The Statewide Once-Through-Cooling (OTC) Policy

Statewide Advisory Committee on Cooling Water Intake Structures (SACWIS)

Annual Meeting
May 4, 2017

LADWP Update
Grid Reliability Study 2016
Los Angeles Basin Generation
- Every in-basin unit is needed to meet the minimum Reliability Must-Run requirement.
- Basin generation is critical in order to meet customer demand particularly in the summer.
- Scattergood Units 1&2 are next units in our repowering schedule.
- Some basin units are dual fuel capable in the event of an emergency.

Transmission Reinforcements
- Install 230kV Scattergood-Olympic Cable A.
- Add reactive support in-basin and external to basin.
- Upgrade equipment: wires, transformers, circuit breakers, etc.

Resources
- Reserve margin requirement is increasing due to more Variable Energy Resources (VERs)
- RPS targets of 33% by 2020 and 50% by 2025, 55% by 2030, and 65% by 2036.

Every WECC audit since 2008 has determined that the LADWP Power System is reliable.
2016 Transmission Assessment

- conforms to new TPL-001-4 by adding near-term short circuit analysis to the near and long term steady state flow studies in addition to the transient and post-transient voltage stability required in previous studies. Findings show LADWP’s Power System will perform reliably over the next ten years.

2016 Transmission Assessment

- Identified minimum Reliability Must Run (RMR) generators is unchanged,

2016 Long-Term Transmission Assessment

- Key segments of LADWP’s transmission system must be reinforced, to the extent possible, in order to ensure continued reliable operations.

- Transmission upgrades are in addition to maintaining current RMR generation requirements.
Findings in 2016 Grid Reliability Report mirror those reported in previous reports and continue to underscore that LADWP’s OTC compliance schedule, shown on the next slide, is the most aggressive that is also feasible.
### LADWP Update

#### 2016 Grid Reliability Report Summary

**LADWP 2016 IRP**

**Recommended Case:** IPP 2025, 65% RPS by 2036, 15% EE by 2020, 1500 MW Local Solar by 2035, 404 MW Energy Storage by 2025, High Electrification

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<td><strong>Development</strong></td>
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<td><strong>Operation &amp; Maintenance</strong></td>
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#### Grid Reliability Study 2015

- The Statewide Once-Through-Cooling (OTC) Policy

#### LADWP Update 2016

- 2016 Grid Reliability Report Summary

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**Dependable Capacity in August (MW)**

- Existing Renewable
- IPP Coal
- Out of Basin Thermal
- In Basin Thermal
- Palo Verde
- Larga Hydro
- Capacity Shortfall
- Energy Efficiency
- Demand Response
- New Renewables
LADWP Update
2016 Grid Reliability Report Summary

- RPS %: 29%, 31%, 34%, 38%, 39%, 42%, 43%, 44%, 48%, 51%, 51%, 51%, 52%, 54%, 55%, 56%, 57%, 58%, 60%, 62%, 65%
  - Codes and Standards account for an additional 567 GWh
- CO2 Emission (Million Metric Tons): 11.0, 9.7, 9.0, 8.5, 8.3, 8.2, 7.9, 7.6, 6.6, 5.8, 6.0, 6.0, 5.8, 5.7, 5.6, 5.6, 5.5
  - 1990 Emission Level (17.5 MMT)
- OTC Water Reduction Intake (Million Gallons/Day): 838, 615, 339, 231
  - Reductions between 1990 (1900 MGD) to 2016 = 838 MGD = 56% Reduction
- Cumulative Number of Electric Vehicles in Los Angeles (Thousands): 111, 132, 173, 212, 253, 293, 334, 378, 413, 444, 476, 504, 531, 554, 580, 604, 629, 653, 673, 715, 731
  - 2016 to 2036
Power System Workforce Integrated Human Resource Plan (IHRP)

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<td>Positions Authorized</td>
<td>4,263</td>
<td>4,260</td>
<td>4,200</td>
<td>3,700</td>
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<td>Potential Gap due to Retirements</td>
<td>394</td>
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<tr>
<td>Potential Workforce Size if Forecasted Retirements Occurred</td>
<td>3,869</td>
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Generation Resource Percentages for 2030

- Hydro: 6%
- Nuclear: 11%
- Natural Gas: 28%
- Renewable: 55%

Power System Revenue ($ Billion)

Total Rate Payer Costs (Cents/kWh)

Model Run Date: 12/21/2016
LADWP Update

2016 Grid Reliability Report Summary

OTC Reduction 1990 - 2029

- Harbor Unit 5 Repower
- Haynes Units 3&4 Repower
- Haynes Units 5&6 Repower
- Scattergood Unit 3 Repower
- Scattergood Units 1&2 Repower
- Haynes Units 1&2 Repower
- Harbor Unit 5 Repower
- Haynes Unit 8 Repower

Year

OTC Flow, MGD


0 200 400 600 800 1000 1200 1400 1600 1800 2000

Los Angeles Department of Water & Power
<table>
<thead>
<tr>
<th>Station</th>
<th>Unit/ (Vintage)</th>
<th>Max. Flow (MGD)</th>
<th>Compliance Date (Complete conversion to Closed-Cycle Cooling)</th>
<th>Status</th>
<th>Cumulative % Flow Reduction</th>
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<tr>
<td>Haynes</td>
<td>5 (1966)</td>
<td>230.4</td>
<td>2013</td>
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<td>6 (1967)</td>
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<td>Scattergood</td>
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<td>270.7</td>
<td>2015</td>
<td>Complete</td>
<td>56</td>
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<td>Scattergood</td>
<td>1 (1958)</td>
<td>112.3</td>
<td>2024</td>
<td>In Progress</td>
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<td>2 (1959)</td>
<td>112.3</td>
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<td>Haynes</td>
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<td>Pending completion SGS 1&amp;2</td>
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<td>2 (1963)</td>
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<td>Harbor</td>
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<td>Haynes</td>
<td>8 (2005)</td>
<td>230</td>
<td>2029</td>
<td>Pending completion HGS 5</td>
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Units 1&2 Repower Project Status:

- Environmental impact analysis is currently underway.
- Developing technical specifications for contracts.
- Performing air modeling for prospective equipment manufacturers.
- Decoupling decommissioned equipment for demolition is complete.
Units 1&2 Repowering Project Status:

- Demolition of existing Unit 3 equipment is currently underway with expected completion of 2/2018.
- Units 1 & 2 scheduled for decommissioning and shutdown of Once-Through Cooling system by December 31, 2024.
Scattergood Unit 3 Repowering Project Footprint

- Unit 7
- Unit 6
- Unit 5
- Unit 4
- Unit 2
- Unit 1
- Unit 3

LADWP Update
2016 Grid Reliability Report Summary
Scattergood Repower Project
Scattergood Units 1&2 Repowering Footprint

LADWP Update
2016 Grid Reliability Report Summary
Scattergood Repower Project
Thank you!