



**Meeting SB100 and Maintaining Affordability and
Consumer Protections**
LADWP Roadmap to 100% Carbon Free by 2035

**CARB Workshop
November 2, 2021**

LADWP's Power System

Balancing Authority

Largest Publicly Owned Utility

1.5 Million Customers

\$4.2 Billion Annual Budget

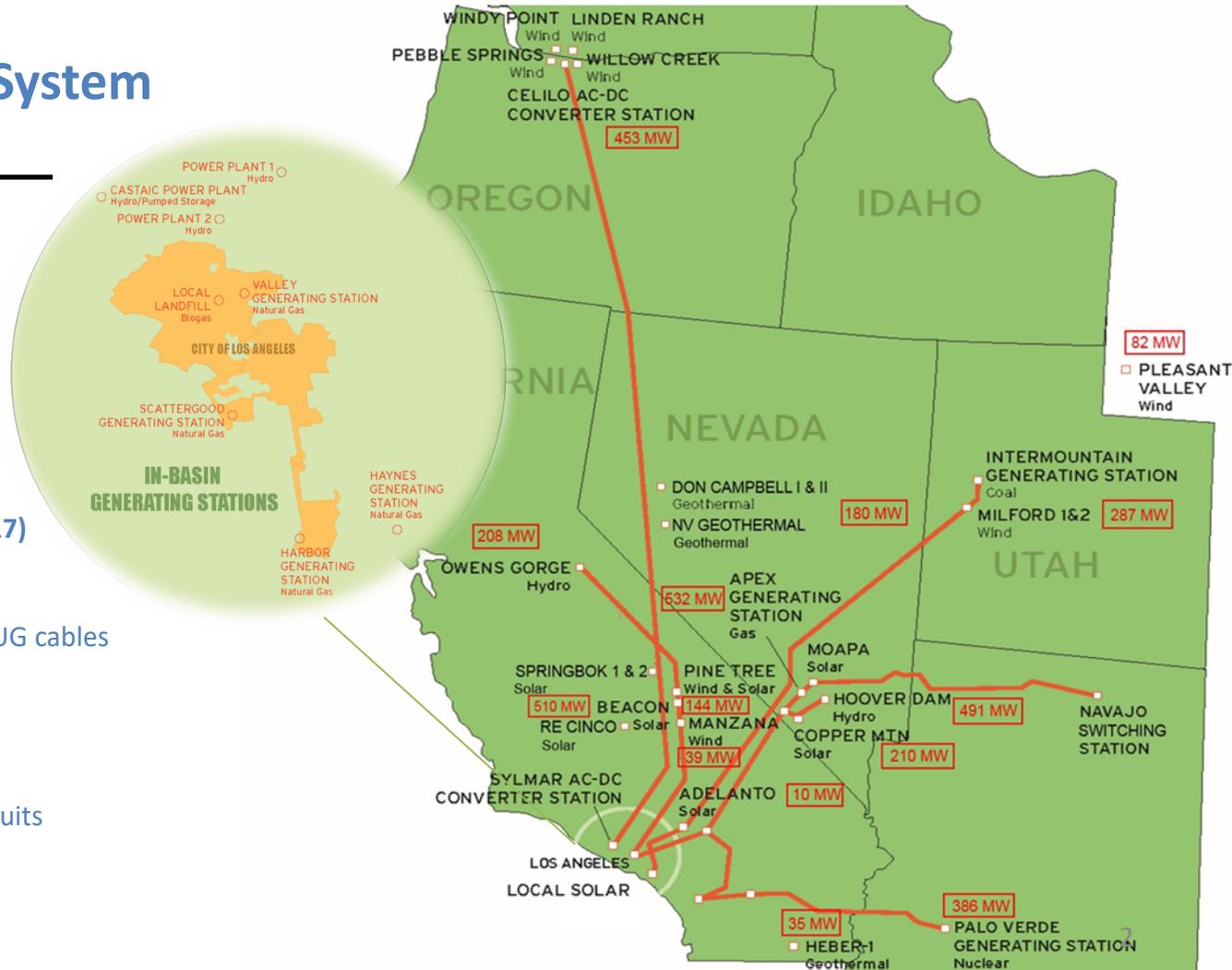
Peak Demand of 6,502 MW (8/31/17)

