Chapter 13: Energy Systems

Presenter:

Erich W. Gunther
EnerNex, Chairman and CTO
NIST Disaster Resilience Fellow
Northridge Earthquake Comparison

- Northridge was a 6.7 magnitude earthquake ($20B in losses)
- Shakeout is an estimate for a Los Angeles area 7.8 quake

<table>
<thead>
<tr>
<th>LA Power System</th>
<th>Northridge</th>
<th>Shakeout</th>
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<tbody>
<tr>
<td>Number of Lines Damaged</td>
<td>26 (25% of System)</td>
<td>~13 (13% of System)</td>
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<tr>
<td>Restore Power to Normal</td>
<td>14 days</td>
<td>~28+ days</td>
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93% of Customers were Restored in 24 Hrs

Source: Potential Impacts to Water and Electric Services from a M7.8 Southern San Andreas Earthquake. H. David Nahai, CEO and GM, LADWP

Key Lesson Learned
Longest electric outages to date have been 4 weeks
Preparation Prioritization Issues

• **Electric Energy**
  – *Clustered, below grade transformers*
  – *Single pole substation high and low voltage feeds*
  – *Fuses, not breakers in many locations*
  – *Underground ducts run close together and crossing in many shallow manholes*
  – *Lack of automation*

• **Non-electric Energy**
  – *Liquid and gaseous fuels infrastructure*

• **Communications** – *identify dependencies*
Key Recovery Issues

• Generation
  – Bulk – may not be highest priority
  – Distributed - activate

• Transmission – assess work-arounds (sub-trans)

• Distribution
  – Make it safe
  – Make it accessible
  – Identify essential services and prioritize restoration
  – Activate mutual aid as/if required

• Determine if temporary services required
  – Traffic light power, gas stations, grocery
Recovery Levels

• **Emergency Facilities and Services Restoration**
• **Critical Rights of Way and Infrastructure Restoration**
• **Socio-Economic Continuity Restoration**
Community Energy Assurance Planning

1. Form a Team
   - Designate EAP Coordinator
   - Identify EAP Working Group
   - Create EAP Vision and Mission

2. Develop your Energy Assurance Plan (EAP)
   2a. Understand your Situation
       - Present Community Overview
       - Build Energy Profile
       - Understand All-Hazards Profile
       - Know Your Emergency Framework
       - Identify Key Assets
   2b. Identify Gaps
       - Assess Threats and Hazards
       - Determine Vulnerabilities
       - Validate your Situation (2a)

3. EAP Review and Approval
   - Finalize your EAP
   - EAP Approval
   - Adopt and Disseminate your EAP

4. EAP Implementation and Maintenance
   - Train Staff
   - Exercise your EAP
   - Review/Update your EAP

Incorporate into, and leverage from your existing Plans

EAP UPDATES