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LADWP Transmission and Preferred Resources

May 8, 2018

Ten Year Transmission Plan Assessment

Purpose

- Ensure present and future reliability of LADWP's System
- Meet customer demand and needs
- Promote efficient utilization of LADWP's System
- Facilitate timely and coordinated transmission development

Key Drivers

- Public policy initiatives (RPS Goals)
- Load growth rate
- Wholesale and generator interconnection requests
- Regulatory and environmental considerations

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LADWP Transmission System Overview

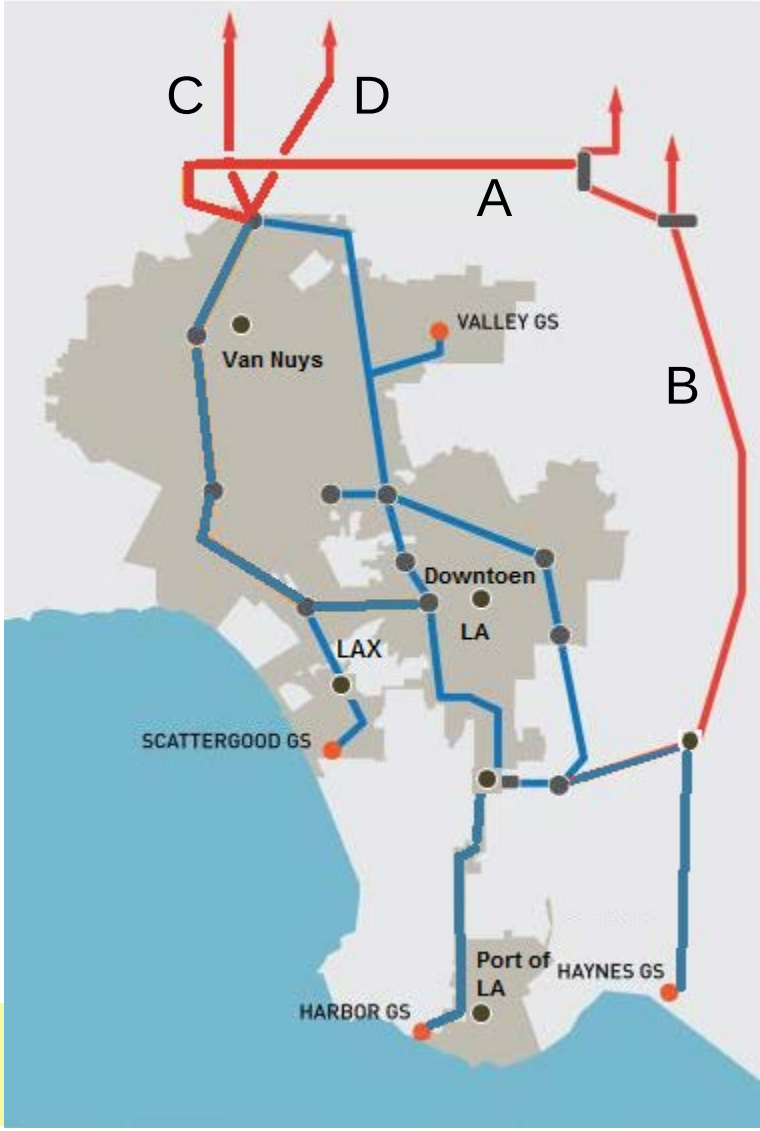
Major Transmission Arteries (Out-of-Basin)

- Vic-LA Path: Collectively Segments A & B
- Pacific DC Intertie: Segment C
- Owens Valley System: Segment D