Distribution System

- 10,495 miles of OH lines & UG cables
- 181 stations
- 128,693 transformers

Transmission System

- 3,760 miles of OH & UG circuits
- 15,452 towers



LADWP's Resource Stack



3,800 MW Nat Gas



2,000 MW Hydro



1,200 MW Coal



380 MW Nuclear

**Total Capacity
10,454 MW**



1,000 MW Wind



1,700 MW Solar



20 MW Battery Storage



340 MW Geothermal



The Los Angeles 100% Renewable Energy Study

LA City Council motions directed LADWP to evaluate:



What are the **pathways and costs to achieve a 100% renewable electricity supply** while electrifying key end uses and maintaining the current high degree of reliability?



What are the potential benefits to **the environment and health**?



How might **local jobs** and the **economy** change?



How can communities shape these changes to prioritize **environmental justice**?

Scenarios Based on Advisory Group Priorities

Each Scenario Evaluated Under Different Customer Demand Projections (different levels of energy efficiency, electrification, and demand response)

Moderate

High

Stress



SB100

Evaluated under **Moderate, High, and Stress Load Electrification**

- 100% clean energy by **2045**
- Only scenario with a target based on retail sales, not generation
- Only scenario that allows up to 10% of the target to be natural gas offset by renewable electricity credits
- Allows existing nuclear and upgrades to transmission



Early & No Biofuels

Evaluated under **Moderate and High Load Electrification**

- 100% clean energy by **2035**, 10 years sooner than other scenarios
- No natural gas generation or biofuels
- Allows existing nuclear and upgrades to transmission



Limited New Transmission

Evaluated under **Moderate and High Load Electrification**

- 100% clean energy by **2045**
- Only scenario that does not allow upgrades to transmission beyond currently planned projects
- No natural gas or nuclear generation



Transmission Focus

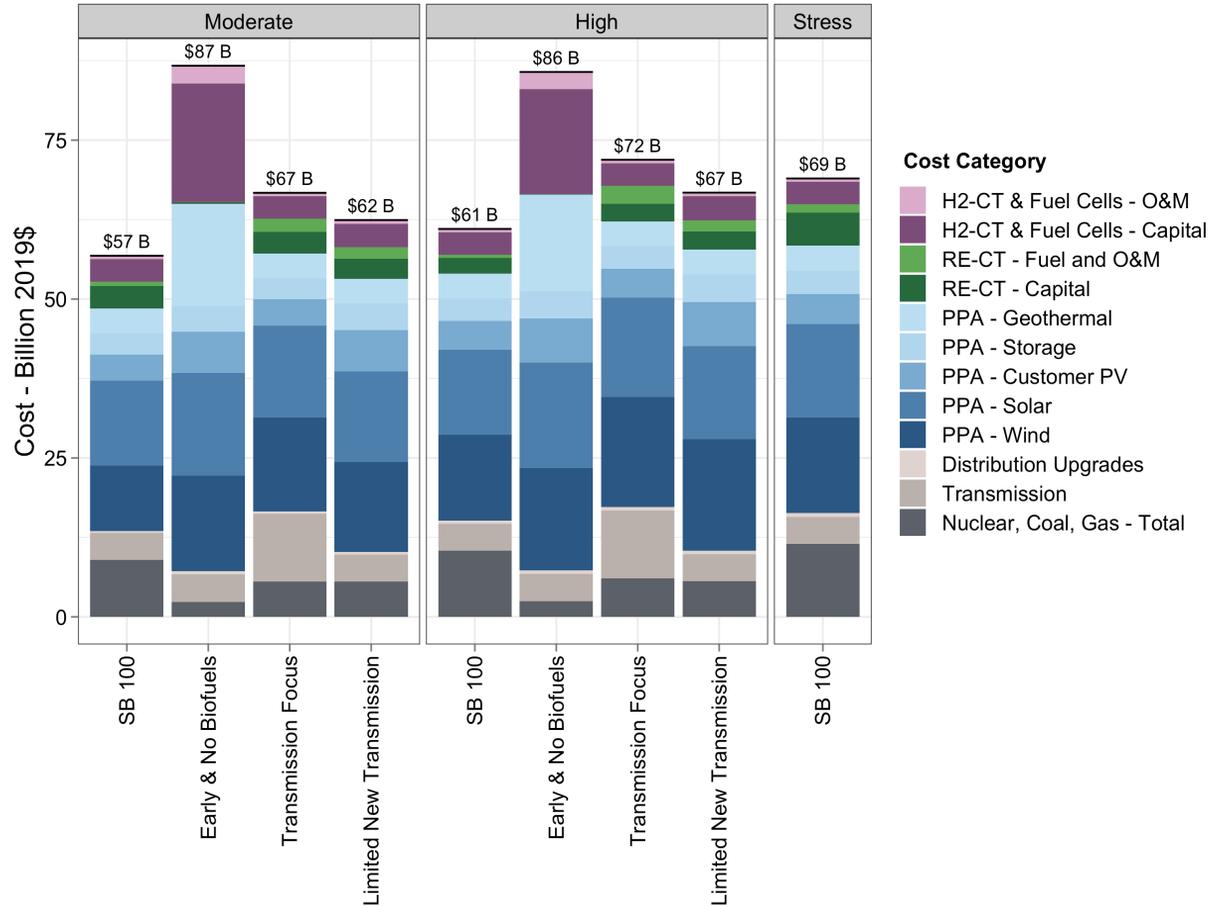
Evaluated under **Moderate and High Load Electrification**

