ERCOT NMMS Topology Processor

Siemens PTI was contracted to assist in delivering part of the Nodal Model Management System (NMMS) to ERCOT, the Reliability Coordinator for the state of Texas. Siemens PTI has delivered a CIM-based Topology Processor and MOD®. The Topology Processor extracts the most current data model from a CIM-based database and produces a full model in PSS®E format. This model will be used as a base case in MOD®.

ERCOT will be maintaining their transmission model for all applications in a single data repository stored in CIM format. In addition to maintaining the current model in the database, all projects up to 12 months in the future will be maintained and merged into the base model as they are put into service.

The Topology Processor developed for ERCOT contains a number of unique features or capabilities, including:

- The Topology Processor is capable of building the PSS®E model using predetermined bus numbers and names. Special split bus configurations along with more complex configurations may be defined in the CIM database and will be exported to the model.
- The model stored in the database only contains two winding transformers, but ERCOT’s planners require that three winding transformers be modeled in their cases. The Topology Processor converts selected groups of two-winding transformers into three-winding transformers.
- Selected loads are combined and radial sections of the model can be reduced while Generators in the subtransmission system are converted to negative loads.
- Ratings are selected from 20 different rating sets over five different regions to populate the branch ratings in the case.
- Alternate Area, Zone and Owner configurations may be selected from eight different CIM containments.
- Reports may be generated which detail the mapping between planning buses and special market locations defined in the CIM central database.
- Contingency and monitored element files may be exported in PSS®E format.
- The Topology Processor will also create a case with specially formatted device identifiers on each PSS®E device. This special case format along with two xml-formatted contingency and monitored element files may be used as import to ERCOT’s market price calculation software.

ERCOT will use MOD® to contain the long-term plan for their system. MOD® will be used by ERCOT and the transmission providers to develop and study long-range projects. These projects may be used to build the projects in the central repository. The base model used in MOD® will periodically be produced by the Topology Processor from the central repository. This circular trail of data will enable ERCOT planners to use the most accurate and up-to-date base case to determine the best decisions for their region.

The Electric Reliability Council of Texas (ERCOT) manages the flow of electric power to approximately 20 million Texas customers – representing 85 percent of the state’s electric load and 75 percent of the Texas land area. As the independent system operator for the region, ERCOT schedules power on an electric grid that connects 38,000 miles of transmission lines and more than 500 generation units. ERCOT also manages financial settlement for the competitive wholesale bulk-power market and administers customer switching for 5.9 million Texans in competitive choice areas.