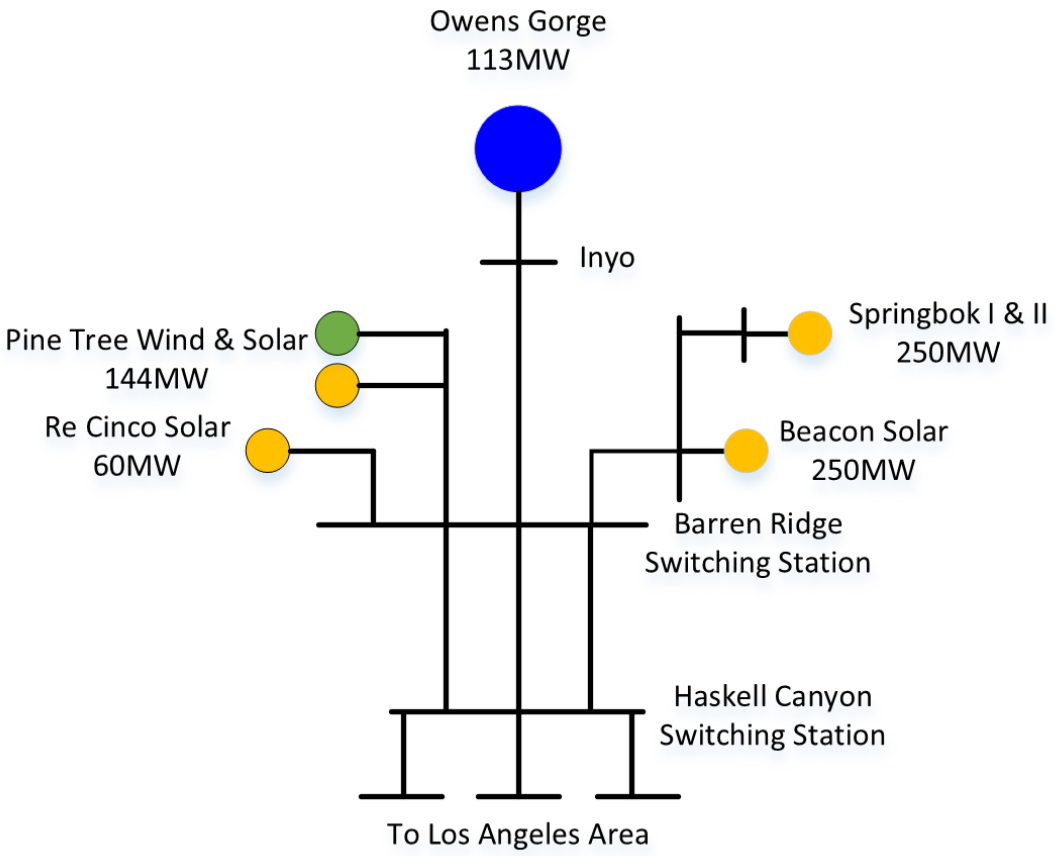
Local Transmission System (In-Basin)

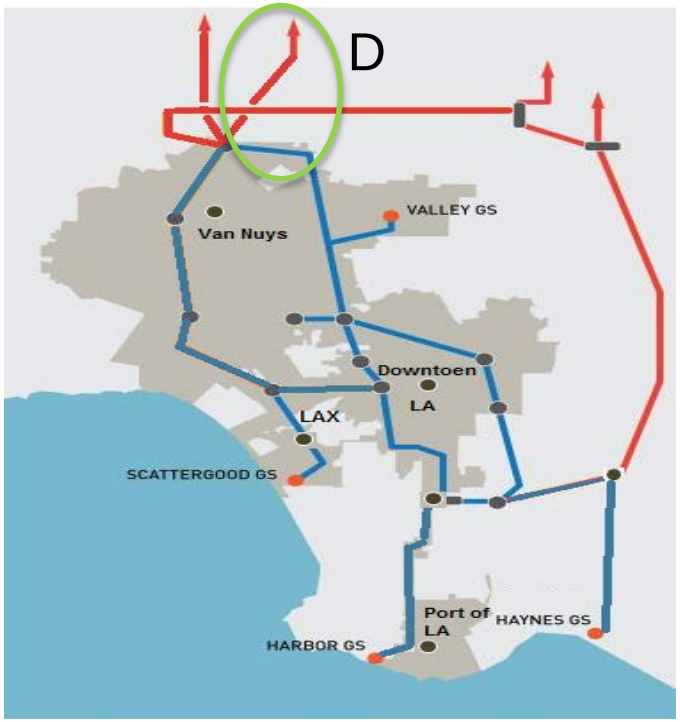
- Local Transmission: Blue Lines
- Generating Stations Supporting Local Transmission:
  - Scattergood Generating Station
  - Haynes Generation Station
  - Harbor Generating Station
  - Valley Generating Station

Scattergood, Haynes, and Harbor Generating Stations Are All Once-Through Cooling (OTC) Thermal Plants.



