



SOUTHERN CALIFORNIA
EDISON®

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Use of Phasor Data for Real-Time Operations

**NASPI Meeting
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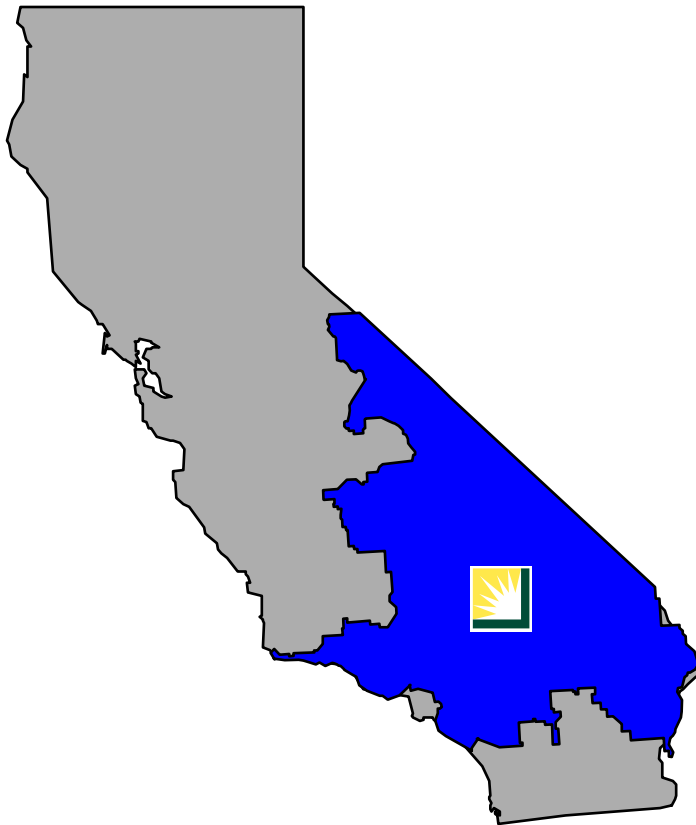
Agenda

- Disturbance Examples
- Operational Perspective
- Barriers
- SCE approach
- The Future



SOUTHERN CALIFORNIA EDISON (SCE)

One of the Largest Electrical Utilities in the U.S.



- 50,000 Square Mile Territory
- Serving 430 Cities and Communities
- 4.7+ Million Customers
- 70,000 New Customers Per Year
- 850 Substations
- 23,303 MW Average Load
- 5400 Transmission & Distribution Circuits
- 3281 Transformers:
 - 59 AA Banks
 - 188 A Banks
 - 3034 B Banks



Disturbances

- November 1998 Breaker Failure SCE Sustained Low Voltage
 - System stressed
 - Normal load
 - Market generation dispatch
 - High path flows
 - Event results in path overload
 - Sustained load voltage
 - Action necessary to prevent voltage collapse
 - Potential cascading event
- January 2008 System Oscillations
 - Loss of transformer 500 kV transformer initiating event
 - System swings lasted over an hour
 - Pacific DC ramped down and subsequently to zero to resolve problem
 - Unfortunately phasor provided data was not the diagnostic used to determine there was a problem
- What problem are we trying to solve?
 - Lets recognize we may not be able to solve all problems
 - We can't boil the ocean



One Operators Opinion

- Since 1996 we have known in WECC that planning studies do not reflect real time conditions
- What do I do with phasor information?
 - Pre-contingency?
 - Post-contingency?
 - Who has agreed to these actions?
 - Are we all looking at the same information?
 - Can we all agree what the solution is?
 - Who ultimately directs the corrective action?
 - Who is responsible for the economic consequences of these actions?

