is not equipment or a specialization of equipment so there is no need to use 'equipment name'.

Connection Point						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Connection Point Name	**Purpose:** Unique name for the equipment within a specified scope (e.g. windings unique within transformer but not within facility. I.e. The name by which the connection point is commonly known.	Solution (no manual override)	Text	Business rule: -connection point name is <facility name><voltage level><equipment name> -remove spaces from <facility name> -for <equipment name> use the first, non-circuit/circuit section equipment selected for the connection point -take the <voltage level> from the equipment [or from the circuit section (should be the same)]	N/A	M

10.2 Generator Resource

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource Id	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants	System	Integer	999999	N/A	M
Resource Name	**Purpose:** Unique identifier across all SCADA systems (e.g. EMS, MIS, etc.)	Solution / IESO	Text	Proposed by solution, confirmed by Market Registration.	N/A	M
Balancing Authority Area (area_id)	**Purpose:** Identifies the IESO control area (ONZN) or intertie zone in which the resource operates. .	System: Computed Values– not recorded attributes	Text	Current list: ONZN MBSI MNSI MISI NYSI PQBE PQDA PQHA PQQC PQPC PQXY PQHZ PQDZ PQSK PQAT	N/A	M
Electrical Zone	**Purpose:** Facilities, equipment and resources are organized by electrical area for IESO Operations purposes. Calculated from equipment and facility electrical zone.	System: Computed Values– not recorded attributes	Text	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce	N/A	M
Resource Configuration	**Purpose:** Identify the resource operating mode where the	Participant	Drop down	Cogeneration Combined cycle	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	associated generating unit(s) are combustion turbines or steam turbines Value is 'not applicable' unless primary fuel is oil, gas, bio-fuel or steam. Values are mutually exclusive. • Cogeneration -exhaust is used to provide power or heat to a non-generation operation. • Combined cycle –Not Cogeneration and exhaust is used as fuel for generating unit. • Simple cycle if not cogeneration or combined cycle.			Simple cycle Not applicable		
Start-up Offer and Speed-no-load Offer Eligibility Flag	**Purpose:** Market participant has elected to submit start-up offers and speed-no-load offers as hourly dispatch data into the day-ahead market and real-time market. Note: this parameter is only available to pseudo-unit resources and non-quick start resources with a primary fuel type of oil, gas, bio-fuel or steam.	Participant	Boolean	Y/N	N/A	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Pseudo Unit Modelling Election Flag	**Purpose:** market participant has elected to enable pseudo unit modelling as part of the day-ahead scheduling for this resource. Note that the CT resource could also operate independently of the Pseudo Unit. Note: This is the record of the participant's request to assign the resource as part of a PSU. Pseudo resource units are only used in the day-ahead market and not dispatched in real-time. They are only available to gas turbines and steam turbines at a single substation (facility) [only available to primary fuel types 'gas' and 'steam']. A Pseudo unit is automatically named with a PSU and the Combustion Turbine Resource name. For example: A combined cycle facility has two combustion turbines (1, 2) and one steam turbine (3). **Physical Resource** / **Pseudo Resource**	System (set when create PSU)	Boolean	Y/N	N/A	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	<table><tr><td>Gas Turbine 1 (Unit-LT.G1)</td><td rowspan="2">Pseudo Unit 1</td></tr><tr><td>Steam Turbine 3 (Unit-LT.G3)</td></tr><tr><td>Gas Turbine 2 (Units-LT.G2)</td><td rowspan="2">Pseudo Unit 2</td></tr><tr><td>Steam Turbine 3 (Unit-LT.G3)</td></tr></table> The Pseudo unit would be labelled as PSU_UNIT-LT.G1 PSU_UNIT-LT.G2					
Generator Turbine Type	**Purpose:** Identify if any associated generating unit is a combustion turbines or a steam turbines. Business Rule: Pseudo resource Flag is yes and generating unit primary fuel is gas or steam. If there is a mix then n/a since will not be part of a PSU	System: Computed Values– not recorded attributes	Text	CT ST Not applicable	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Steam Turbine Duct Firing Capacity	**Purpose**: Duct firing capacity is the capacity available from the duct firing of a physical steam turbine. For registration purposes, a single value of duct firing capacity will be provided and captured for a steam turbine resource. Derived from associated ST generating unit. Sum (add) Steam Turbine Duct Firing Capacity for all associated STs	System: Computed Values– not recorded attributes	Decimal number with validation	0-999	MW	O
Duct Firing 10-minute Operating Reserve Capability Flag	**Purpose:** Does the resource, with a Generator Turbine Type of steam, have the capability to initiate duct firing to provide 10-minute operating reserve by initiating? The generation resource must have a fuel type of 'steam' and must have a value registered for the Steam Turbine Duct Firing Capacity parameter.	Participant	Boolean	Y/N	N/A	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status. For participants and IESO staff viewing records	System	Drop down	Verified (system), Commissioning (system), Commissioning Update (system) Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Bid/Offer Type	The participation for the resource in the IESO administered markets. This drop down menu determines how the participant will be dispatched or bid/offer in the market.	Participant	Drop down	Dispatchable Intermittent Generator Self-Scheduling Generator	N/A	M
Operating Reserve Class	**Purpose:** If the resource is dispatchable than and the fuel type is not wind or solar than the participant may elect to participate in the various operating reserve classes.	Participant	Drop Down if bid type above is dispatchable and fuel type is not wind / solar	All types, 30min non-spin, 10 min non-spin and 30 min, no Operating Reserve Validation –only allowed for dispatchable (disabled if not with 'Not applicable ' value)		M
Embedded Resource Flag	**Purpose:** Independent of facility connection, this flag identifies if a resource is embedded.	IESO	Boolean	Y/N	N/A	O
Embedded Facility Flag	**Purpose:** This flag identifies if this is an embedded facility	IESO	Boolean	Y/N	N/A	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource at embedded facility	From equipment; facility (Connection Type)	System: Computed Values– not recorded attributes	Boolean	Y/N		O
Embedded Facility name	From equipment; facility	System: Computed Values– not recorded attributes	Text		N/A	O
Directly connected facility name	From equipment; facility (relationship)	System: Computed Values– not recorded attributes	Text		N/A	O
Electricity Storage Resource Flag	**Purpose:** This flag identifies if a resource is an electricity storage resource.	IESO	Boolean	Y/N	N/A	O
Connection point name	From connection point relationship	System: Computed Values– not recorded attributes	Text		N/A	M
Resource primary fuel type	**Purpose:** Identify the primary fuel used for the generating unit(s) associated to the resource. This is not a derived field	IESO	Drop down	List of fuel type for the associated gen unit	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource secondary fuel type	**Purpose:** Identify the secondary fuel used for the generating unit(s) associated to the resource. This is not a derived field	IESO	Drop down	As per gen unit	N/A	O
Real Time Energy Market Flag	**Purpose:** Identifies that this resource participates in the IESO administered physical market Values on resource creation/update (applies to all resource types) • Creation (new resource) submitted -> null; registered (=approved at end of RE) -> 'no' ; commissioning/in-service -> 'yes' • Update Staging: submitted -> null; registered (=approved at end of RE) -> 'no' ; commissioning/in-service -> 'yes' • During update there is no change to CDMS instance of resource which is in-service and has a value of 'y'	System	Boolean	Y/N	N/A	M
