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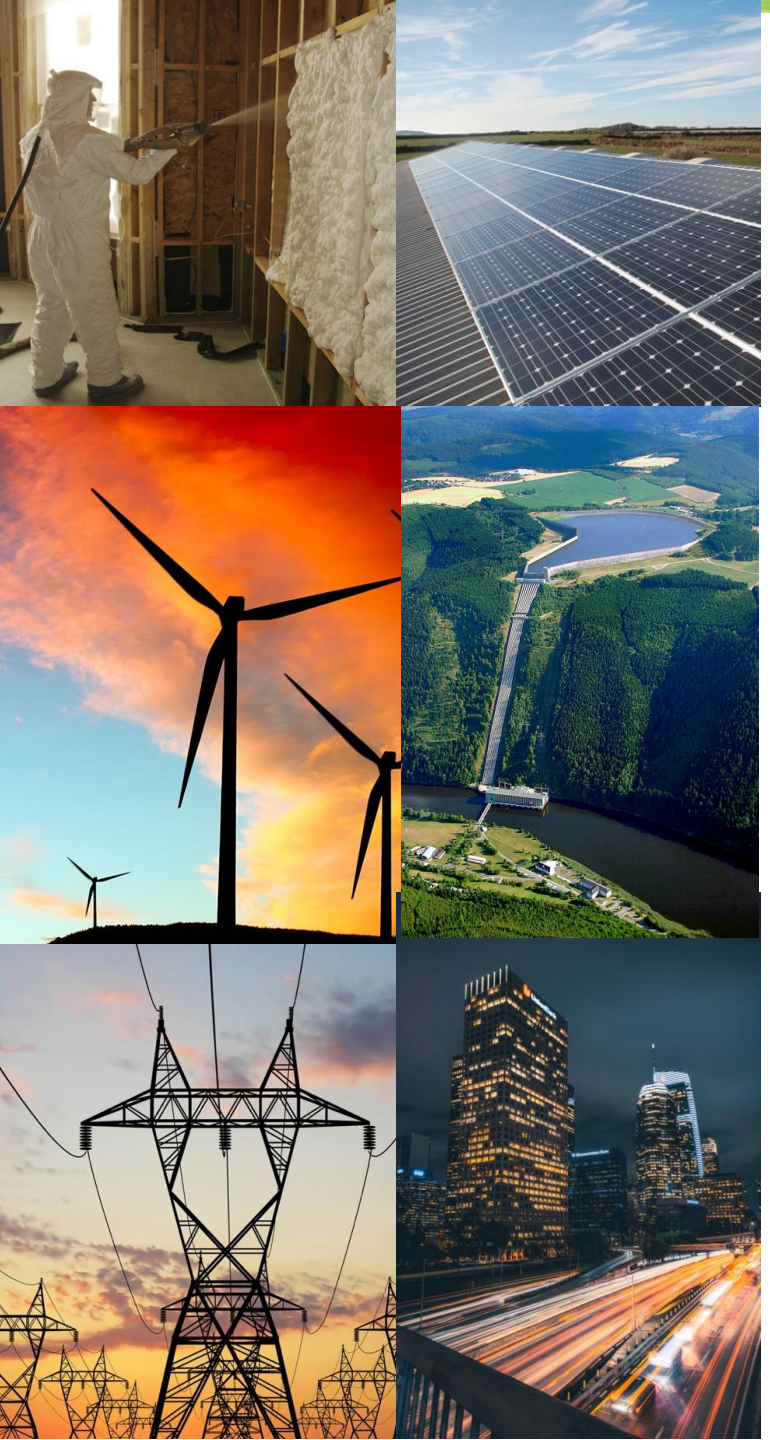
Los Angeles Department of Water & Power

CUSTOMERS FIRST

Joint Agency Workshop on Summer 2021 Electric and Natural Gas Reliability

Jason L. Rondou
Director of Resource Planning, Development & Programs
July 9, 2021