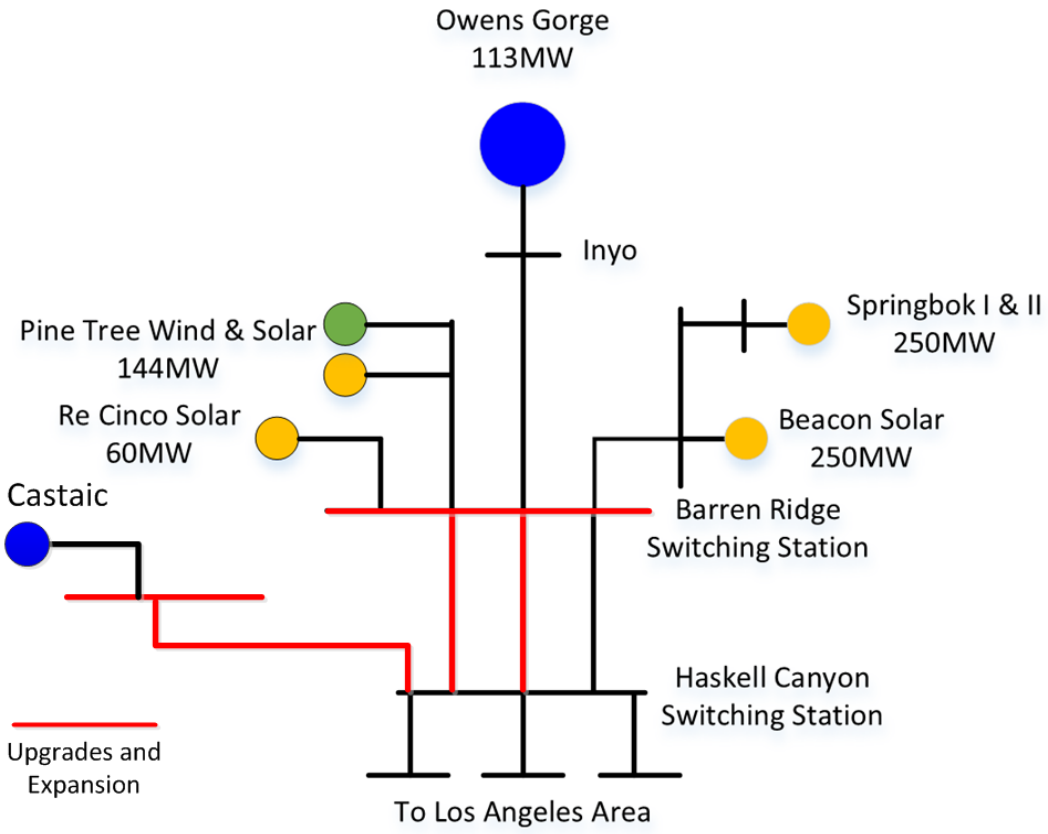
Completed Transmission Projects

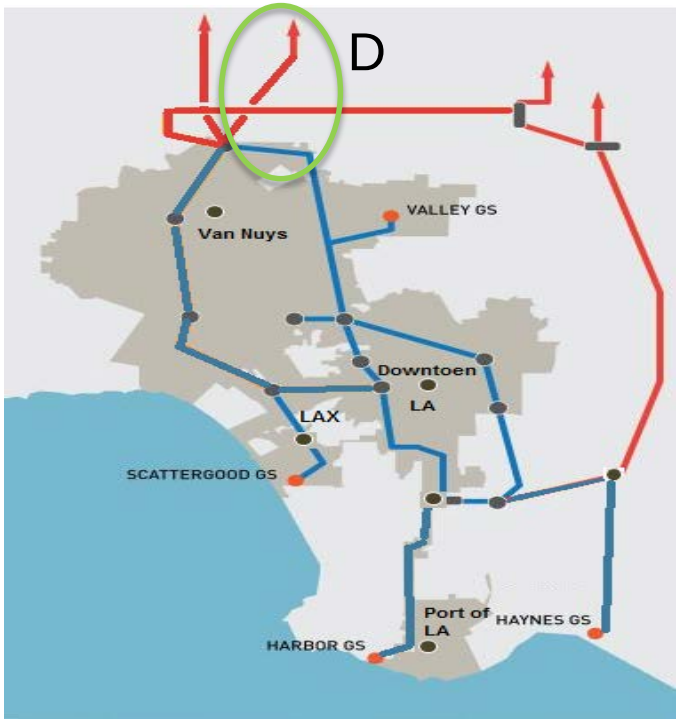




Barren Ridge Transmission Project Completed in 2016 to Deliver over 1,000 MW of Renewable Energy to Los Angeles.