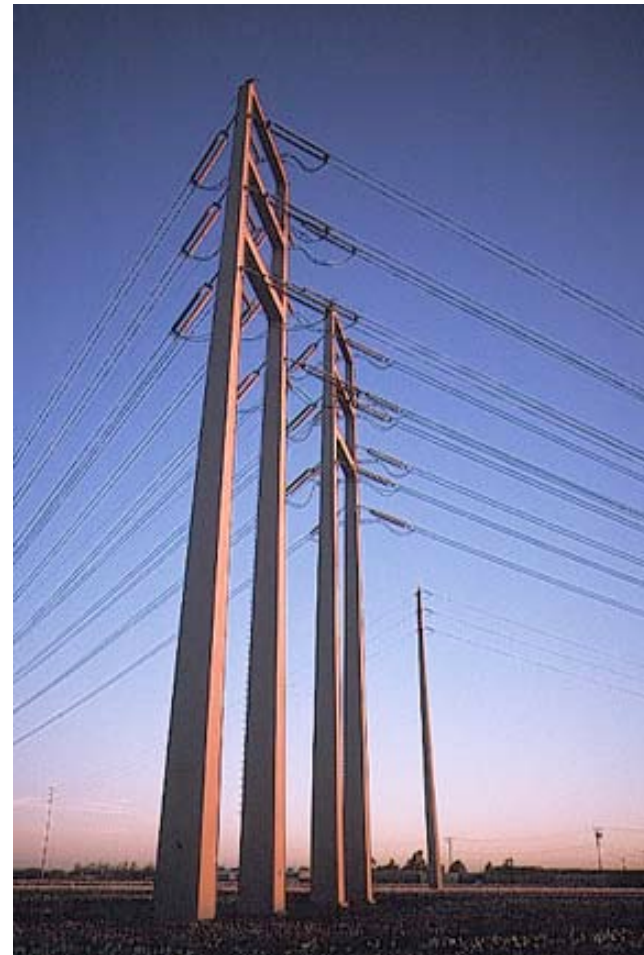


Operational Perspective

- Lets walk before we run
 - We need to know what problem we are trying to solve
 - All disturbances are not created equal
- SCADA versus PMU data
 - Integration or separation
 - How can the operators determine solutions
 - When is SCADA latency good enough
 - Intelligent alarming possibilities
- When should we take action?
- When should we wait?

Barriers

- Engineers and Operators
 - Communication
 - Who carries the torch
- Industry
 - Expectations
 - Buy in on solutions
 - Economic impact of path reductions and generation re-dispatch
- Funding
 - The time is right
 - What are the right projects to work on
- Markets
 - Consideration to market implications
 - What is the price for operating more reliably



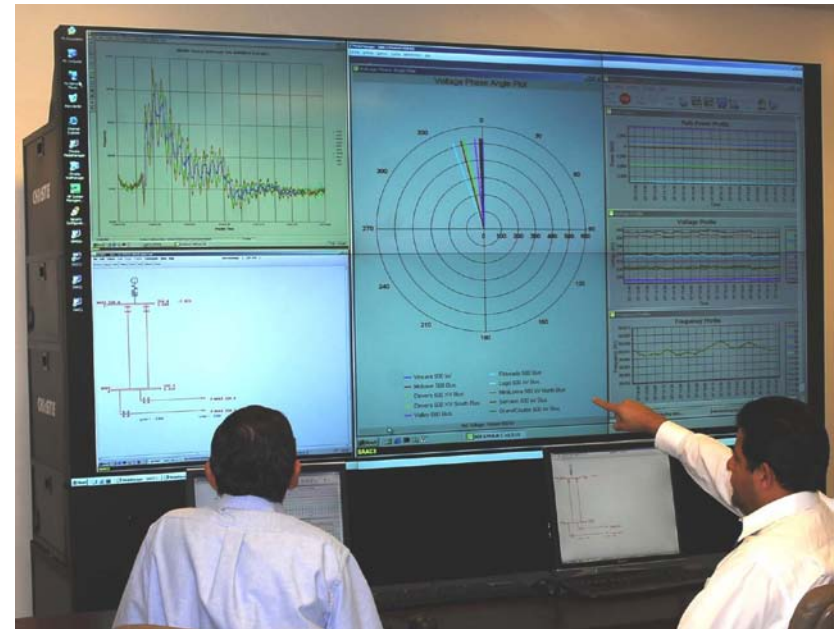
SCE Approach

- Control Center Changes
 - Introduction of applications
 - Visual presentation
 - EMS State Estimation enhanced with phasor data
- Engineering Engagement
 - Workshops
 - Training
- Collaborative Solutions
 - Situational awareness
 - New tools
 - SCE Smart Grid initiative



The Future

- Lets work together to deliver a solution
 - Improve the accuracy of existing tools
 - Provide a compelling interconnection wide case to affected entities that proactive response is warranted
 - Give engineers information they need to determine how to improve reliability
 - That will give operators what they need to maintain reliability





QUESTIONS?

THANK YOU FOR YOUR ATTENTION