AGC Energy Market Flag	**Purpose:** Is this an AGC resource	IESO	Boolean	Y/N	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Operational Compliance Aggregation Election	**Purpose:** Market participant has elected to include this resource as part of an operational compliance aggregation for dispatch instruction	System	Boolean	Y/N	N/A	O
Control Deadband	**Purpose:** Unit control error deadband. When a unit's desired active power change is less than this deadband, then no control pulses will be sent to the unit. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 3.2	0-9999	MW	O
Control Pulse High	**Purpose:** Pulse high limit which is the largest control pulse that the unit can respond to. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 4.2	0-9999	MW	O
Control Pulse Low	**Purpose:** Pulse low limit which is the smallest control pulse that the unit can respond to. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 4.2	0-9999	MW	O
Control Response Rate	**Purpose:** Unit response rate which specifies the active power change for a control pulse of one second in the most responsive loading level of the unit. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 4.2	0-9999	MW/min.	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Gen Control Mode	**Purpose:** The unit control mode. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Free text	"on", "off" or on standby		O
Gen Control Source	**Purpose:** The method of AGC control of the resource in following the IESO AGC signal (i.e. "pulse" or setpoint). Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Free text	"pulse" or "setpoint"		O
Gen Operating Mode	**Purpose:** This is the base point operating mode of the AGC signal to the resource. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Free text	Auto, MBP (manual base point), MBPR (range)		O
High Control Limit	**Purpose:** This is the maximum output for operation while on AGC control. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 4.2	0-9999	MW	O
Low Control Limit	**Purpose:** This is the minimum output for operation while on AGC control. Value is provided only if AGC energy market flag is a "Y" otherwise N/A.	IESO	Decimal number 4.2	0-9999	MW	O
Minimum Generator Resource Capability (Winter)	**Purpose:** the sum of all Minimum Active Power Capability (winter) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Minimum Generator Resource Capability (Summer)	**Purpose:** The sum of all the Minimum Active Power Capability (Summer) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Generator Resource Rated Active Power	**Purpose:** The sum of all the Rated Active Power values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Maximum Generator Resource Capability (-10 C ambient)	**Purpose:** The sum of all the Maximum Continuous Active Power (-10 C ambient) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Maximum Generator Resource Capability (0°C ambient)	**Purpose:** The sum of all the Maximum Continuous Active Power (0°C ambient) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Maximum Generator Resource Capability (Winter)	**Purpose:** The sum of all the Maximum Continuous Active Power (winter) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Maximum Generator Resource Capability (20°C ambient)	**Purpose:** The sum of all the Maximum Continuous Active Power (20°C ambient) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Generator Resource Capability (Summer)	**Purpose:** The sum of all the Maximum Continuous Active Power (summer) values of the connected generating units.	System	Decimal number with validation	0-9999	MW	M
Maximum Generator Resource Active Power Capability	**Purpose:** The sum of all the Maximum active power capability of all the connected generating units. This value is used to calculate the energy resource's maximum offer capability. This value will also be used to calculate the PSU's percent shared calculation.	System	Decimal number with validation	0-9999	MW	
Maximum Bid/Offer Ramp Rate	**Purpose:** The sum of all maximum ramp rate of the member generating units.	system	Decimal number with validation	0-9999	MW/Min	
Quick Start Flag	**Purpose:** Does this resource have generating units that are quick start capable?	Participant confirmed by IESO-MR	Boolean	Y/N Set by the participant at the resource (per rule "Does this resource have any generating units that are quick start capable?"). During resource approval by Market Registration the IESO can reject or approve.	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Elapsed Time To Dispatch	**Purpose:** The minimum amount of time, in minutes, between the time at which a start-up sequence is initiated for a generation unit and the time at which it becomes dispatchable by reaching its minimum loading point;	Participant	Numeric Text		Min	M
Period of Steady Operation	Period of steady operation means a predefined number of intervals (0, 1, or 2) for which a non quick-start (quick-start flag is 'no') generation facility must maintain steady operation before changing direction of its energy output (either increasing or decreasing). (note: for non quick-start resources fuel type will be one of Bio Fuel, Coal (although obsolete now), Gas, Oil, Steam Use zero for quick start. Disable on form (not editable). Such a facility is considered to be in steady operation if the magnitude of change between dispatch instructions for the last two intervals is less than 0.1 multiplied by its ramp rate capability between the two intervals; Period of steady operation is specifically for slow moving units such as fossil or nuclear generating	Participant	Must be a non-quick start generation resource, default is 0.	0,1,2	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	units and may also include combined cycle and cogeneration facilities. This value which is stated in number of five-minute intervals, with a maximum value of 2, is used to ensure that units do not reverse direction without a minimum period of steady operation.					
Minimum Run Time	(MRT) means the number of hours required for a generation facility to ramp from a cold start to its minimum loading point, plus the facility's minimum generation block run-time, as specified by the market participant in accordance with the technical requirements of the facility., Fuel type must be one of Bio Fuel, Coal , Gas, Oil, Steam Can only be provided on update to in-service resource.	Participant	Decimal Can expect one decimal place i.e. 6.5	0-25	Hr	O
Minimum Generation Block Run–Time	(MGBRT) means the number of hours, specified by the market participant, that a generation facility must be operating at or above minimum loading point, in accordance with the technical requirements of the facility. , Fuel type must be one of Bio Fuel, Coal , Gas, Oil, Steam Can only be provided on update to in-service resource.	Participant	Whole number	0-24	Hr	O
Minimum Loading Point (MLP)	(MLP) means the minimum output of energy specified by the market	Participant	Numeric	0-999	MW	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	participant that can be produced by a generation facility under stable conditions without ignition support. Fuel type must be one of Bio Fuel, Coal, Gas, Oil, Steam Can only be provided on update to in-service resource. • 0 =< MLP =< Maximum Generator Resource Active Power Capability					
Generator Offer Guarantee (GOG) Flag	**Purpose:** Indicates if this resource qualifies for GOG? IF • Quick Start = NO • MLP > 0 MW • MGBRT > 1 hour • ETD > 60 min • Registered Resource Primary Fuel Type is not 'URANIUM' THEN GOG Eligibility Flag = YES ELSE GOG Eligibility Flag = NO	IESO	Boolean	Y/N	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Production Cost Guarantee (PCG) Flag (Retired)	**Purpose:** does this resource qualify for PCG? Business rules, DA-GCG flag yes, RT-GCG flag "y", do values exist for MLP, MGBRT, MRT, is the resource a non-quick start and is the ETD greater than 60 minutes IF Quick Start = NO AND MLP > 0 MW AND MGBRT > 1 hour AND ETD > 60 min AND Registered Resource Primary Fuel Type is not 'URANIUM'[3] THEN PCG Eligibility Flag = YES ELSE PCG Eligibility Flag = NO	System	Boolean	Y/N	n/a	O

