POWER SYSTEM RESILIENCY UPDATE

STAKEHOLDER ADVISORY GROUP – 1/22/2020
• Generation – Thermal, Hydro, and Renewables
• 2 Large Solar Photovoltaic Plants and 1 Wind Plant
• Renewable Energy Targets: 55% by 2025, 80% by 2036, and 100% by 2045
• 124 mi – UG Transmission
• 3,636 mi - OH Transmission
• 7,148 miles OH Distribution
• 3,709 mi of UG Distribution
• 177 Substations
Green Meadows Overview
# Green Meadows Technology Scope

<table>
<thead>
<tr>
<th>DER/Technology Deployed</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooftop Solar (UBS)</td>
<td>30kW</td>
</tr>
<tr>
<td>Rooftop Solar (NEM)</td>
<td>50kW</td>
</tr>
<tr>
<td>Carport Solar</td>
<td>220kW</td>
</tr>
<tr>
<td>Energy Storage</td>
<td>250kW/1200kWh</td>
</tr>
<tr>
<td>L2 EV Chargers</td>
<td>2</td>
</tr>
<tr>
<td>DC Fast Chargers</td>
<td>3</td>
</tr>
</tbody>
</table>
## Future Resiliency Related Projects

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Location</th>
<th>Solar Capacity</th>
<th>Storage Capacity</th>
<th>Commercial Operation</th>
<th>Cal EnviroScreen*</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBD</td>
<td>Pacoima (area)</td>
<td>100 - 400 kW (rooftop/carport)</td>
<td>150 kW – 1000 kWh</td>
<td>Dec - 2021</td>
<td>95-100%</td>
</tr>
<tr>
<td>TBD</td>
<td>Boyle Heights (area)</td>
<td>100 - 400 kW (rooftop/carport)</td>
<td>150 kW – 1000 kWh</td>
<td>Dec - 2022</td>
<td>95-100%</td>
</tr>
<tr>
<td>TBD</td>
<td>Wilmington (area)</td>
<td>100 - 400 kW (rooftop/carport)</td>
<td>150 kW – 1000 kWh</td>
<td>Dec - 2023</td>
<td>95-100%</td>
</tr>
<tr>
<td>Water Materials Test Lab</td>
<td>Downtown</td>
<td>175 kW (rooftop/carport)</td>
<td>120 kWh</td>
<td>Dec 2023</td>
<td>90-95%</td>
</tr>
<tr>
<td>Water Headworks Flow Station</td>
<td>Toluca Lake</td>
<td>19 kW (rooftop)</td>
<td>120 kWh</td>
<td>Dec 2023</td>
<td>60-65%</td>
</tr>
</tbody>
</table>
Substation Grid Hardening

<table>
<thead>
<tr>
<th>FY 18-19 Replacement Targets</th>
<th>FY 18-19 Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Receiving Station (RS) and 1 Switching Station (SS) transformer</td>
<td>2 RS and 2 SS transformers</td>
</tr>
<tr>
<td>18 Distributing Station (DS) transformers</td>
<td>34 DS transformers</td>
</tr>
<tr>
<td>28 Circuit Breakers (4.8-kV and 34.5-kV)</td>
<td>27 Circuit Breakers replaced</td>
</tr>
<tr>
<td></td>
<td>Completed 212 Circuit Breaker life extension jobs</td>
</tr>
</tbody>
</table>

In Addition:
- Completed 22 feeder jobs
- Completed seven DS transformer bank life extensions
- Piloted Indoor Circuit Breakers at DS-5 to replace 67 year old technology
Distribution Grid Hardening

Distribution Assets:
- Poles
- Crossarms
- Underground Cables
- Transformers
LADWP’s Wildfire Mitigation Plan

• Wildfire Mitigation Plan consistent with state law (SB 901)
• Higher level of collaboration
  – LAFD and other local fire agencies
  – Water and Power Systems
  – Mutual Assistance (Western Region Mutual Assistance and California Utilities Emergency Association)
• Ensure public safety by minimizing sources of ignition
  – Focus on safety, prevention, mitigation, response, and recovery
  – Diminish the contribution of transmission/distribution systems
• Intentional focus to minimize wildfire risks
  – Improving processes, leveraging partnerships, hardening the power system, and exploring innovative technologies
Resiliency Strategies

Upgraded Poles

Alternative Pole Materials
- Wood Pole
- Steel Pole

Increased Wind Loading
- Wind 56 MPH
- Wind 80 MPH

High Fire Risk Areas

Standard Poles

Increased Wind Loading
- Wind 56 MPH
- Wind 80 MPH


### Resiliency Strategies

#### Upgraded Conductors

<table>
<thead>
<tr>
<th>Covered Conductors</th>
<th>Increased Conductor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare Conductor</td>
<td>Standard</td>
</tr>
<tr>
<td>Covered Conductor</td>
<td>High Fire Risk Areas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Increased Conductor Spacing</th>
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<tbody>
<tr>
<td>State Minimum</td>
</tr>
<tr>
<td>LADWP Standard</td>
</tr>
<tr>
<td>LADWP High Fire Risk Areas</td>
</tr>
</tbody>
</table>

- **Covered Conductors**
  - Bare Conductor
  - Covered Conductor

- **Increased Conductor Size**
  - 0.184”
  - 0.398”

- **Increased Conductor Spacing**
  - 20.5” min
  - 11.5” min
  - 39” min

- **State Minimum**
  - 20.5” min
  - 11.5” min
  - 39” min

- **LADWP Standard**
  - 20.5” min
  - 11.5” min
  - 39” min

- **LADWP High Fire Risk Areas**
  - 20.5” min
  - 11.5” min
  - 39” min
Questions