

**CYME**

Power Engineering Software and Solutions

# Low-Voltage Distribution Network Modeling and Analysis

## In-depth network planning with low-voltage distribution system modeling and analysis

In common practice, distribution system modeling stops at the high side of the distribution transformer. However, with the rise of an interconnected energy system, engineers seek to study the distribution system as a whole, which requires the modeling of the secondary distribution system.

The CYME Low-Voltage Distribution Network Modeling and Analysis module allows the detailed modeling and simulation of any circuit beyond the distribution transformer.

As most utilities are interested in improving the energy efficiency of their distribution system and assessing the impact of distributed energy resources, it has become increasingly important to have a complete network model. The CYME Low-Voltage Distribution Network Modeling and Analysis module supports the modeling of the low-voltage distribution system within your current one-line diagram.

The analysis of your network will be more complete without adding any complexity.

The detailed modeling of low-voltage distribution systems is possible thanks to the following features:

- Single-phase and three-phase center-tap transformers
- Service drop cables: triplex and quadruplex
- Low-voltage spot load connected to the center-tap

- Center-tap connected sources and meters
- Single phase center tap connected generators, motors, shunt capacitors and reactors

The secondary distribution system can be built and shown in a distinct view, giving the possibility to add more information without further complicating the rest of the distribution system view. Report functionalities allow the display of the relevant information and results.

The module provides a complete and accurate representation of the distribution system. With the CYME software, medium and low voltage system losses can be calculated accurately and overloaded equipment can be identified to help you plan and improve the system for the future.



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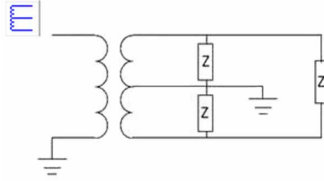
# Low-Voltage Distribution Network Modeling and Analysis

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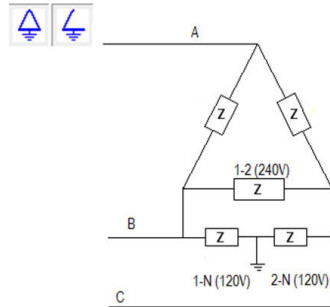
## Center-tap transformer

The single-phase and three-phase center-tap transformer model supports connecting to either half or full secondary voltage.

With this center-tap transformer model, spot loads representing each individual customer can be connected to the center-tap as they are in reality.



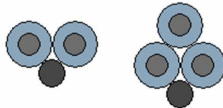
Single-phase transformer center-tap configuration



Three-phase transformers center-tap configuration

## Service drop cables

Overhead and underground triplex and quadruplex cable constructions used as service drop are available to allow accurate network modeling.



## Low-voltage network view

The low-voltage distribution system can be modeled in a distinct view or in the same view as the feeders.

- Display options will allow the user to distinguish the secondary distribution system from the primary and see where they overlap (i.e. using the same poles).
- The secondary distribution system can be loaded alone or simultaneously with the primary distribution system. Even when only the primary or the secondary distribution system is loaded, the network equivalent of the unloaded portion is calculated accurately and taken into consideration for simulations. System losses, equipment loading, and contingency scenarios can all be studied with ease.

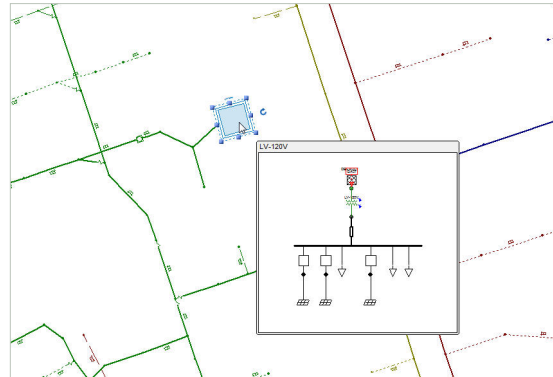
All the relevant CYME analyses (load flow, short-circuit, load allocation, etc.) that can be executed on the medium voltage distribution system will run on the low voltage distribution system, with the same accuracy.

## Sub-networks modeling

More accurate simulation results lead to the more precise planning and management of the expansion and maintenance of the distribution system, and a greater facility to manage the integration of the Distributed Generation (DG) and Distributed Energy Resources (DER) in the power grid; saving time and money.

The Sub-Networks Modeling module is included with any of the other CYME circuit/system modeling modules, and shares similar features. It supports the creation of any sub-network, including utility vaults, switching cabinets and modular substations; DG and DER components, in a nested representation connected to the overall grid.

The user can create a sub-network in a schematic or georeferenced view style as needed. Each can be shown as clickable nested view icons on the overall main representation of the system, revealing the editable view of the sub-network.



**Eaton**  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
Eaton.com

**CYME International T&D**  
1485 Roberval, Suite 104  
St. Bruno, QC, Canada J3V 3P8  
P: 450.461.3655 F: 450.461.0966  
P: 800.361.3627 (Canada/USA)  
CymelInfo@eaton.com  
www.eaton.com/cyme

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