- 100% clean energy by **2045**
- Only scenario that builds new transmission corridors
- No natural gas or nuclear generation

LA100 Total New Investment Costs

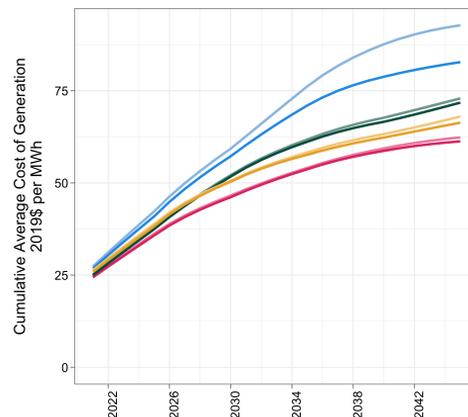
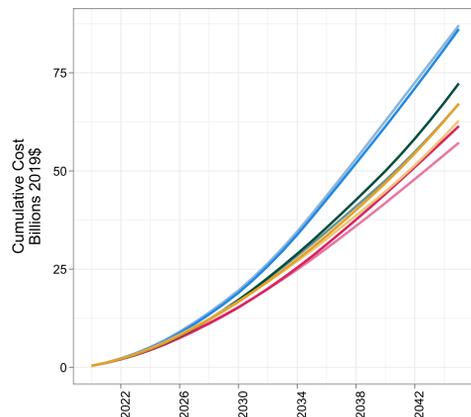
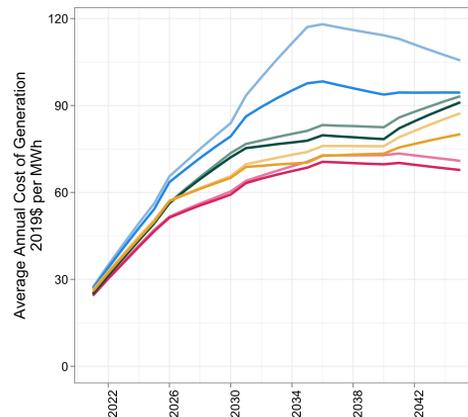
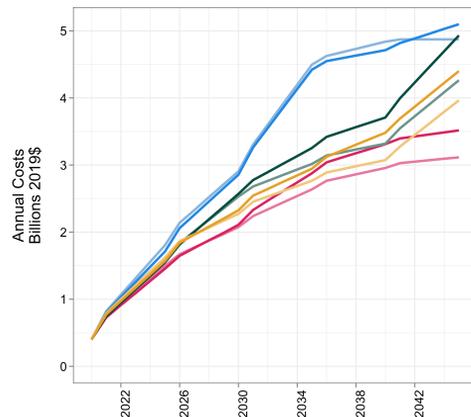
Total bulk system costs are dominated by investment in new solar, wind, and storage.