Near-Term Transmission Upgrades



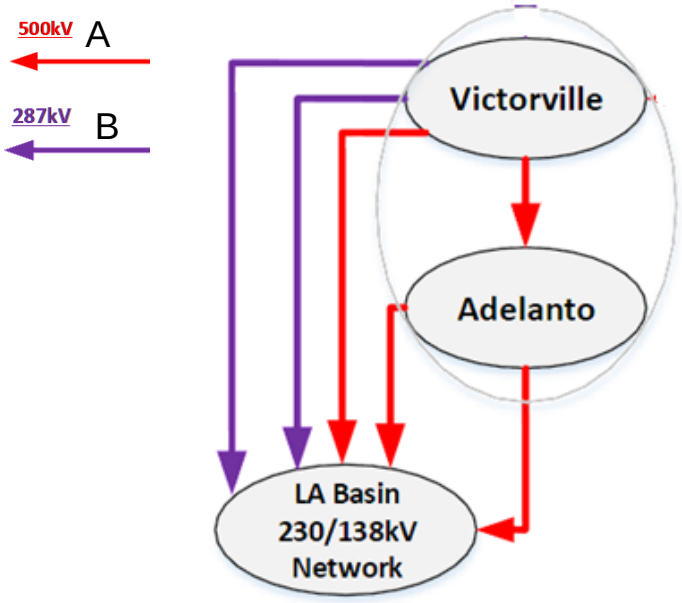


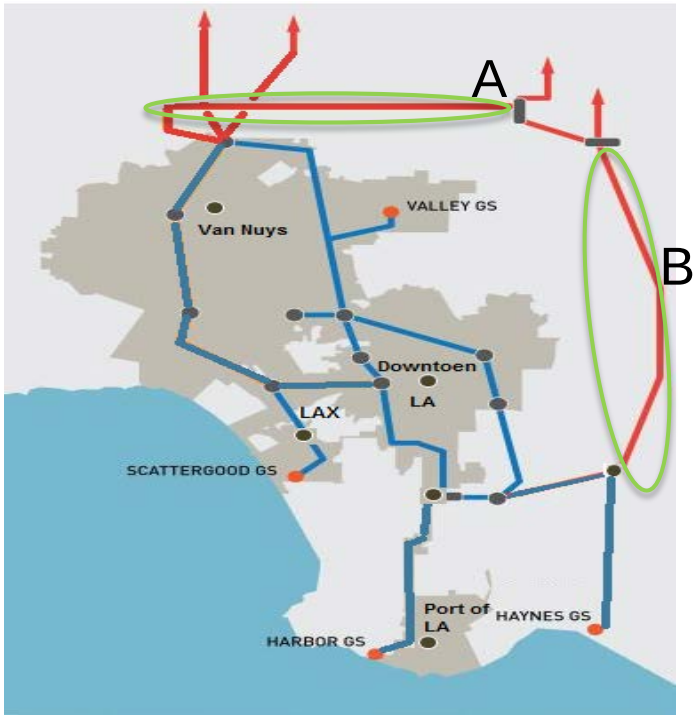
Barren Ridge Transmission System Expansion when completed in 2022 will deliver up to 1,700 MW of renewable energy to Los Angeles.

Near-Term Transmission Upgrades

Vic-LA Path (A & B)

- Increase import capacity of about 450 MW
- Maximize renewable energy import
- In-service date of 2022





Vic-LA Path Upgrades Completion Will Reduce LADWP Reliance on Natural Gas While Improving System Reliability.

Leveraging Existing Assets to Increase Renewable Energy

Navajo Generating Station

LADWP's transmission capacity ownership of 48.9% (628 MW)

Leveraging Existing Assets to Increase Renewable Energy

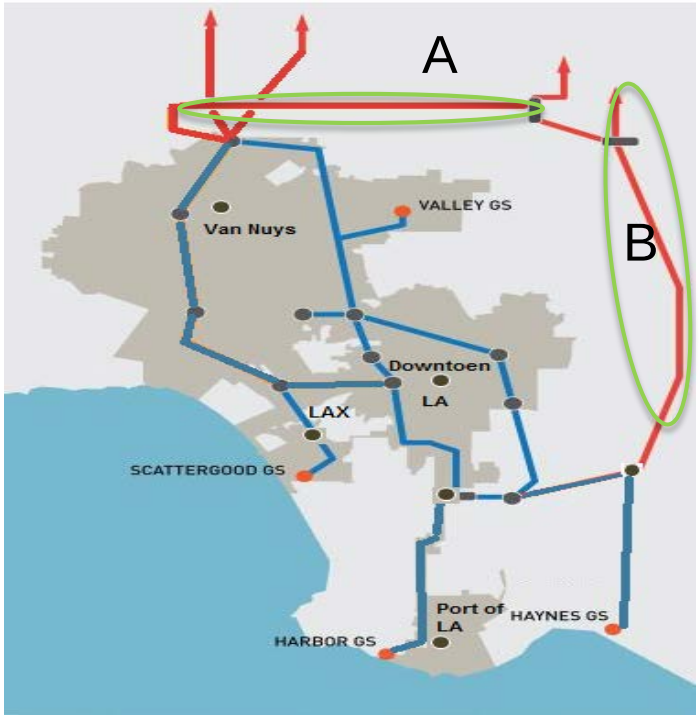
Mohave Generating Station

LADWP's transmission capacity ownership of 30% (716 MW)