[3] Nuclear generation resources must be excluded from receiving a DA-PCG

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Steam Turbine MLP (2 on 1)	**Purpose**: The minimum loading point of a steam turbine (ST) at a combined cycle/cogeneration plant may differ depending on the number of combustion turbines that are in-service. Additional ST MLPs are required for all combined cycle / cogeneration plant configurations above the MLP submitted for a 1 CT on 1 ST. Must be provided if the participant owns two gas turbines at the same facility as the steam turbine. Available only to a generation resource that has one generating unit assigned to it, that has a primary fuel source of steam and may be operating in a combined cycle relationship that has more that has 2 or more gas turbine associated with it. (2 on 1 MLP) means the minimum output of energy specified by the market participant that can be produced by a generation facility under stable conditions without ignition support when two gas turbines are in service. Generation Online Eligibility Flag (SGOL) Flag needs to be Y, Production Cost Guarantee (PCG) Flag needs to be Y, Day-Ahead	Participant	Numeric		MW	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	Production Cost Guarantee (DA-GCG) flag needs to be "Y" Enabled if the resource primary or secondary fuel type is steam. Since it is not populated under all conditions, it is deemed Optional so users understand that an empty value is valid.					
Steam Turbine MLP (3 on 1)	**Purpose**: The minimum output of energy specified by the market participant that can be produced by a generation facility under stable conditions without ignition support when three gas turbines are in service Must be provided if the participant owns three gas turbines at the same facility as the steam turbine. Available only to a generation resource that has one generating unit assigned to it, that has a primary fuel source of steam and has a combined cycle relationship that has more that has three or more gas turbine associated with it. (3on 1 MLP) means the minimum output of energy specified by the market participant that can be produced by a generation facility under stable conditions without ignition support when three gas	Participant	Numeric		MW	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	turbines are in service. Generation Online Eligibility Flag (SGOL) Flag needs to be Y, Production Cost Guarantee (PCG) Flag needs to be Y, Day-Ahead Production Cost Guarantee (DA-PCG) flag needs to be "Y" Enabled if the resource primary or secondary fuel type is steam.					
Steam Turbine MLP (4 on 1)	**Purpose**: The minimum output of energy specified by the market participant that can be produced by a generation facility under stable conditions without ignition support when four gas turbines are in service Must be provided if the participant owns four gas turbines at the same facility as the steam turbine. Available only to a generation resource that has one generating unit assigned to it that has a primary fuel source of steam and has a combined cycle relationship that has more than 4 or more gas turbine associated with it. (4 on 1 MLP) means the minimum output of energy specified by the market participant that can be produced by a generation facility under stable	Participant	Numeric		MW	O

