Next Steps In Dynamic Load Modeling

WECC MVS Meeting

September 27 2023

1. Modular Structure

Transition from fixed to modular CMLD representation in WECC cases

- Existing CMLD model structure is rigid, it became an impediment to advances in end-use modeling e.g. – drives, EVs, protection models

- **WECC staff** to work with software developers to convert existing CMLD models to modular structure
- **WECC staff** to perform model validation studies by comparing existing fixed CMLD models and CMLD modular structure
- **LMWG** to upgrade Load Model Dat Tool to write modular records

- Let’s discuss

2. End-Use Models

Advance Modeling of End-Use Components

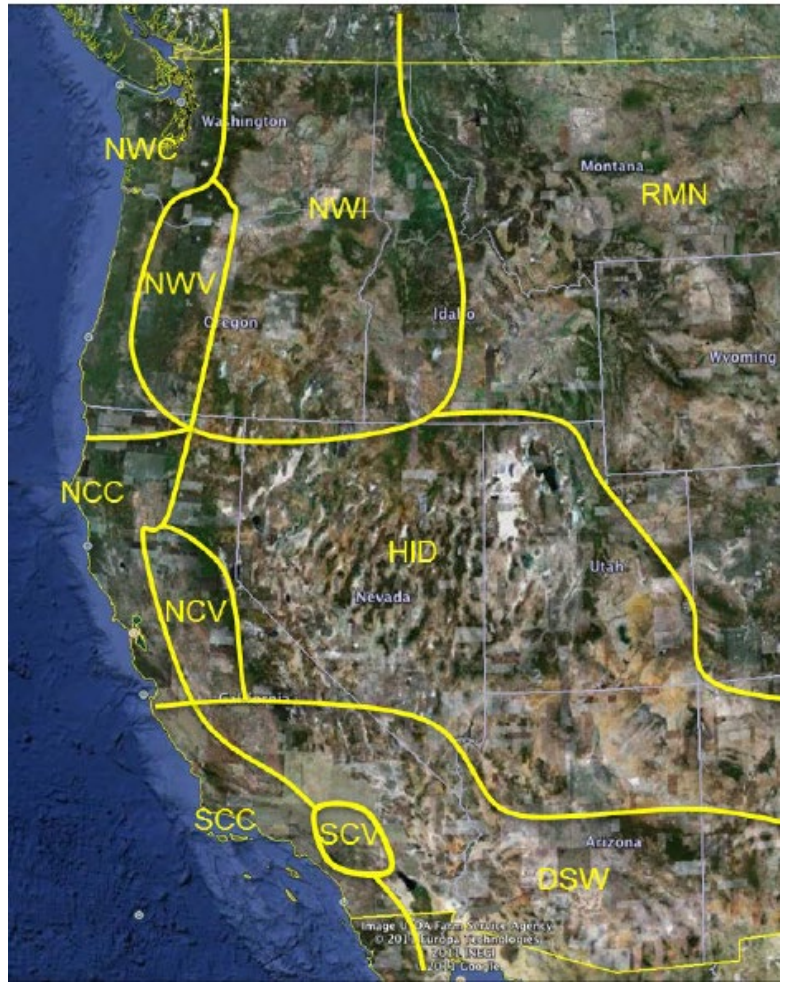
- Advancing end-use models requires modular implementation
- Electric Vehicle Models – large charging station, personal vehicles, public transport, ferries
- Variable Frequency Drive (VFD) and Electronically-Commutated Motor (ECM)
- Protection and Control Modules:
  - Revise protection and control models to allow for progressive motor tripping
- Single-phase motor models:
  - Revisit the motor stalling phenomenon, do we need to replace performance model with MOTORC
  - Scroll versus recip. compressors, running backward?
- **Timeline** Let's discuss

3. Load Composition Data

Update Load Composition Data Sets

- WECC is using Load Composition Data sets developed back in 2011
- Load Composition is changing rapidly due to energy efficiency measures (drives), electrification (EVs), heat pumps, etc

- **Let's discuss process for updating load composition data**
- **Should we go from 12 climate zones (right) to more granular airport code definition used in Eastern Interconnection and ERCOT**