Long-Term Transmission Expansion Plans for More Renewable Energy Access

Vic-LA Path (A & B) Major Upgrade Feasibility Studies

- Increase transmission capacity of 500 kV Lines (Segment A)
- Convert 287kV Century Lines 1 and 2 (Segment B) into High Voltage DC or AC



Southern Transmission System (STS)

- Perform STS DC system life extension upgrade
- Up to 600MW of additional renewable energy from coal retirement

Long-Term Transmission Strategies

Key Objectives:

- Increase renewable energy level
- Maintain high level of system reliability
- Cost-effective and responsible transition

Factors for Consideration:

- OTC Study (Completion date Fall 2018)
- RPS Mandates: achieved 31% in 2017, with 55% target by 2030
- 100% Renewable Energy Portfolio Study (Completion date Summer 2020)
- Joint BPA, CAISO, and LADWP PDCI Upgrade Study (Completion Fall 2018)
- Environmental Process
- Costs

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Preferred Resources

Mitigation Measure Summary – Distributed Energy Resources

- Accelerated & launched new energy storage projects
- Accelerated existing EE programs
- Accelerated DR program and launched SummerShift
- Maximized the use of renewable energy resources:
  - Continued Solar Incentive Program (SIP)
  - Launched Solar Rooftops Program (SRP)
  - Re-launched Feed in Tariff (FiT) Program
  - Utility-Scale Solar and Wind

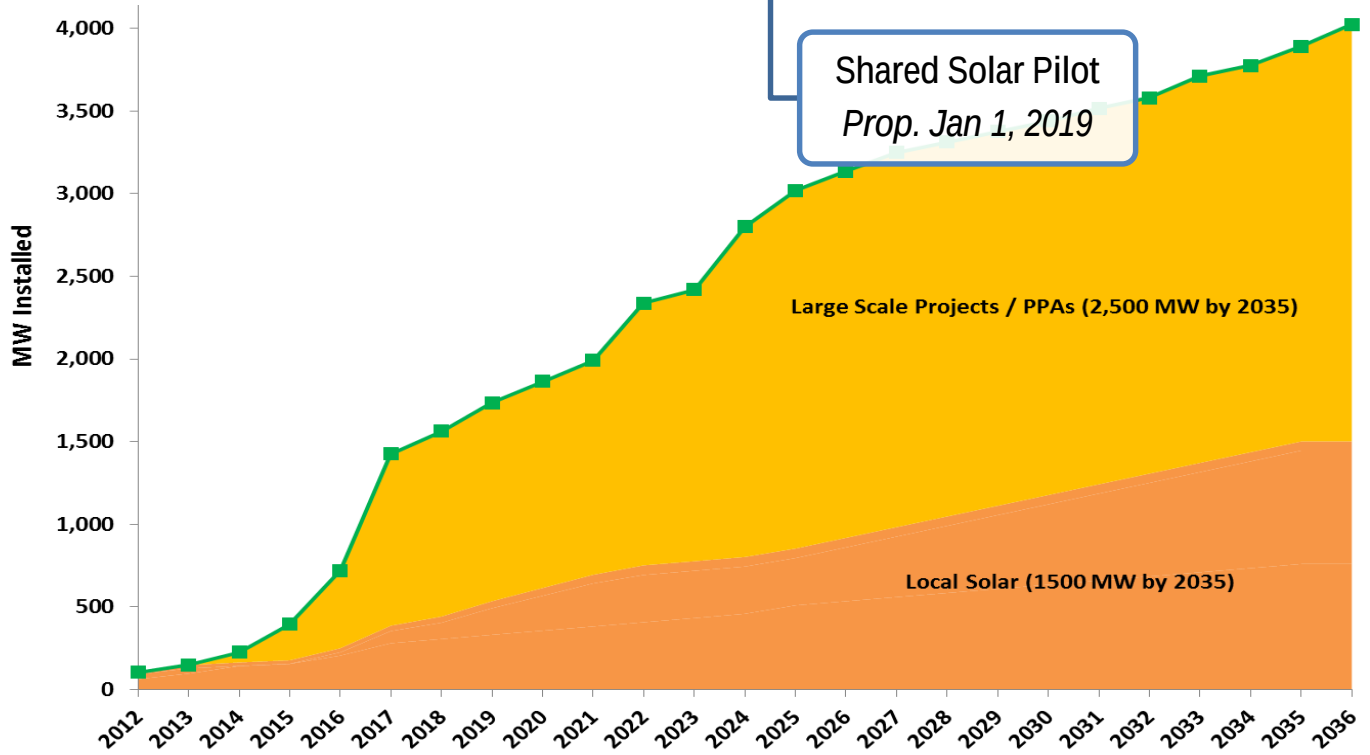
Local Solar Programs

Solar Incentive Program/Net Metering
- 240 MW installed
  Goal: 760 MW

Feed-in Tariff
- 47 MW in-service
  Goal: 700 MW

Community Solar Programs
- Solar Rooftops Pilot
  Launched 2017
- Shared Solar Pilot
  Prop. Jan 1, 2019