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
	conditions without ignition support when four gas turbines are in service. Generation Online Eligibility Flag (SGOL) Flag needs to be Y, Production Cost Guarantee (PCG) Flag needs to be Y, Day-Ahead Production Cost Guarantee (DA-GCG) flag needs to be "Y" Enabled if the resource primary or secondary fuel type is steam.					
Associated CT 1	**Purpose:** Identify combustion turbine resource associated with the steam turbine resource	Participant	Text		N/A	M
Associated CT 2	See above	Participant	Text		N/A	O
Associated CT 3	See above	Participant	Text		N/A	O
Associated CT 4	See above	Participant	Text		N/A	O
Day-Ahead Production Cost Guarantee (DA-PCG) election flag (Retired)	**Purpose:** the participant wishes their resource to participate in the Day-Ahead PCG Program. Non-quick start units; Fuel type must be one of Bio Fuel, Coal (although obsolete now), Gas, Oil, Steam	Participant	Boolean	Y/N	N/A	M
Real Time Eligibility Flag (RT-PCG) election Flag (Retired)	**Purpose:** the participant wishes that their resource participate in the RT-PCG Program. Non-quick start units; Fuel type must be one of Bio Fuel, Coal, Gas, Oil, Steam	Participant	Boolean	Y/N	N/A	M

Generator Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Eligible Energy Limited Resource Resubmission (EELR) Flag (Retired)	**Purpose:** Resource has associated generating units that are EELR enabled. Business Rule: resource EELR resubmission flag is yes if at least one associated generating unit has the 'Unit Eligible Energy Limited Generation Unit' flag as 'yes'.	System: Computed Values– not recorded attributes	Boolean	Y/N	N/A	M
Daily Cascading Hydroelectric Dependency (DCHD) resource (Retired)	**Purpose:** Identifies the upstream cascading hydroelectric generation resource that is controlled by the same registered market participant if the resource has a Minimum Hydraulic Time Lag of less than 24 hours to or from the cascading resource. The resource furthest upstream does not have a DCHD.	Participant	Integer	N/A	N/A	O
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the resource must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M
Outage Criticality Level	**Purpose:** Criticality Level is used to determine resource outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the resource to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

10.3 Hydroelectric Resource

A hydroelectric resource is a generation resource with a primary fuel type of water

Hydroelectric Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**M/O**
Hourly Must Run Flag	**Purpose:** Is the resource eligible to submit the hourly must run dispatch data?	Participant	Boolean	Y/N	N/A	O
Number of Forbidden Regions	**Purpose:** Forbidden regions are specifically for hydraulic (fuel type is 'water' only) generating units. These regions up to a maximum of 5 are accompanied by an upper and lower limit measured in MW and are intended to ensure equipment safety. These values will allow the IESO to not schedule facilities within these predefined operating ranges. If submitted, forbidden regions should meet the following criteria: · Forbidden region 1 Lower Limit shall be greater than or equal to 0, · Forbidden region 1 Upper Limit shall be greater than forbidden region 1 Lower Limit, · Forbidden region 2 Lower Limit shall be greater than forbidden region 1 Upper Limit, · Forbidden region 2 Upper Limit shall be greater than forbidden region 2 Lower Limit,	Participant	Dropdown maximum of 5	0,1,2,3,4,5	N/A	O

Hydroelectric Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**M/O**
	· Forbidden region 3 Lower Limit shall be greater than forbidden region 2 Upper Limit, · Forbidden region 3 Upper Limit shall be greater than forbidden region 3 Lower Limit. · Forbidden region 4 Lower Limit shall be greater than forbidden region 3 Upper Limit, · Forbidden region 4 Upper Limit shall be greater than forbidden region 4 Lower Limit. · Forbidden region 5 Lower Limit shall be greater than forbidden region 4 Upper Limit, · Forbidden region 5 Upper Limit shall be greater than forbidden region 5 Lower Limit.					
Forbidden Region 1 – Lower Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal. Range Lower limit	Example lower limit 2	MW	O
Forbidden Region 1 – Upper Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal. Range Upper limit	Upper limit 5	MW	O

Hydroelectric Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**M/O**
Forbidden Region 2 – Lower Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal. Range Lower limit (needs to be greater than upper limit of 1)	Example lower 6	MW	O
Forbidden Region 2 – Upper Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal. Range Upper limit (needs to be higher than lower limit 2)	Upper limit 9	MW	O
Forbidden Region 3 – Lower Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O
Forbidden Region 3 – Upper Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O
Forbidden Region 4 – Lower Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O
Forbidden Region 4 – Upper Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O
Forbidden Region 5 – Lower Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O

Hydroelectric Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**M/O**
Forbidden Region 5 – Upper Limit	**Purpose**: See above	Participant	Numeric text. Allow one decimal.		MW	O
Start Indication Value 1	"Purpose: Identifies the minimum quantity of energy that a generation unit associated with the resource can be schedule to in the DA and RT markets. This parameter is used to determine if a resource has used one or more of their maximum starts per day. Each start indication value is unique and applies to exactly one generating unit associated to the resource.	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 2	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 3	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 4	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 5	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O

Hydroelectric Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**M/O**
Start Indication Value 6	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 7	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O
Start Indication Value 8	Purpose: See above	Participant	Integer	1-maximum generator resource active power capability	MW	O

10.4 Pseudo Unit

A pseudo unit is a resource that can be offered into the day-ahead market but not into the real-time market.

Pseudo Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Pseudo Unit Name	**Purpose:** Unique identifier across all SCADA systems (e.g. EMS, MIS, etc.)	Solution / IESO	Text	Proposed by solution, confirmed by enrolment specialist. 'PSU_'|CT resource name	N/A	M
Resource Id	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants	Solution	Integer	999999	N/A	M

Pseudo Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status.	System	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Steam turbine percentage share	This will determine the capacity of the PSU resource. For example if the Steam Turbine is 100 MW and each gas turbine is 100 MW, if the participant submits a percentage allocation of 50% the Pseudo unit would be resource gas turbine + steam turbine x PSU percentage.	Participant	Percentage (integer)	0-100	%	M
Maximum Generator Resource Capability (Winter)	**Purpose:** the sum of all the Maximum continuous Active Power (winter) values of the connected generating units. For downstream system and review by Market Registration and participant	System (derived field)			MW	
Maximum Generator Resource Capability (Summer)	**Purpose:** The sum of all the Maximum continuous Active Power (summer) values of the connected generating units.	System (derived field)			MW	

Pseudo Unit						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Bid/Offer Ramp Rate	**Purpose:** Maximum ramp rate that a PSU can reduce/increase at. Calculated as the sum of the Maximum Bid/Offer Ramp Rate for the associated combustion turbine resource and associated steam turbine resource.	System (derived field)	Integer	0-9999	MW/min	M
Maximum Generator Resource Active Power Capability	**Purpose:** The sum of all the Maximum active power capability of the associated combustion turbine resource and the associated steam turbine resource. This value is used to calculate the energy resource's maximum offer capability.	System	Decimal number with validation	0-9999	MW	M

10.5 Load Resource

- Note: See section 11 Demand Response for load resources participating in the Demand Response programs.