4. Tools for Load Model Data Management

Update tools for Load Model Data Management

- Keep up to date Load Composition Model (LCM) to account for electrification (transportation and buildings)
- Keep Load Model Data Tool up to date with new modular structure

5. Update Protection and Control Models

Update Protection and Control Models

- Upgrades to protection and control modules will require modular CMLD implementation
- Protection and control models have been a pain point for CMLD for a while now (since the beginning)
- Concepts of progressive tripping have been discussed at many meetings

- **Let's discuss on move this forward**

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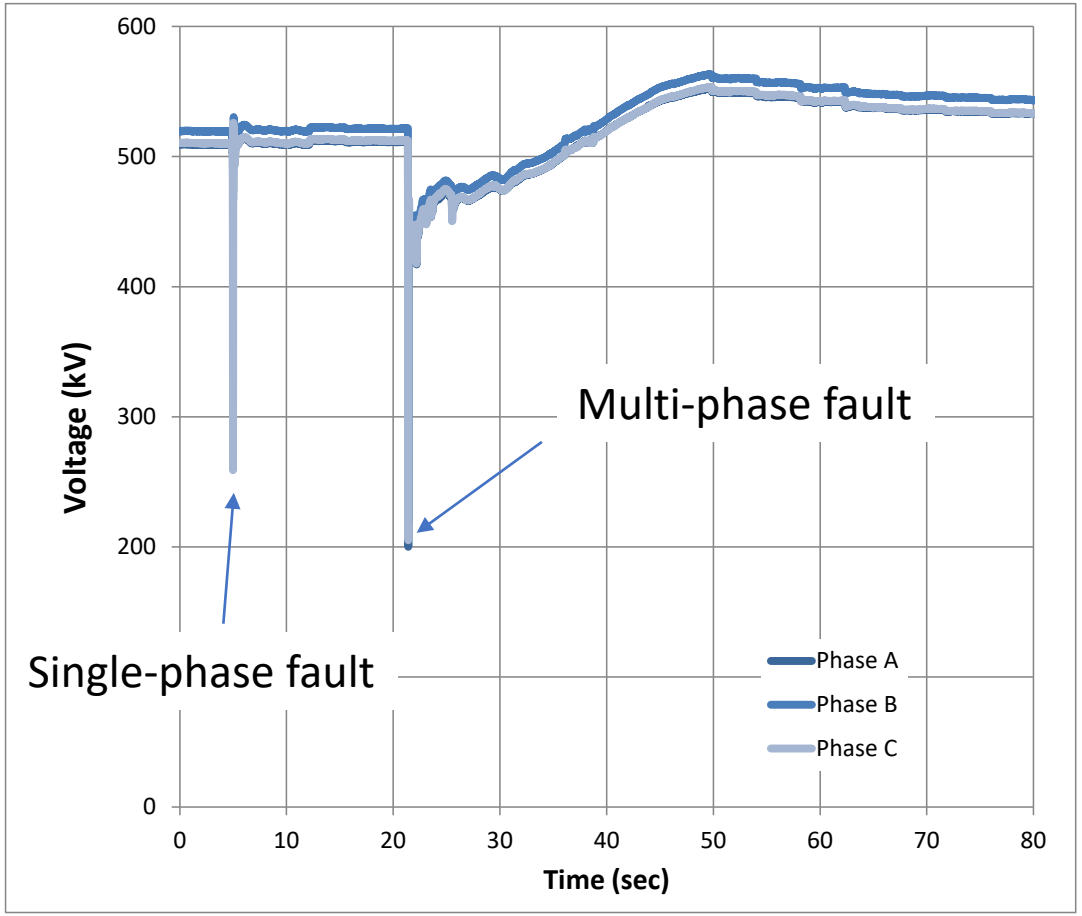
6. Validation and System Impact Studies

Implement processes for model validation and system impact studies

- Event data collection
- Model validation studies
- System impact studies

- **Let's discuss**



7. Support NERC LMWG

Coordinate and Support with NERC LMWG

- Support NERC Initiatives
- Support NERC special studies
- Coordinate on Data Center modeling
- Coordinate on Emerging Load Modeling – EVs, Heat Pumps, etc
- Coordinate on protection and control modeling

- **Let's discuss**