RELIABILITY AT LINCOLN ELECTRIC SYSTEM

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- LES serves the needs of the community
- Investments in facilities done for long term benefits
- No Investors to pay
Reliability – How to Define

- Keep lights on
- Resiliency – ability to restore service
- Efficiency – prompt response
- Dependable – there when we need it
Measure Reliability

- How much are you out? (How much are you on?)
- How long to get you back on?
- How many outages do you see?
- How many “blinks” do you see?
## Industry Indices

<table>
<thead>
<tr>
<th>Index</th>
<th>2014 Performance</th>
<th>5 year Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAIDI</td>
<td>27 Min</td>
<td>40 Min</td>
</tr>
<tr>
<td>System Average Interruption Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASAI</td>
<td>99.9949%</td>
<td>99.9924%</td>
</tr>
<tr>
<td>Average System Availability Index</td>
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<td></td>
</tr>
<tr>
<td>CAIDI</td>
<td>69 Min</td>
<td>94 Min</td>
</tr>
<tr>
<td>Customer Average Interruption Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAIFI</td>
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<td>0.41</td>
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<tr>
<td>System Average Interruption Frequency Index</td>
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<td></td>
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<tr>
<td>MAIFI</td>
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<td>0.76</td>
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<tr>
<td>Momentary Average Interruption Frequency Index</td>
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</tbody>
</table>

Striving to be the world’s best energy company.
International Reliability Statistics

Customer outage minutes per year

Source: The Brattle Group, Galvin Power Institute, Council of European Energy Regulators, China Southern Power Grid
**LES Efforts**

**Maintenance**

- Vegetation Management,
- Infrared (IR) Inspection,
- Pole Inspection,
- Duct Installation Project (DIP),
- Cable Replacement Project (CRP),
- Substations –
  - Dissolved Gas Analysis (DGA)
  - Equipment Testing,
  - Regular inspections
LES Efforts

Planning

• Asset Management
  • Transformers
  • Cable

• Additions
  • Substations
  • Transmission
  • Feeders
  • City Growth

• Contingency Planning
  • Feeders
  • Transmission,
  • Substation Equipment
LES Efforts

Operational

- Backup Control Center
- Material placement,
- Material contracts,
- Power System Restoration Drills
- RP3 Award from APPA
Outage Response

- Responder (OMS)
- IVR System (PowerLine)
  - Customer registration
  - 888-365-2412
- Crew Response
- System Configuration
- Mutual Aid planning – APPA Mutual Aid Group
Customer Considerations

LES Communications

• LES Account Representatives
• News media, fb, Twitter
• LES.COM – Outage Map

Customer Preparation

• 3 Phase Protection
• Phone Numbers
  • Account Representative
  • On-Call number
• Generator Protection
• Event Observations
Industry Trends Impacting Reliability

Smart Grid

- Distribution Automation /
  - Distribution Management Systems
- AMI (Advanced Metering Infrastructure)
- Distributed Energy Resources /
  - Distributed Generation / Storage
- Sensors
  - Voltage
  - Power Quality
  - Loading
Questions?