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource Name	**Purpose:** unique identifier across all SCADA systems (e.g. EMS, MIS, etc.)	Solution / IESO	Text	Proposed by solution, confirmed by enrolment specialist	N/A	M
Resource Id	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants	Solution	Integer	999999	N/A	M

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status. For participants and IESO staff viewing records	System	Drop down	Verified (system), Commissioning (system), Commissioning Update (system) Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Bid/Offer Type	The type of interaction for this resource in the IESO administered markets. This drop down menu determines how the participant will be bid in the market.	Participant	Drop Down	Dispatchable Non-Dispatchable Day-Ahead Price Responsive	N/A	M
Operating Reserve Class	If the resource is dispatchable and a load the participant may elect to participate in the various operating reserve classes.	Participant	Drop Down	All types, 30min non-spin, 10 min non-spin and 30 min, no Operating Reserve Validation –only allowed for dispatchable (disabled if not with 'Not applicable ' value)	N/A	M
Real Time Energy Market Flag	**Purpose:** Identifies that this resource participates in the IESO administered physical market	System	Boolean	'N' until System sets flag to yes on approval of NFN if no commissioning or on approval of commission (i.e. as moving to in-service state)	N/A	M

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
AGC Energy Market Flag	**Purpose:** Is this an AGC resource Note: This value should be automated depending on the AGC values on generating unit	IESO	Boolean	Y/N	N/A	M
Balancing Authority Area	**Purpose:** Identifies the IESO control area (ONZN) or intertie zone in which the resource operates. For all other resources the area is ONZN.	System: Computed Values– not recorded attributes	Text	Current list: ONZN MBSI MNSI MISI NYSI PQBE PQDA PQHA PQQC PQPC PQXY PQHZ PQDZ PQSK PQAT	N/A	M
Electrical Zone	**Purpose:** Facilities, equipment and resources are organized by electrical area for IESO Operations purposes. Calculated from equipment and facility electrical zone.	System: Computed Values– not recorded attributes	Text	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce	N/A	M

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Maximum Load – Active Power	**Purpose:** Where the load resource is dispatchable or price-responsive (bid/offer type is 'dispatchable' or 'price-responsive'), this is the sum of the load and associate motors for all the loads associated to this resource. I.e. the sum of 'Total peak load - Active Power' from all loads. If the load resource is not dispatchable or price-responsive the value is 'null'.	System	Numeric value allow one decimal place	0 to 9999	(MW)	M
Minimum Registered Dispatchable Load	**Purpose:** Where the load resource is dispatchable (Market Flag = yes), this is the minimum load point for the resource. If the load resource is not dispatchable the value is 'null'.	Participant	Numeric value allow one decimal place	0 to 9999	(MW)	O
Maximum Bid/Offer Ramp Rate	**Purpose:** Identifies the maximum ramp rate the resource can provide. Calculated as the sum of all Maximum Registered Ramp Rate of the member loads. Note: This field depends on the maximum of either the raise ramp rates on the load.	System	Integer	0-9999	MW/Min	

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Embedded Resource Flag	**Purpose:** Independent of facility connection, this flag identifies if a resource is embedded.	IESO	Boolean	Y/N	N/A	O
Embedded Facility Flag	**Purpose:** This flag identifies if the resource is at an embedded facility	IESO	Boolean	Y/N	N/A	O
Resource at embedded facility	From equipment; facility (Connection Type)	System: Computed Values– not recorded attributes	Boolean	Y/N		O
Embedded Facility name	From equipment; facility	System: Computed Values– not recorded attributes	Text		N/A	O
Directly connected facility name	From equipment; facility (relationship)	System: Computed Values– not recorded attributes	Text		N/A	O
Electricity Storage Resource Flag	**Purpose:** Identifies if the resource is an electricity storage resource	IESO	Boolean	Y/N	N/A	M
Connection point name	From connection point relationship	System: Computed Values– not recorded attributes	Text		N/A	M
Outage Reporting Required Flag	**Purpose:** Indicate whether outages to the resource must be reported to the IESO for assessment.	IESO	Boolean	Y/N	N/A	M

Load Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Outage Criticality Level	**Purpose:** Criticality Level is used to determine resource outage request submission requirements. It determines how far in advance the market participant must submit an outage request for the resource to the IESO for approval. Mandatory if Outage Reporting Required Flag = "Y".	IESO	Dropdown	1=Critical 2=Non-Critical 3=Low-Impact	N/A	O

10.6 Transmission Connection Resource

Transmission Connection Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource Name	**Purpose:** unique identifier across all SCADA systems (e.g. EMS, MIS, etc.)	Solution / Participant (transmitter)	Text	Proposed by solution, confirmed by participant.	N/A	M
Resource Id	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants	Solution	Integer	999999	N/A	M

