

# Day 2 – Material Discussions

Discussion with Everyone

# Review of Issues

- Mis-operation of relays in renewable rich areas
- Business case for developing a high SCD and a low SCD scenarios
- Equivalencing Issues for Inverter Based Resources
- Coordinating case data between Power Flow and Sequence Data

# Issue 1: Mis Operation of Relays in Renewable Rich Areas

## Fixes / Solutions:

- Better modeling of renewable generation using the current tools
- Get better models for renewable generation
- Working with software vendors if there are issues found with their models
- Coordination of cases especially if renewables are near seam buses

## Issue 2: High SCD and Low SCD scenarios

### Fixes / Solutions:

- Better modeling of renewable generation using the current tools
- Better way to coordinate cases to create scenarios
- Better way to exchange data between cases

## Issue 3: Equivalencing Issues

### Fixes / Solutions:

- Model the entire WECC; equivalences will not be an issue
- Create guidelines for modeling

## Issue 4: Coordination between Power Flow and SCD

### Fixes / Solutions:

- Coordinated effort to identify data differences
- Network topology consolidation
- Process to consolidate data deficiencies or extra data not being used in other programs
- Data consolidation tools
- Combined database with all applicable data

# Solution Theme

## Theme 1: Renewable Generation Modeling

- Better modeling of renewable generation using the current tools
- Get better models for renewable generation
- Working with software vendors if there are issues found with their models

# Theme 1: Renewable Generation Modeling

Energy for What's Ahead<sup>SM</sup>





# Inverter Based Resources Modeling Presentations

- Modeling Inverter Based Resources in Short Circuit Programs EPRI
- Inverter Based Generator Models with Controlled Power and Current
- SCE\_Inverter\_Modelling\_Research\_Memo
- Data Collection for Renewable Generation

# Modeling Inverter Based Resources in Short Circuit Programs EPRI – IEEE C24 Paper

Takeaways from Presentation:

# CAPE - Inverter Based Generator Models with Controlled Power and Current

Takeaways from Presentation:

# SCE\_Inverter\_Modelling\_Research\_Memo

## Takeaways from Memo:

- Needs to model Type 3 and Type 4 Wind Turbines
- Basic Type 3 model is available and a revised version by EPRI will be released at the end of the year
- Type 4 recommended values
- Control Mode is important to set
- After entering data then turn it on in the Global Preferences for Inverter-Based Generators
- Importance of getting as much information as possible

# Data Collection for Renewable Generation

Time frame 1 (seconds or cycles)		Fault Type:	Time frame 1 (seconds or cycles)		Fault Type:
Positive sequence voltage (pu)	Positive sequence current (pu)	Positive sequence current angle w/ respect to positive sequence voltage(deg)	Negative sequence voltage (pu)	Negative sequence current (pu)	Negative sequence current angle w/ respect to negative sequence voltage(deg)
1.0			1.0		
0.9			0.9		
0.8			0.8		
0.7			0.7		
0.6			0.6		
0.5			0.5		
0.4			0.4		
0.3			0.3		
0.2			0.2		
0.1			0.1		

Time frame: 1 cycle; 3 cycle; 5 cycle; 7 cycle; 9 cycle; 11 cycle...

Dependent on Control Mode

# Solution Theme

## Theme 2: SCD Base Case Modeling

- Better way to exchange data between cases
- Coordination of cases especially if renewables are near seam buses
- Better way to coordinate cases to create scenarios
- Create guidelines for modeling
- Coordinated effort to identify data differences
- Model the entire WECC
- Network topology consolidation
- Consolidate data deficiencies or extra data not being used in other programs
- Data consolidation tools
- Combined database with all applicable data

**NSDCF**  
Network  
Sequence Data  
Common  
Format

**SUPR** Short-Circuit  
User  
Preparation  
Resource

SRS  
direction

# Theme 2: SCD Base Case Modeling

Energy for What's Ahead<sup>SM</sup>



# Network Sequence Data Common Format (NSDCf)

## Overview:

- Aspen OneLiner and Siemens Electrocon CAPE can read/write to the format
- Based on revised new Aspen OneLiner XML format
- Adds Siemens Electrocon CAPE data used by WECC users
- Adds capability to add, delete, or modify network components
- Adds capability to import and export SCD solution parameters between software platforms
- New data table – Connections Table which enables coordination of adding or merging data between cases and software platforms



# Network Sequence Data Common Format (NSDCf)

## Latest News:

- NSDCf Requirements document has been distributed to both Aspen and Siemens Electrocon
- Feasibility Assessment from both software vendors sometime mid-November
- Price quote to implement from both software vendors sometime in beginning of December
- Entities that will pay for project is still being negotiated but so far anyone under Western Area Transmission Subcommittee (WATS) will share in the costs

# Short-Circuit User Preparation Resource (SUPR)

## Short Circuit / Sequence Data Base Cases Process Creation

- Break out Session will be scheduled to work on this
- Standardized Data so coordination will be easier
  - Bus Attributes
  - Line Attributes
  - Machine / Generation Attributes
  - Voltage Control Devices Attributes
  - Network Topology Discussion