Utility Built Solar
- 7 MW in-service
  Goal 40 MW



Westmont Solar Project – 15 MW

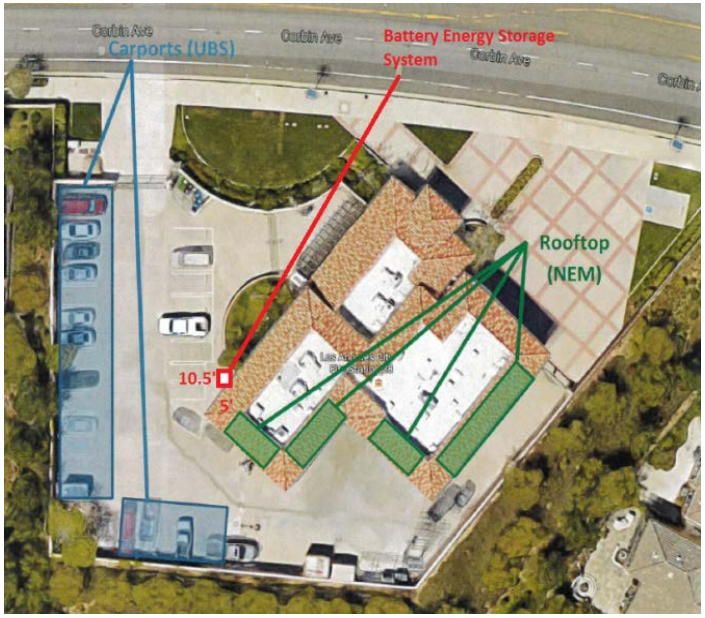
Energy Storage

Achieved

- Upgraded Castaic Power Plant, 21 MW - Completed 2013
- Fire Station 28, 12 kW - Completed 2/2018
- La Kretz Innovation Center, 60 kW - Completed 7/2016
- Beacon Battery Energy Storage System, 20 MW - target 6/2018 in service

In Progress

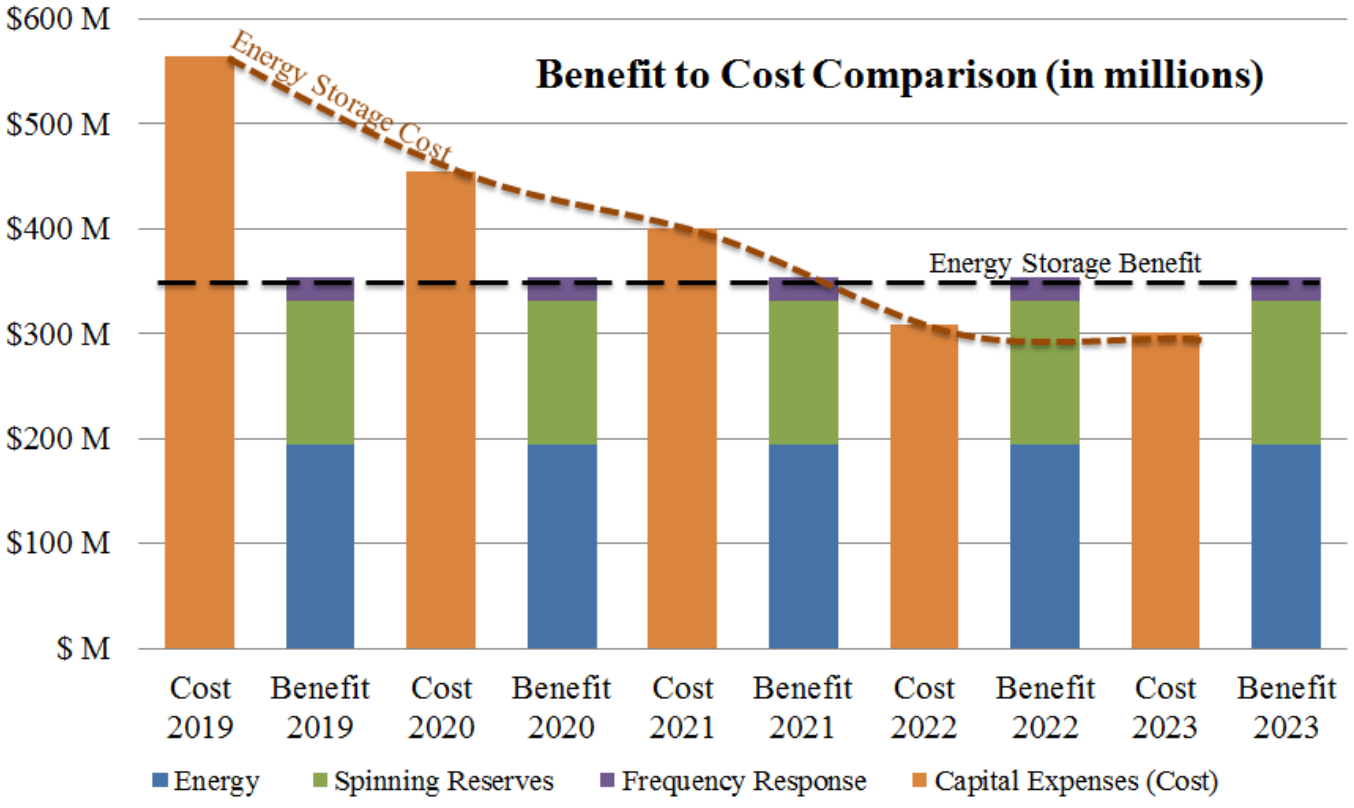
- LADWP HQ : 200 kW BESS – Evaluating Proposals
- Over 500 Interconnection applications totaling ~3.6 MW's
- Grid-connected installations at LAPD, Rec & Parks, Distributing Stations, LA Zoo and others