Transmission Connection Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Registration Status	**Purpose:** Indicate current registration status. For participants and IESO staff viewing records	System	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Transformation Connection Flag	**Purpose:** Specify if the transmission customer will be charged fees for the use of Transformation Connection facilities (i.e. transformation station facilities that step down the voltage from above 50 kV to below 50 kV are categorized as the No - Customer owns transformer and does not pay charge. Yes – transmitter owns transformer and customer pays charge	Participant (transmitter)	Boolean	Y/N	N/A	M

Transmission Connection Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Line Connection Flag	**Purpose:** Specify if the transmission customer will be charged fees for the use other electrical facilities (i.e. that are neither Network nor Transformation). No - Customer owns other electrical facilities and does not pay charge. Yes – transmitter owns other electrical facilities and customer pays charge	Participant (transmitter)	Boolean	Y/N	N/A	M
Balancing Authority Area	**Purpose:** Identifies the IESO control area (ONZN) or intertie zone in which the resource operates.	System: Computed Values– not recorded attributes	Text	Current list: ONZN MBSI MNSI MISI NYSI PQBE PQDA PQHA PQQC PQPC PQXY PQHZ PQDZ PQSK PQAT	N/A	M

Transmission Connection Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Electrical Zone	**Purpose:** Facilities, equipment and resources are organized by electrical area for IESO Operations purposes. Calculated from equipment and facility electrical zone.	System: Computed Values– not recorded attributes	Text	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce (please use CDMS numbering system and 1 – N/A, 2 – Bruce, etc.)	N/A	M
Connection Point Name	From connection point relationship	System: Computed Values– not recorded attributes	Text		N/A	M
Directly Connected Facility Name	From equipment; facility (relationship)	System: Computed Values– not recorded attributes	Text		N/A	O

10.7 Transmission Network Resource

Transmission Network Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource Name	**Purpose:** Unique identifier across all SCADA systems (e.g. EMS, MIS, etc.)	Participant (transmitter)	Text	Proposed by solution, confirmed by market rule.	N/A	M

Transmission Network Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Resource Id	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants	Solution	Integer	999999	N/A	M
Registration Status	**Purpose:** Indicate current registration status. For participants and IESO staff viewing records	System	Drop down	Verified (system), Commissioning (system), Registered (system) Long term Shutdown (manual), Deregistered (system), IESO maintained (system)	N/A	M
Balancing Authority Area	**Purpose:** Identifies the IESO control area (ONZN) or intertie zone in which the resource operates. For all other resources the area is ONZN.	System: Computed Values– not recorded attributes	Text	Current list: ONZN MBSI MNSI MISI NYSI PQBE PQDA PQHA PQQC PQPC PQXY PQHZ PQDZ PQSK PQAT	N/A	M

Transmission Network Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Electrical Zone	**Purpose:** Facilities, equipment and resources are organized by electrical area for IESO Operations purposes. Calculated from equipment and facility electrical zone.	System: Computed Values– not recorded attributes	Text	Northeast, Northwest, Essa, Toronto, East, Ottawa, South, Southwest, Niagara, Bruce (please use CDMS numbering system and 1 – N/A, 2 – Bruce, etc.)	N/A	M
Connection Point Name	From connection point relationship	System: Computed Values– not recorded attributes	Text		N/A	M
Directly Connected Facility Name	From equipment; facility (relationship)	System: Computed Values– not recorded attributes	Text		N/A	O

10.8 Settlement Compliance Aggregation Model

Note: registration status is derived from registration status of the associated resources

Settlement Compliance Aggregation Model						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Compliance Aggregation Model type	**Purpose:** Identifies the aggregation model functionality for the selected resources. Compliance Aggregation and Meter Disaggregation are the functionalities within MDMS which permit measured generation from multiple facilities to be aggregated and then apportioned to the delivery points associated with the Compliance Aggregation / Meter Disaggregation Model. The apportionment is performed by applying a proportionality factor based on dispatch instructions to the aggregation summary meter.	Participant	Drop down	Compliance aggregation Meter disaggregation	N/A	M
Compliance Aggregation Model Name	**Purpose:** Unique identifier for the model.	Participant	Text	N/A	N/A	M
Settlements Service Start Date	**Purpose:** This is the date that the Compliance Aggregation / Meter Disaggregation Model will become active in the MDMS system.	Participant IESO	Date		N/A	O

10.9 Operations Compliance Aggregation Model

Note: registration status is derived from registration status of the associated resources

Operations Compliance Aggregation Model						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Compliance Aggregation Model type	**Purpose:** Identifies the aggregation model functionality for the selected resources. Compliance Aggregation and Meter Disaggregation are the functionalities within MDMS which permit measured generation from multiple facilities to be aggregated and then apportioned to the delivery points associated with the Compliance Aggregation / Meter Disaggregation Model. The apportionment is performed by applying a proportionality factor based on dispatch instructions to the aggregation summary meter.	Participant	Drop down	Compliance aggregation Meter disaggregation	N/A	M
Compliance Aggregation Model Name	**Purpose:** Unique identifier for the model.	Participant	Text	N/A	N/A	M
Operations Service Start Date	**Purpose:** This is the date that the Compliance Aggregation / Meter Disaggregation Model will become active in the operations real-time systems.	Participant IESO	Date			M

Operations Compliance Aggregation Model						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Compliance Aggregation Dead band	**Purpose:** This is the operational dispatch variance allowed for compliance with dispatch instructions For quick-start and non-coal fired non-quick start units, the deadband is the greater of: • One half of the rated capacity of the largest single unit in the compliance aggregate (to a maximum of the total of the individual deadbands for the units), or • 15 MW For compliance aggregates composed of coal units with pulveriser mills, the deadband for the compliance aggregate as a whole is one half of the nominal megawatt value of a single pulveriser mill within the aggregate.	IESO	Numeric whole number	0-999	MW	M
Settlement Compliance Aggregation model	**Purpose:** This is the name of the related Settlement Compliance Aggregation model. If there is no settlement CA model, the participant must indicate this.	Participant	Free text	Model name or 'null'	N/A	M