Pathways that do not allow biofuel plants to be built result in substantially higher cost.



LA100 Total New Investment Costs

Annual and
Cumulative Costs
Normalized by
total Generation

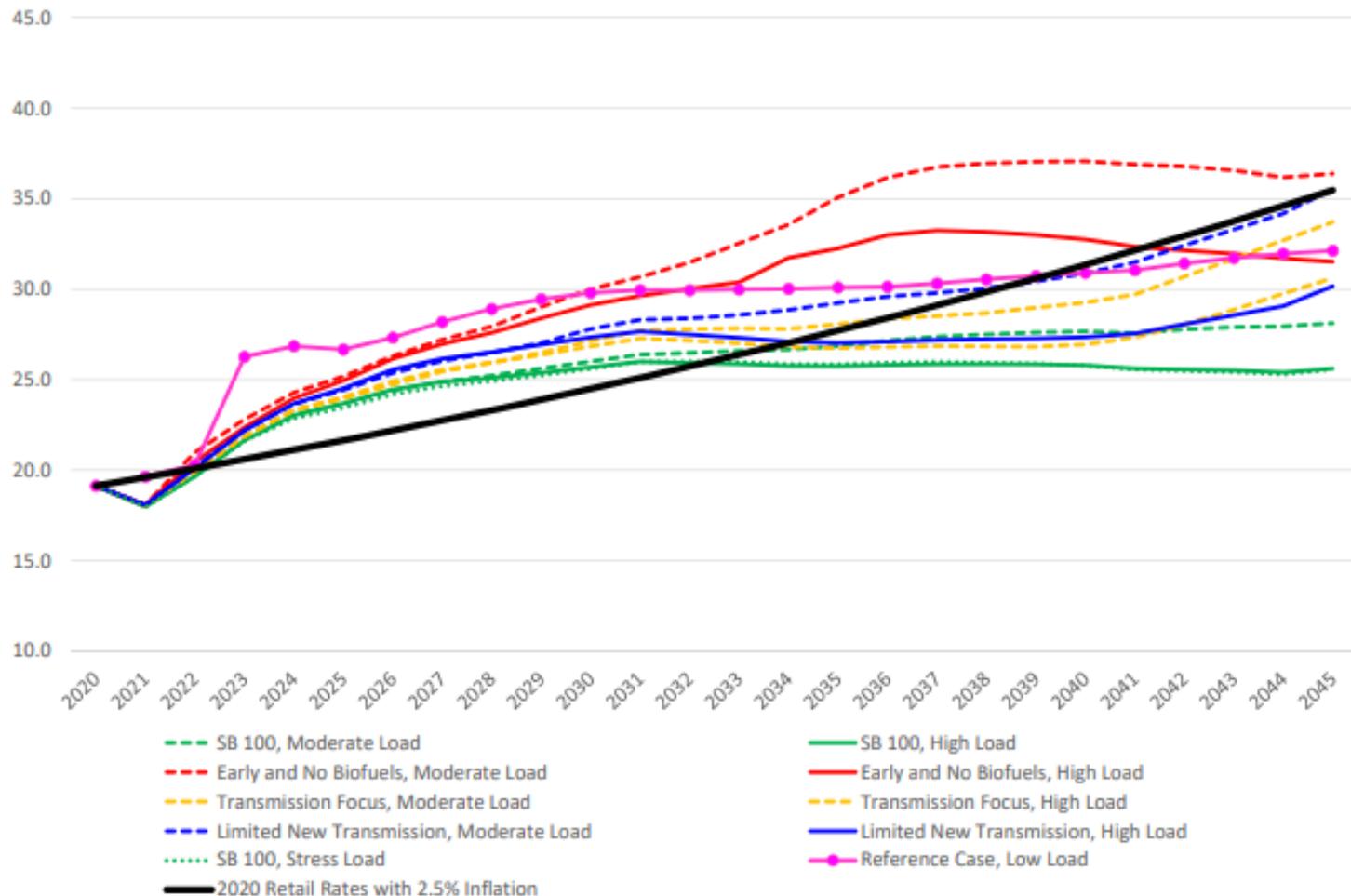


- SB 100 – Moderate
 - SB 100 – High
 - Early & No Biofuels – Moderate
 - Early & No Biofuels – High
- Transmission Focus – Moderate
 - Transmission Focus – High
 - Limited New Transmission – Moderate
 - Limited New Transmission – High