Beacon Battery Storage – 20 MW

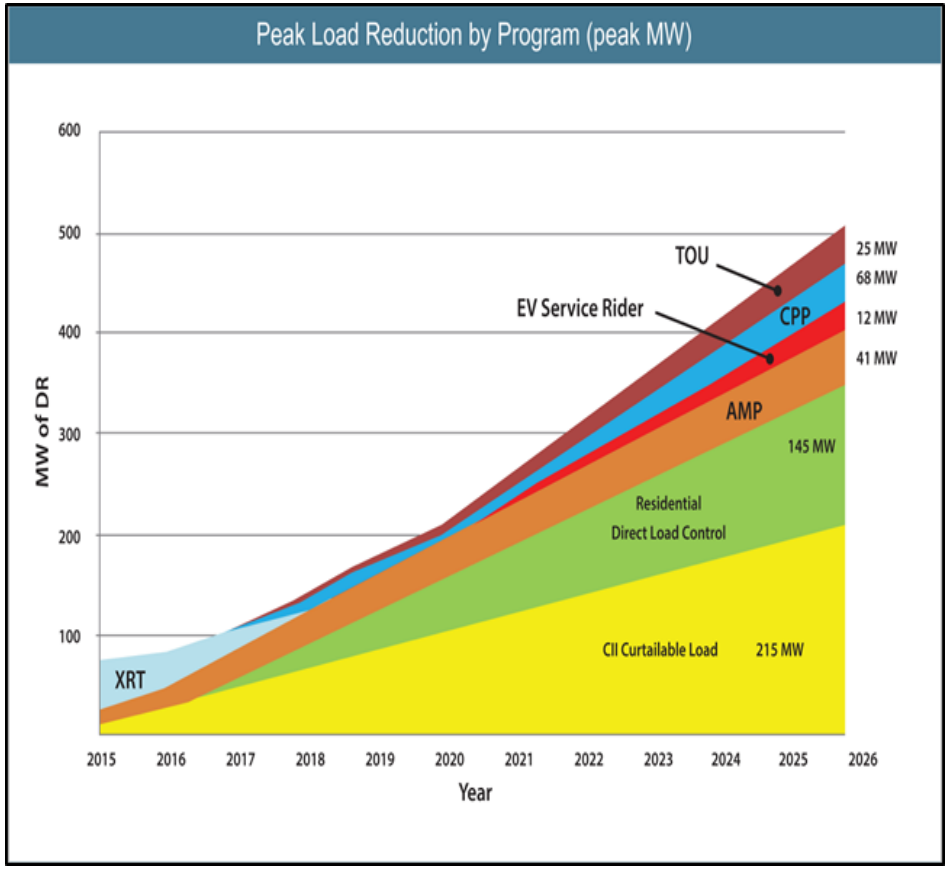
LADWP's SB 801 Initiative

100 MW 4-hr battery + 200 MW solar: LADWP engaged Electrical Power Research Institute (EPRI) to perform an in-depth cost-effectiveness study



