## DOCKETED

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<th>Docket Number:</th>
<th>16-OIR-04</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Integrated Resource Plans (Publicly Owned Utilities)</td>
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<td><strong>TN #:</strong></td>
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<tr>
<td><strong>Document Title:</strong></td>
<td>Presentation - Los Angeles Department Water &amp; Power - 2015 Power Integrated Resource Plan</td>
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<tr>
<td><strong>Description:</strong></td>
<td>LADWP's SB 350-Required Integrated Resource Plan Workshop of April 18, 2016.</td>
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<td><strong>Filer:</strong></td>
<td>Patty Paul</td>
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<td><strong>Organization:</strong></td>
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<td>General Rulemaking Proceeding for Developing Regulations, Guidelines and Policies for Implementing SB 350 and AB 802</td>
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LADWP’s Resource Stack (2015)

- 1,956 MW Hydro
- 3,978 MW Nat Gas
- 387 MW Nuclear
- 54 MW Biogas
- 1,679 MW Coal
- 996 MW Wind
- 375 MW Solar
- 69 MW Geothermal
IRP Key Strategic Initiatives

- Eliminate Coal from LADWP’s Power Supply
- Reach 33% RPS by 2020 and 50% by 2030
- Achieve 15% Energy Efficiency by 2020
- Once-through Cooling Repowering
- Invest in Power System Reliability Program
- Support Electric Vehicle Expansion
GHG Reduction Strategy

1. Energy Efficiency
   - Navajo: 477 MW
   - IPP: 875-1200 MW

2. Renewable Energy Sources
   - Solar
   - Wind
   - Geothermal
   - Combined Cycle Natural Gas

3. Electrification of the Transportation Sector
Over the next 15 years, LADWP will replace over 70% of its generation infrastructure used to reliably deliver power to its customers.
IRP Public Outreach Process

- IRP Updated Annually
- Public Outreach every 2 years
  - Extensive Stakeholder Outreach
  - IRP Advisory Committee
  - IRP Public Workshops
    with Website and Online Forums
  - Address concerns and goals
  - Incorporate feedback

www.ladwp.com/powerIRP
LADWP’s IRP Development Process

- Gather Stakeholder Input
- Establish Clear Goals and Objectives
- Review Key Assumptions and Load Forecast
- Establish Strategic Case Alternatives
  - Conduct Computer Modeling of Cases
  - Evaluate Resource Adequacy and Reliability
  - Present Preliminary Findings
  - Public Outreach
  - Recommend and Approve a Preferred Case
  - Publish IRP
- IRP Advisory
- IRP Analysis
- Public Outreach
Dependable Capacity

Case #2 Navajo 2015, IPP 2025, 50% RPS, Adv EE, 800 MW Local Solar, High EV
### 2015 IRP Recommended Case

<table>
<thead>
<tr>
<th>Program/Initiative</th>
<th>Case</th>
<th>Year</th>
<th>Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Replacement</td>
<td>Navajo early divestiture</td>
<td>2016</td>
<td>SB1368, AB32, public feedback, core objective (environment)</td>
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<tr>
<td></td>
<td>IPP early replacement</td>
<td>2025</td>
<td></td>
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<tr>
<td>Energy Efficiency</td>
<td>15 percent less electricity usage than FY 2010;</td>
<td>2020</td>
<td>AB2021, AB32, SB350, Mayor's pLAn, public feedback</td>
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<tr>
<td></td>
<td>&quot;advanced&quot;</td>
<td></td>
<td></td>
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<td>RPS</td>
<td>25 percent of retail electricity sales</td>
<td>2016</td>
<td>SB2, AB32, SB350, Mayor's pLAn, public feedback, core objective (environment)</td>
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<tr>
<td></td>
<td>33 percent of retail electricity sales</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 percent of retail electricity sales</td>
<td>2024</td>
<td></td>
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<td></td>
<td>50 percent of retail electricity sales</td>
<td>2030</td>
<td></td>
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<tr>
<td>Local Solar</td>
<td>800 MW</td>
<td>2023</td>
<td>SB1, SB1332, Mayor's pLAn, public feedback</td>
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<tr>
<td>Transportation Electrification</td>
<td>2,344 GWh for 580,000 electric vehicles; &quot;high&quot;</td>
<td>2030</td>
<td>SB350, Mayor's pLAn, public feedback</td>
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<tr>
<td>Demand Response</td>
<td>200 to 500 MW</td>
<td>2026</td>
<td>SB1037, CEC</td>
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<tr>
<td>Energy Storage</td>
<td>Evaluate 154 MW for technical and economic viability</td>
<td>2021</td>
<td>AB2514, Mayor's pLAn, public feedback</td>
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</table>
Achieving 50% RPS by 2030