Note that these costs do not include costs of existing (prior to 2021) debt payments or PPAs, or costs associated with future distribution O&M, energy efficiency or demand response program costs

Cents/kWh

Retail Rates Comparison for LA100 Study



Customer actions that help complement a renewable energy transition



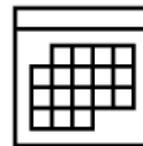
Energy efficiency

- Helps offset climate- and electrification-driven load growth and potentially higher electricity rates
- Especially valuable for low-income residents to reduce electricity bills



Greater electrification

- Provides higher public health and greenhouse gas emissions-reduction benefits
- Helps reduce per-unit electricity costs



Customer demand flexibility

- Helps contain costs of electrification and achieving 100% renewable energy
- Supports reliability

Across All LA100 Scenarios



Electrification
Efficiency
Flexible Load



Customer
Rooftop Solar



Renewable
Energy



Storage



Transmission,
Distribution



Renewably Fueled
Dispatchable
Turbines

+>2,600 MW
(in basin)

Much More

Solar: + >5,700 MW
Wind: + >4,300 MW

+ >2,600 MW

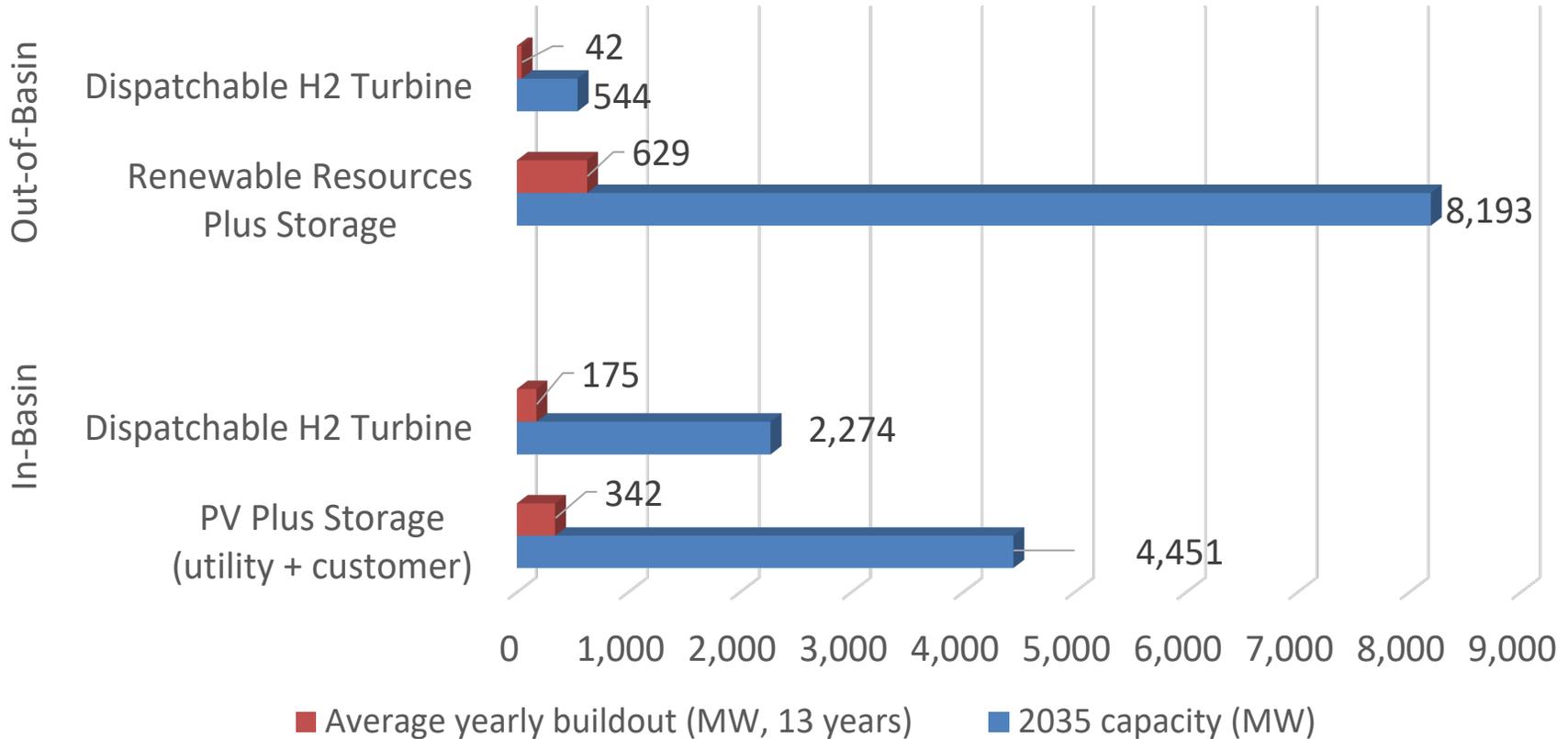
Natural gas

Today:
Daily

Biofuel/ hydrogen

Future:
Infrequently

LA100's 100% Carbon Free 2035 Scenario Required Yearly Buildouts (MW)



Clean Grid LA Plan: Aligning with LA100

**Accelerate to 80% Renewable
97% GHG-Free by 2030**

Increase to 80% renewable energy by 2030 to achieve 97% GHG free by adding **3,000 MW** of new renewables.

Accelerate Transmission

Complete **10 critical transmission projects over 10 years** to maintain grid reliability and meet growing EV, building electrification, LAX, and Port of LA electricity demand

Transform Local Generation

Green hydrogen Request for Information (RFI) for all in-basin generating stations. Construct **hydrogen capacity at Scattergood**. Retrofit **Haynes to recycled water cooling**.

Accelerate Energy Storage

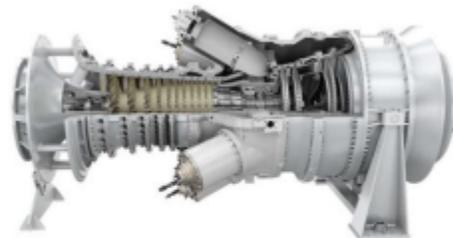
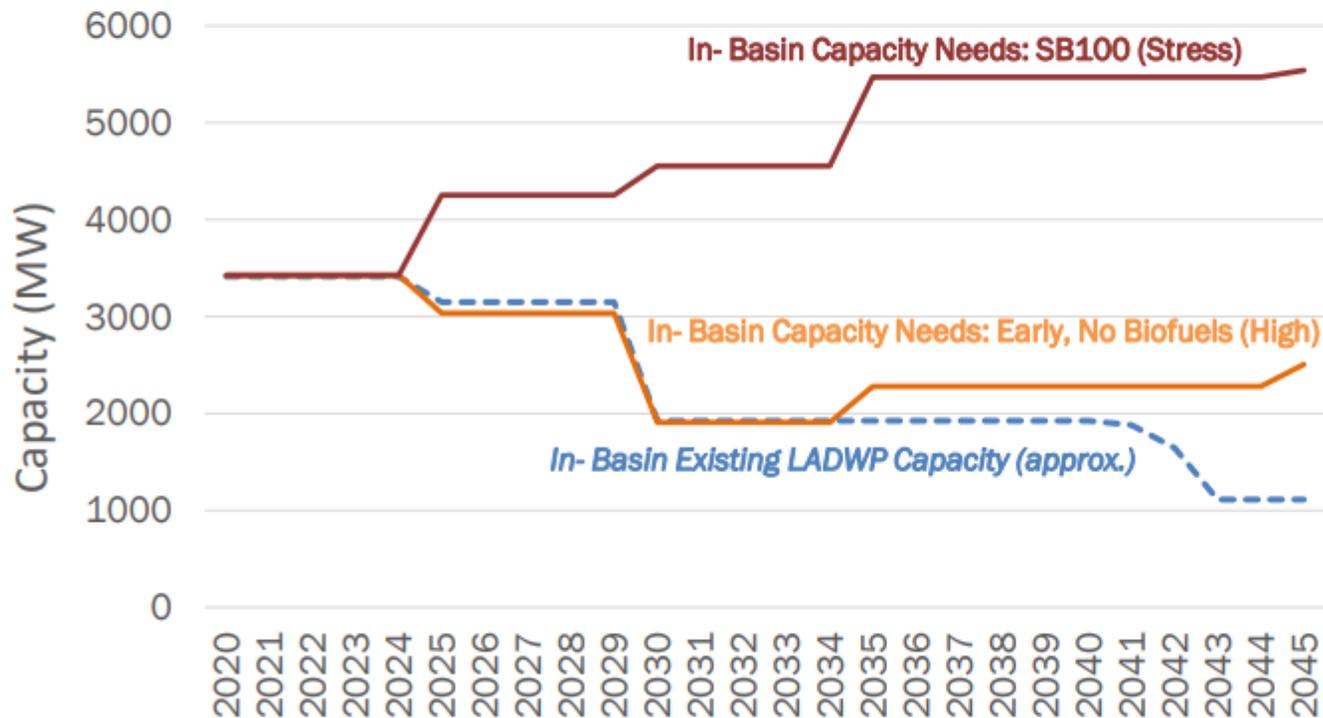
Build over **1,000 MW of energy storage by 2030** to support short-duration in-basin and out-of-basin capacity needs.

