The Changing Needs of the Western Interconnection

March 18, 2019

Byron Woertz
Manager of System Adequacy Planning
Not-for-Profit Organization
• Assure reliable bulk power system in the Western Interconnection

Regional Entity
• Approved by FERC
• Largest of seven

Authority delegated by NERC
• Create, monitor, and enforce reliability standards

Unique Perspective
• Both Region and Interconnection
## What We Do

<table>
<thead>
<tr>
<th>Compliance</th>
<th>Planning</th>
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| • Ensure compliance with NERC reliability standards  
• Conduct audits every 1-3 years | • Reliability Assessments 0-20 years in the future  
• Essential Reliability Services, Economics and Policy Impacts  
• Event Analysis  
• Situational Awareness  
• Performance Analysis |
From Past to Future

Tool-Based Approach
• What can we learn from PCM analyses?
• What can we learn from power flow analyses?

Risk-Based Approach
• What potential future reliability risks should we be thinking about?
• How can we study them?
How Are Things Changing?

Current events submitted by WECC staff, stakeholders and consultants
## WECC EPS Issues

National Survey of Electric Utilities Indicate Market Uncertainty as Leading Issue

### Table of EPS Current Events

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WECC Near-Term Priorities

Representation of Inverter-Based Resources
- Improve modeling representation
- Data collection for utility-scale, battery storage and DER

Impacts of the Changing Resource Mix
- Impacts on path ratings
- Modeling transmission-distribution interface
- Impacts on essential reliability services

Expansion of RC and Market Service Providers
- Potential reliability risks and mitigations
- Consider regional standards

Clarify Roles in BPS Planning
- Improve coordination by clarifying roles and responsibilities

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WECC Scenarios

Scenario 1
Open Market, Restricted Customer Choice

Scenario 2
Open Market, High Customer Choice

Scenario 3
High Mandates, Restricted Customer Choice

Scenario 4
High Mandates, High Customer Choice
Changes to System Inertia with High Renewable Implementation

• How would major changes to system inertia affect Essential Reliability Services such as frequency response?
  • Retirement of 90 to 100% of the coal fleet
  • Increase in renewable penetration

Significant Electrification

• What reliability risks could be created by large-scale electrification?
  ⚡ High market penetration of passenger and commercial electric vehicles
  ⚡ Significant effort to electrify non-electrical energy uses
  ⚡ Increasing penetration of electronically interfaced end-use loads?

System Resilience Under Extreme Natural Disaster

• What are the reliability impacts, regionally and systemwide, of a major natural disaster such as a wildfire or earthquake?
El Paso Natural Gas Pipeline Disruption
• Would an interruption in gas supply from the El Paso Pipeline, as described in WECC’s Gas-Electric Interface Study, create stability risks in Southern California or Arizona?

Water Availability Issues
• How will limitations on water availability in the next 10-20 years impact reliability?

Reliability Impacts of Most Likely Year 10 Future
• In the Year 10 “Base Case” (2028), are there any reliability risks associated with path flows, resource adequacy, system stability or other parameters?
WECC 2019 Assessments Schedule

Jan 28 – Apr 12
• Finalize Assessment Scopes

Apr 14 – Jun 14
• Identify and Collect Needed Data

Jun 16 – Aug 31
• Complete Assessments

Sep 1 – Sep 30
• Review Assessment Results

Oct 1 – Dec 31
• Report on Assessment Results

Apr 1 – May 31
• Determine Modeling Tools
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(801) 883-6841