Demand Response

- 500 MW by 2026
- June 2015 launched C&I
- Launched “SummerShift” program in 2016 with 100 MW
- Created “DER Planning” organization to conduct pilot and deploy DERMS



Next:

- Residential Thermostat Program & Smart Charging Pilot
- Update DR targets with consideration for OTC results

LADWP's Draft 5 Year EV Plan

5 Year Goal:

- The equivalent of 145,000 Electric Vehicles in LA
- 10,000 commercial chargers by 2021 (4000 on City Property)
- Governor Brown's Zero-Emission Vehicle Executive Order of 250,000 chargers by 2025

Strategy:

1. Increase EV adoption to 15% of vehicle purchases
2. Count Public and Workplace Chargers as EV equivalent.
3. Consider non-light duty as EV equivalent (i.e. Medium & Heavy Duty).

Residential & Commercial EV Charging

Residential

- Used Car Rebate – $450
- EV Charger Rebates – up to $500, with +$250 for dedicated service
- Developing Residential Smart EV charging pilot
- blueLA – New City of LA car sharing program

Commercial

- Up to $4,000 per charger – workplace, public & multi-unit
- Depot Charging: off-peak “industrial rate” with no monthly demand charge – 2.5 cents/kWh discount for off-peak
- “Anytime Rate”: Need to develop a rate for charging anytime during the day.

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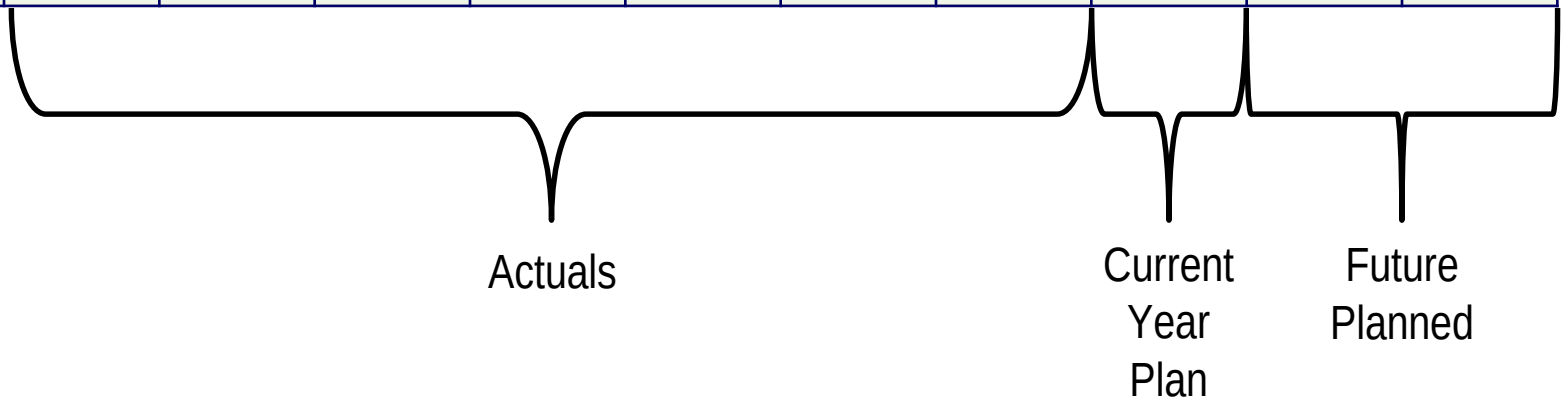
Energy Efficiency: 15% by 2020

Annual EE Investment and Goals: 2010 – 2020

Fiscal Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Budget (millions)	$49.5	$37.3	$50.0	$78.0	$79.0	$73.0	$133.0	$178.0	$180.0	$163.0
GWh Savings	265	228	319	337	343	412	480	412	396	359
Portfolio Savings Cum'l	1.1%	2.1%	3.4%	5%	6.5%	8.2%	10.4%	12%	13.7%	15.1%



Energy Efficiency: 15% by 2020

- Residential LED Distribution
  - 2.6M bulbs to all 1.3M LADWP residential customers, SF and MF
- AC Optimization Program
- Energy Savings Assistance Program
  - Partnership with SoCalGas, available to CPUC-eligible low-income residents in multi-family buildings in LA.
- EE lighting measures for LAUSD

Electrification Targets: February 2018, LA City Council requests LADWP to adopt aggressive Building Electrification targets aimed at GHG reduction; LADWP partnering with SCE & SMUD on study

Thank You

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