**Accelerate Distributed
Energy Resources Equitably**

Deploy **1,000 MW of local solar, 500 MW of demand response**, doubling energy efficiency, and support 580,000 electric vehicles by 2030. Adopt goal of **50% of DER investment reaching disadvantaged communities**.

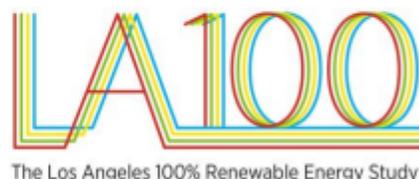
Changing Needs of In-Basin Generation

LA100: Capacity (MW) of Total In-Basin generation (H2, gas, biofuels), year by year

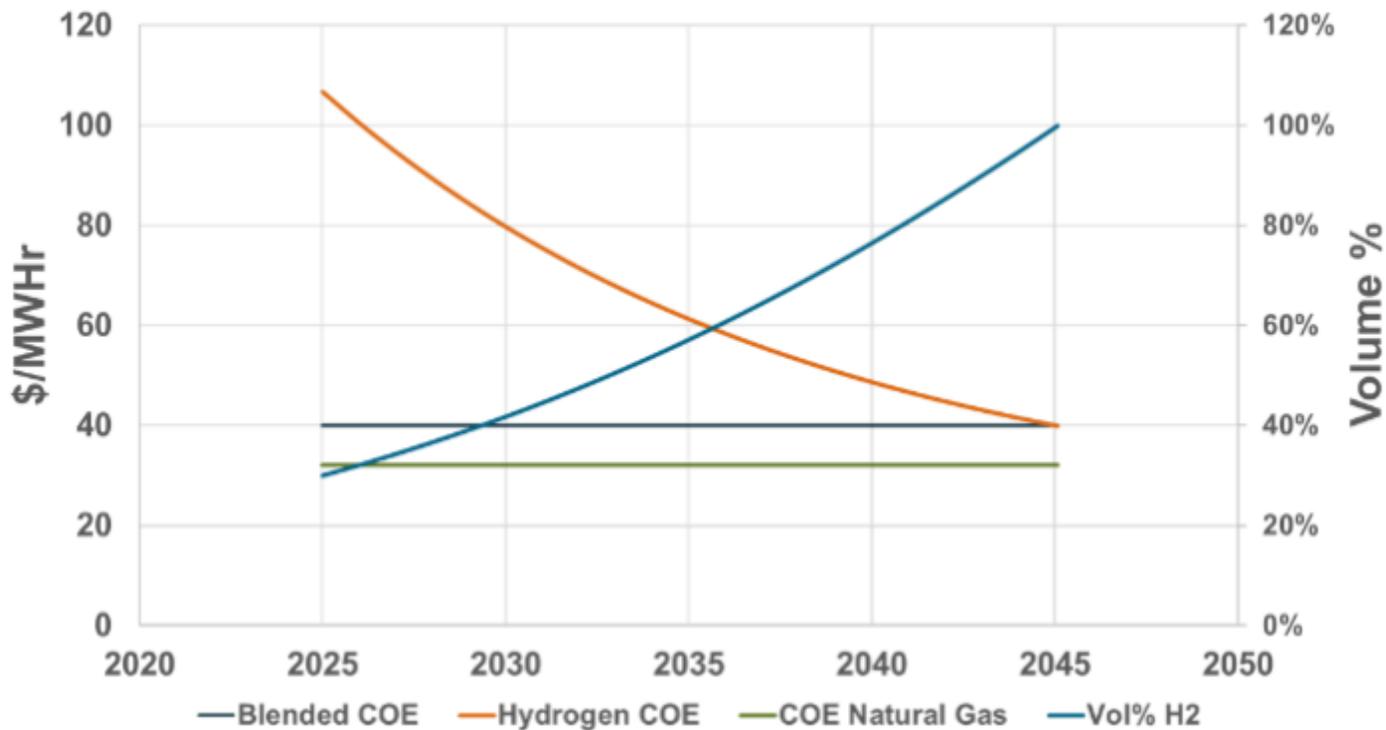


Transforming In-Basin Generation

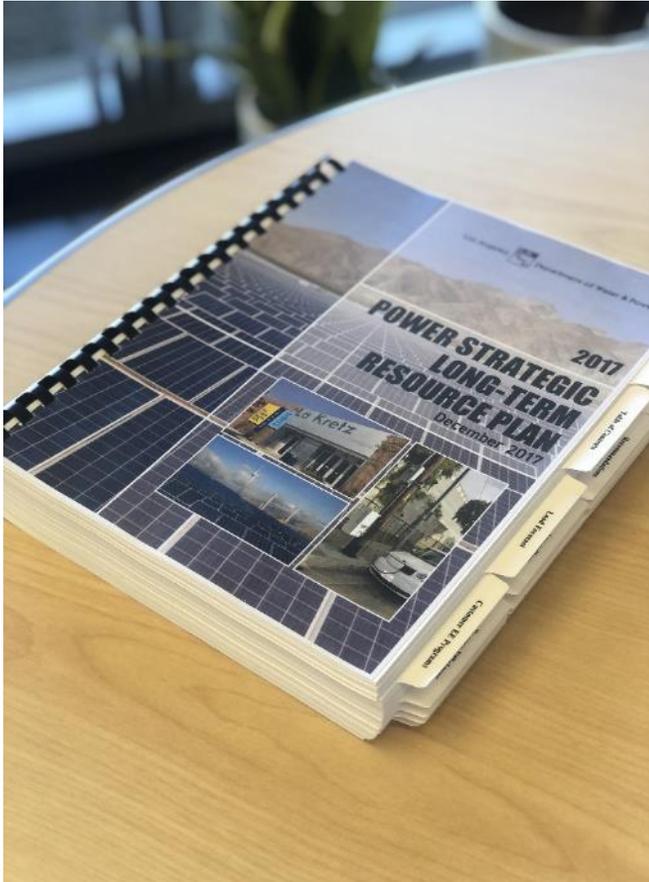
- *LA100 study* identified the need for **dispatchable capacity** at all in-basin generating stations
- **Request for Information (RFI)** will help form the basis of LADWP's in-basin green hydrogen strategy for all in-basin generating stations
 - Scattergood Hydrogen Power Capacity
 - Retrofits to existing natural gas combustion turbines
 - New hydrogen-fired combustion turbines
 - Technologies of Interest as they relate to, hydrogen production, transportation, storage, and end use
 - Safety and environmental stewardship



Cost of Electricity (COE) Over Time for an Increasing Blend of Green Hydrogen



2022 Power Strategic Long-Term Resource Plan (SLTRP)



SLTRP Incorporates Power System Efforts, including:

- Load Projections
- Supply Side Resources (Renewables, Energy Storage, Fuel Procurement, Local Capacity Needs)
- Demand Side Resources (Distributed Generation, Electric Vehicles, Distributed Automation)
- 10-Year Transmission Plan
- Power System Reliability Program
- LA100 Next Steps

2022 SLTRP will also be supported by:

- Integrated Human Resources Plan
- Implementation & Constructability Assessment
- Procurement Risk Assessment
- Operations & Maintenance Assessment
- Supply Chain Risk Assessment

Questions?