33% by 2020
7,800 GWh

50% by 2030
14,000 GWh\(^1\)

\(^1\) Assumes 2,344 GWh of Electrification is Achieved
Energy Efficiency Programs

**Commercial, Industrial, and Institutional**
- Energy Efficiency Technical Assistance Program (EETAP)
- Commercial Lighting Incentive Program (CLIP)
- Custom Performance Program (CPP)
- Custom Express Program
- Retrocommissioning (RCx) Program
- Savings By Design (SBD)
- New Construction Incentive Program
- Food Service Program
- Commercial Direct Install (CDI) Program
- Commercial Heating, Ventilation, Air Conditioning (HVAC) Program

**Mass Market Programs (Residential)**
- *Home Energy Improvement Program (HEIP)*
- *Refrigerator Exchange Program (REP)*
- Appliance Recycling Program (ARP)*
- Consumer Rebate Program (CRP)*
- Solar Incentive Program (SIP)*
- Charge Up LA! – Home, Work and On the Go*
- Energy Upgrade California (EUCA)*
- Green Power for a Green LA Program (Green Power Program)*
- City Plants (CP)*
- California Advanced Homes (CAHP)
- LAUSD Direct Install Program (LDIP)
- Behavior-Based Energy Efficiency Program*
- Residential Lighting Efficiency Program*
- Air Conditioning Tune-Up Program*

*Available to disadvantaged communities
Red text denotes programs targeted towards disadvantaged communities
Electric Vehicle (EV) Goals

- **Cumulative Number of EVs in Los Angeles**
- **Base Case Transportation Electrification (IEPR)**
- **High Case Transportation Electrification (Double IEPR Forecast)**

- **145,000 EVs by 2020**
- **580,000 EVs by 2030** = 2,344 GWh
GHG Emission Goals

Electrification of the transportation sector will significantly reduce overall GHG emissions.

Early IPP Replacement results in 5.32 MMT GHG reduction.

60% GHG Reduction below 1990 levels.

80% below 1990 Emissions Level (3.6 MMT)
POWER SYSTEM RELIABILITY

Generation
- Transformers
- Major Inspections

Transmission
- 138kV UG Cables
- 138kV Stop Joints
- Maintenance Holes
- Restraints

Substations
- Transformers
- Circuit Breakers
- Battery Banks

Distribution
- Poles
- Crossarms
- Lead and Synthetic Cables
- Transformers
- Substructures
LADWP must replace 9 generating units at 3 Coastal Power Plants. No unit can be taken off-line until its replacement is ready.
Fuel Carbon Intensity

Gasoline is 4 times more polluting than LADWP’s future resource mix

Savings from Fuel Switching

Case Comparisons of GHG Emissions

1990 Emission Level (17.9 MMTons)

CARB Emissions Allocation to LADWP (2015 - 2020)

Total CO₂ Emissions (Million Metric Tons)

80% below 1990 Emissions Level (3.6 MMT)

- Red: Case #3 - 33% RPS, 800 MW Local Solar, Base EV
- Green: Case #4 - 50% RPS, 800 MW Local Solar, Base EV
- Blue: Case #5 - 50% RPS, 800 MW Local Solar, Med EV
- Orange: Case #6 - 50% RPS, 800 MW Local Solar, High EV
- Purple: Case #7 - 50% RPS, 1000 MW Local Solar, Med EV
- Dotted: Case #3 after CO2 savings
- Dotted Green: Case #4 after CO2 savings
- Dotted Blue: Case #5 after CO2 savings
- Dotted Orange: Case #6 after CO2 savings
- Dotted Purple: Case #7 after CO2 savings

- Black: No RPS No EE
LADWP 2016 IRP Timeline

Kick-Off Meeting

AC Mtg. 1 May 2016
Develop Updated Assumptions

AC Mtg. 2 Jun 2016
Define Model Runs

AC Mtg. 3 Aug 2016
Preliminary Results

Public Outreach Sep 2016
Close Public Comment Period

Final model runs, issue Draft IRP for internal review

Prepare final document, rate impact, internal review

Update IRP Narrative

Issue Final IRP