WG13 Issues - CIM Issues #6342

[GMDM #8] Phase modeling on the low side of residential and commercial service transformers

05/24/2023 08:53 AM - Pat Brown

Status:	New		
Priority:	Normal		
Target version:			
Author/Contact Info:	Pat Brown pat@cimpledata.com	**Standard(s):**	61970-301, 61970-452, 61968-13
Base Release:	CIM17	**Version:**	
Solution to be Applied To:		**Clause:**	
Solution Version:		**Sub-Clause:**	
Solution Applied By:		**Paragraph:**	
Completion Date:		**Table:**	
CIM Keywords:	61970-Wires	**Originally Closed in Version:**	
Breaking Change:	Yes	**Origination Date:**	
Breaking Change Description:	maybe breaking depending on solution	**Origination ID:**	
CIM Impacted Groups:	WG13	**Originally Assigned To:**	
Requestor:	Pat Brown		

Description

The population of attributes related to transformer windings, and of the related attributes of classes representing loads and distributed generation, posed ongoing challenges during GMDM test model creation.

The power that 'comes out of' the low-side transformer end(s) – which is what load and/or distributed generation is connected to - can have phasing that is not the same as what 'goes into' the high-side transformer end – which is what higher voltage ConductingEquipment (with xxxPhases) is connected to. There appear to be at least 2 requirements the description of low-side load/generation phasing needs to support: an accurate electrical representation for power flow (where characteristics of the feeding transformer are taken into account) and a 'short hand' that identifies the effect of high-side phase outages on low-side load/generation. A suggestion was made to add a .primaryPhase attribute on the EnergyConsumerPhase and PowerElectronicsConnectionPhase classes. Further exploration is needed.

Another area of difficulty related to the accurate description of phasing on load and distributed generation using the existing class attributes. The EnergyConsumer and EnergyConsumerPhase classes represent load and have the following phasing-related attributes:
- EnergyConsumer.grounded (true/false)
- EnergyConsumer.phaseConnection (with a datatype of PhaseShuntConnectionKind with possible values of D, Y, Yn, I and G)
- EnergyConsumerPhase.phase (with a datatype of SinglePhaseKind with possible values of A, B, C, N, s1, s2)

The PowerElectronicsConnection and PowerElectronicsConnectionPhase classes represent load and distributed generation and have the following phasing-related attributes:
- PowerElectronicsConnection.ratedU
- PowerElectronicsConnectionPhase.phase (datatype of SinglePhaseKind)

Shortcomings/challenges identified during GMDM IOP modeling effort included:
- For load modeling, the inability to explicitly represent 240 load made up of s1 and s2. Expanding the list of enumerated values of the SinglePhaseKind datatype was suggested as possible solution, as was replacing the EnergyConsumerPhases.phase and PowerElectronicsConnectionPhase.phase attributes with .orderedPhases attributes (datatype OrderedPhaseCodeKind with 50+ possible values). (The TransformerTankEnd.orderedPhases attribute uses OrderedPhaseCodeKind.)
- Difficulty in determining the appropriate values of EnergyConsumer.phaseConnection (datatype PhaseShuntConnectionKind with possible values of D, Y, Yn, I, G) and EnergyConsumer.grounded to accurately characterize the load while also aligning with TransformerEndInfo.connectionKind (datatype WindingConnection with possible values on D, Y, Z,Yb, Zn, A and I) and TransformerEnd.grounded. The notes (description) of the .grounded attributes in UML require review as well.
- The lack of PowerElectronicsConnection.phaseConnection and PowerElectronicsConnection.grounded attributes which are present on the EnergyConsumer class. There seemed to be a consensus that they should be added.
- Disagreement relative to the value that should be assigned to .ratedU on a single-phase inverter (0.12 vs 0.24) object (instance of PowerElectronicsConnection class).

History

#1 - 05/24/2023 09:08 AM - Pat Brown

- File deleted (GMDM 6 - Streamline approach to phase modeling.docx)

#2 - 05/24/2023 09:12 AM - Pat Brown

- File Bubble Diagram GMDMGrid_BasicAndSSH.vsdx added

- File GMDM 8 - Phase modeling on the low side of residential and commercial service transformers.docx added

- Subject changed from [GMDM #6] Streamline approach to phase modelling to [GMDM #8] Phase modeling on the low side of residential and commercial service transformers

- Description updated

- Breaking Change changed from No to Yes

- Breaking Change Description set to maybe breaking depending on solution

- CIM Keywords 61970-Wires added

- CIM Keywords deleted (61970-Core)

#3 - 05/24/2023 09:35 AM - Pat Brown

- Base Release set to CIM17

- Requestor set to Pat Brown

Files

Bubble Diagram GMDMGrid_BasicAndSSH.vsdx	456 KB	05/24/2023	Pat Brown
GMDM 8 - Phase modeling on the low side of residential and commercial service transformers.docx	488 KB	05/24/2023	Pat Brown