11 Resources on a Cascade

11.1 Forebay

A forebay is a collection of resources at the same dam on a cascade river system

Forebay						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**Opt.**
Forebay ID	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants.	System	Integer	999999	N/A	M
Forebay Name	**Purpose:** Unique identifier across all SCADA systems (e.g. EMS, MIS, etc.) Resources are assigned to a forebay by the IESO Enrolment Specialist. All resources assigned to a forebay will be eligible to share daily energy limits submitted as dispatch data in the IESO administered markets.	IESO	Text	N/A	N/A	M
Forebay Sequence ID	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants.	System	Integer	999999	N/A	M

Forebay						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of Measurement**	**Opt.**
Max Time Lag	**Purpose:** The amount of time for water discharged from an upstream forebay to reach a downstream forebay in the same Cascade Group.	Participant	Integer	1-23	Hours	O

11.2 Cascade Group

A Cascade Group is a set of sequenced hydroelectric generation dams (i.e. forebays) on a river system.

Attribute Name	Cascade Group Business Definition	Submitted by	Data Type	Value Range	Unit of Measurement	Opt.
Cascade Group ID	**Purpose:** Unique numeric identifier for each resource. Often included in reports or communications to participants.	System	Integer	999999	N/A	M
Cascade Group Name	**Purpose:** Unique textual identifier for a Cascade Group	IESO	Text		N/A	M

12 Demand Response

The demand response market participants providing demand response capacity obligation with transmission connected load facilities or with embedded load facilities that are revenue metered by the IESO must register their resources as hourly demand response or as dispatchable loads (for example, a non-dispatchable load could be registered as hourly demand response) and submit the demand response capacity per resource at least three months prior to the beginning of the commitment period.

As part of the contributor management and registration process, the demand response market participant must submit information for each contributor to be associated to their registered demand response resource(s) through Online IESO. Each demand response market participant is responsible for maintaining the contributor registry throughout their commitment period, which may include a combination of virtual (LDC revenue metered) and/or physical (non-dispatchable loads) contributors.

12.1 DR Resource

All participants that have received a demand response capacity obligation shall register resources with the IESO to meet their demand response capacity obligation as either an hourly demand response (HDR) resource (to represent non-dispatchable and/or virtual loads) or as a dispatchable load (DL) resource.

Demand response contributors that can be registered to meet a demand response capacity obligation:

1. HDR associated with commercial/industrial (C&I) loads can have:
    a. Virtual C&I contributors; and
    b. Physical (non-dispatchable) contributors;
2. HDR associated with residential loads can have only:
    a. Virtual residential contributors

A physical DR resource can be fulfilled though registering a (5-min) dispatchable or an (Hourly) non-dispatchable load resource where the demand response market participant (DRMP) must be the same as the load owner of that resource.

Business Rule: Dispatchable load resources used for Demand Response:

- Have a commitment period
- Have different business rules for the system to derive selected fields as specified in the following table. Note that DR resource is a type of load resource. Hence all load resource attributes and related business rules are applicable to DR resources.

DR Resource						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Dispatch Type	**Purpose:** Identifies the real-time dispatch period. Added for DR resources. Applicable to all dispatchable resources which currently will be '5-minute'. Non-dispatchable and Price-responsive load resources are set to 'null'	Participant	Drop Down	5-minute Hourly	N/A	M
Minimum Registered Dispatchable Load	**Purpose:** Where the load resource is dispatchable (Market Flag = yes), this is the minimum load point for the resource If the load resource is not dispatchable the value is 'not applicable' Not relevant for DR resource since ETL/records (via market resource data view) will use capability from commitment period	Participant	Numeric value allow one decimal place	N/A	(MW)	O

12.2 Resource DR Participations (lookup table)

These are the Demand Response participations applicable to the load resource (which must also be a dispatchable load resource)

Demand Response Participations						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Demand Response Participation	These are the DR participations applicable to the load resource.	Participant	Multi-select but resource cannot be in both pilot and auction	• DR Market Participant Pilot • DR Market Participant Action • CBDR	N/A	M

12.3 Demand Response Resource Commitment

The Demand Response Resource Commitment is the capability that the DR resource will contribute to fulfill the participant's DR obligation for a given commitment period.

Demand Response Resource Commitment						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
DR Capability	**Purpose:** The value indicates the capacity the DR resource will contribute to fulfill the participant's DR obligation. This value must be less than or equal to the resource's maximum capacity and less than or equal to the participant's DR obligation.	Participant –DR Owner	*Numeric value allow one decimal place*	0 to 9999	(MW)	M

Demand Response Resource Commitment						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Capability Effective Date	**Purpose:** This is the date from which the related DR resource will start contributing the DR capability towards the related DR obligation.	Participant –DR Owner	*Date*			M

12.4 DR Contributor

A DR contributor is an interruptible load that contributes DR capacity to a virtual hourly demand response (HDR) resource.

DR Contributor						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
DR Capacity	**Purpose:** The value indicates the maximum capacity that the contributor is able to deliver for DR purpose.	Participant –DR Owner	*Numeric value allow one decimal place*	0 to 9999	(MW)	M
Comments	**Purpose:** Participant supplied comments	Participant –DR Owner	*Free text*			O
Contributor Type	**Purpose:** Physical NDL or non-revenue virtual meter	Participant –DR Owner	*N/A*	1 and 2		M
Contributor Effective Date	**Purpose:** The date from which the contributor is effective to deliver the DR capacity	Participant –DR Owner	*Date*			M

12.5 Virtual DR Contributor

Virtual DR contributors are the contributors that are not operationally visible to the IESO. These contributors contribute DR capacity to the virtual DR resource. There are two type of Virtual DR Contributor: Residential DR Contributor and Non-Residential DR Contributor.

Virtual DR Contributor						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Name	**Purpose:** The name of the virtual contributor	Participant –DR Owner	*Text*			M
Address	**Purpose:** Address of the contributor	Participant –DR Owner	*Text*			M
LdcLDC account no	**Purpose:** The LDC account number of the contributor	Participant –DR Owner	*Text*			M

12.6 Residential DR Contributor

A residential DR contributor is an interruptible residential load that contributes DR capacity to a virtual hourly demand response (HDR) resource.

Residential DR Contributor						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Treatment Contributors Capacity (MW)	**Purpose:** Total curtailment capacity in Megawatts	Participant –DR Owner	Number	≥1		M
Number of Treatment Contributors	**Purpose:** Total number of treatment group contributors	Participant –DR Owner	Number			M
Number of Control Contributors	**Purpose:** Total number of control group contributors	Participant –DR Owner	Number			M
Comments	**Purpose:**	Participant –DR Owner	Text			M

12.7 Non-Residential DR Contributor

Non- Residential contributors are only associated with virtual DR Resources and represent Industrial, Commercial and Institutional loads.

Non-Residential DR Contributor						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Other IESO DR Initiatives	**Purpose:** This flag indicated whether the contributor is participating in any other DR initiatives administered by the IESO.	Participant –DR Owner	*Flag*	Y/N		M
Other IESO DR Initiatives Description	**Purpose:** To provide detailed description about other DR initiatives that this DR contributor is related to.	Participant –DR Owner	*Free text*			O
Data Acquisition Method	**Purpose:** This field captures the method using which the meter data from the contributor will be captured by the IESO	Participant –DR Owner	*Drop down menu*	Direct from Meter, LDC provided		M
Premise Id	**Purpose:** A unique identifier of the premise related to the contributor	Participant –DR Owner	*Text*			M

12.8 DR Contributor SLD

DR Contributor SLD captures the technical details of the related virtual DR contributor.

DR Contributor SLD						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Doc version	**Purpose:** This captures the current version of the SLD file	Participant –DR Owner	Number			M

DR Contributor SLD						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
SLD file	**Purpose:** Name of the SLD file	Participant –DR Owner	Attachment			M
Comments	**Purpose:** Comments supplied by the participant	Participant –DR Owner	Text			M

12.9 DR Contributor ROI

This entity captures the technical details of a meter installation that measures the energy flow within a DR contributor. A DR contributor may have multiple meter installations.

DR Contributor ROI						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Doc version	**Purpose:** This captures the current version of the ROI file	Participant –DR Owner	Number			M
ROI file	**Purpose:** Name of the ROI file	Participant –DR Owner	Attachment			M
Comments	**Purpose:** Comments supplied by the participant	Participant –DR Owner	Text			M

12.10 DR Behind the Meter Generator

This entity captures the details of the generator unit(s) that is installed behind the meter that provides the meter data for the contributor.

DR Behind the Meter Generator						
Attributes	**Definition**	**Submitted by**	**Data Type**	**Value Range**	**Unit of measurement**	**M/O**
Model number	**Purpose:** The model number of the behind the meter generator associated with the DR contributor	Participant –DR Owner	Text			M
Name plate capacity	**Purpose:** The capacity of as given on the nameplate of the behind the meter generator associated with the DR contributor	Participant –DR Owner	Text			M
Fuel type	**Purpose:** The type of the fuel used by the behind the meter generator associated with the DR contributor	Participant –DR Owner	Text			M
Load following	**Purpose:** The declaration that technology is in place to ensure no generation is injected to the grid	Participant –DR Owner	Toggle	Y/N		M

13 Capacity Commitments

13.1 Capacity Resource Commitment

This entity captures the registration details for the successful sale of capacity to an external jurisdiction.

Table Error! No text of specified style in document.**-1: Capacity Resource Commitment**

Capacity Resource Commitment					
Attribute Name	**Business Definition**	**Submitted by**	**Data Type**	**Value Range**	**Opt.**
Capacity Resource Commitment id	Unique numeric id for commitment	System	Number	N/A	M

Capacity Resource Commitment					
Attribute Name	**Business Definition**	**Submitted by**	**Data Type**	**Value Range**	**Opt.**
Registration Status	Status of commitment registration	System	Number	Pending Verification, Registered	M
Cleared MW	Capacity export that has been committed to the external jurisdiction for each month of the Commitment Period.	Participant	Number	N/A	M
Capacity vehicle Cleared document Id	Document id with notice of auction/contract result(s) Appian id if commitment is pending verification Citadel id if commitment is registered	System	Number	N/A	M
Capacity vehicle Cleared document Name	Document name with notice of auction/contract result(s)	Participant / System[4]	Text	N/A	M
Capacity vehicle type	Indicates if the commitment was awarded through an auction or a contract.	System[5]	Text	Auction, Contract	M
Capacity Auction Type	Auction purpose and commitment period duration	Participant	Text	Strip, Monthly, Spot, Annual Auction	O
Commitment start date (effective date)	Date on which the commitment starts. Must be 1st day of calendar month. May differ from the commitment period start for monthly auctions if offers cleared for only selected months or for different MW in different months.	System	Date	N/A	M

[4] The participant uploads the document. The system computes the name and files the document.

[5] The system retrieves values dictated by the approved capacity assessment request (e.g. capacity vehicle type, commitment start and end dates)

Capacity Resource Commitment					
Attribute Name	**Business Definition**	**Submitted by**	**Data Type**	**Value Range**	**Opt.**
Commitment end date (end date)	Date on which the commitment ends. Must be last day of calendar month end unless end-dated (see next line). May differ from the commitment period start for monthly auctions if offers cleared for only selected months or for different MW in different months. May differ from the commitment period end if commitment was changed (i.e. replaced by a later record)	System	Date	N/A	M

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