LA100

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

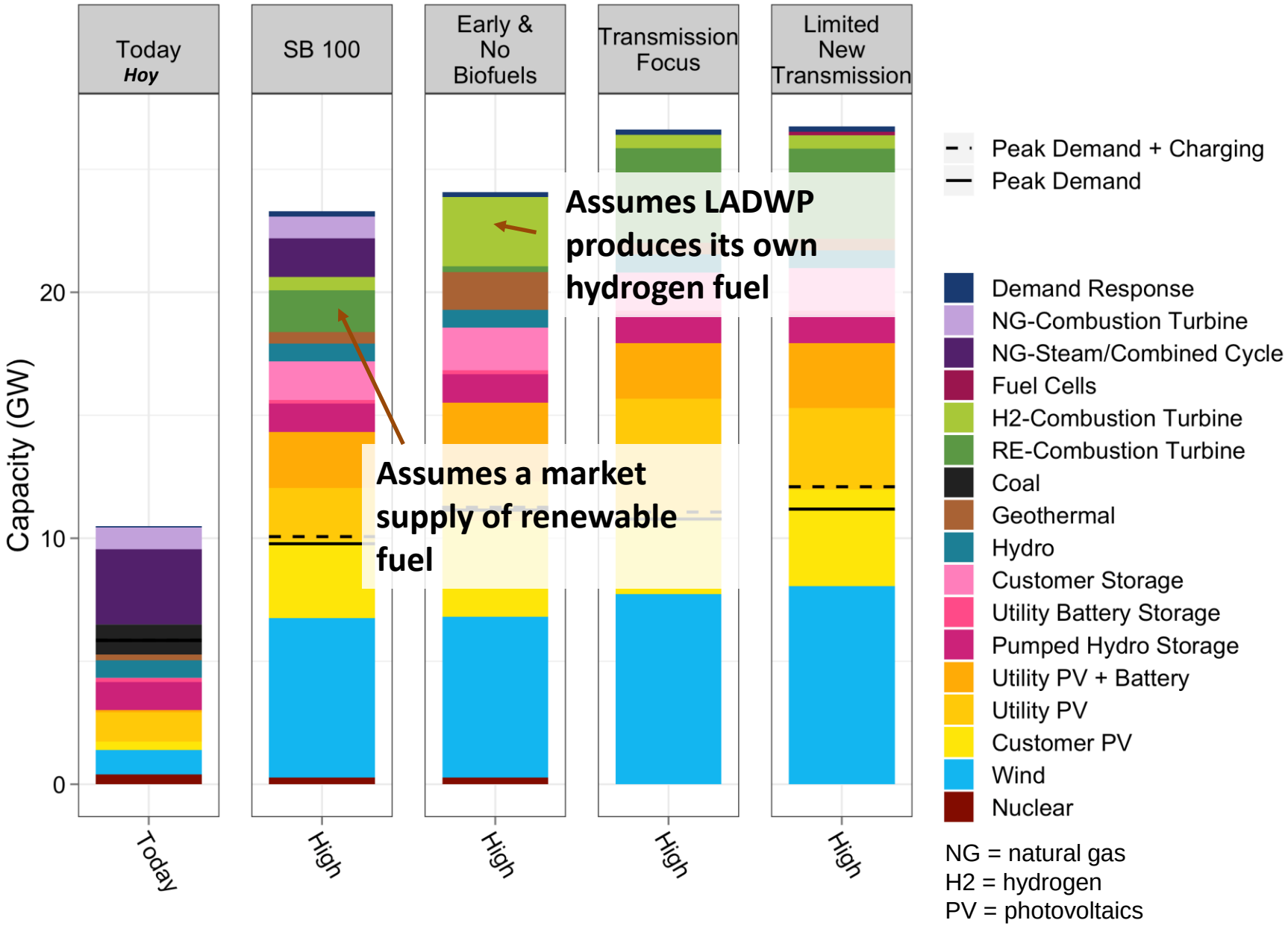
Transmission Focus

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

What types of power plants get built?

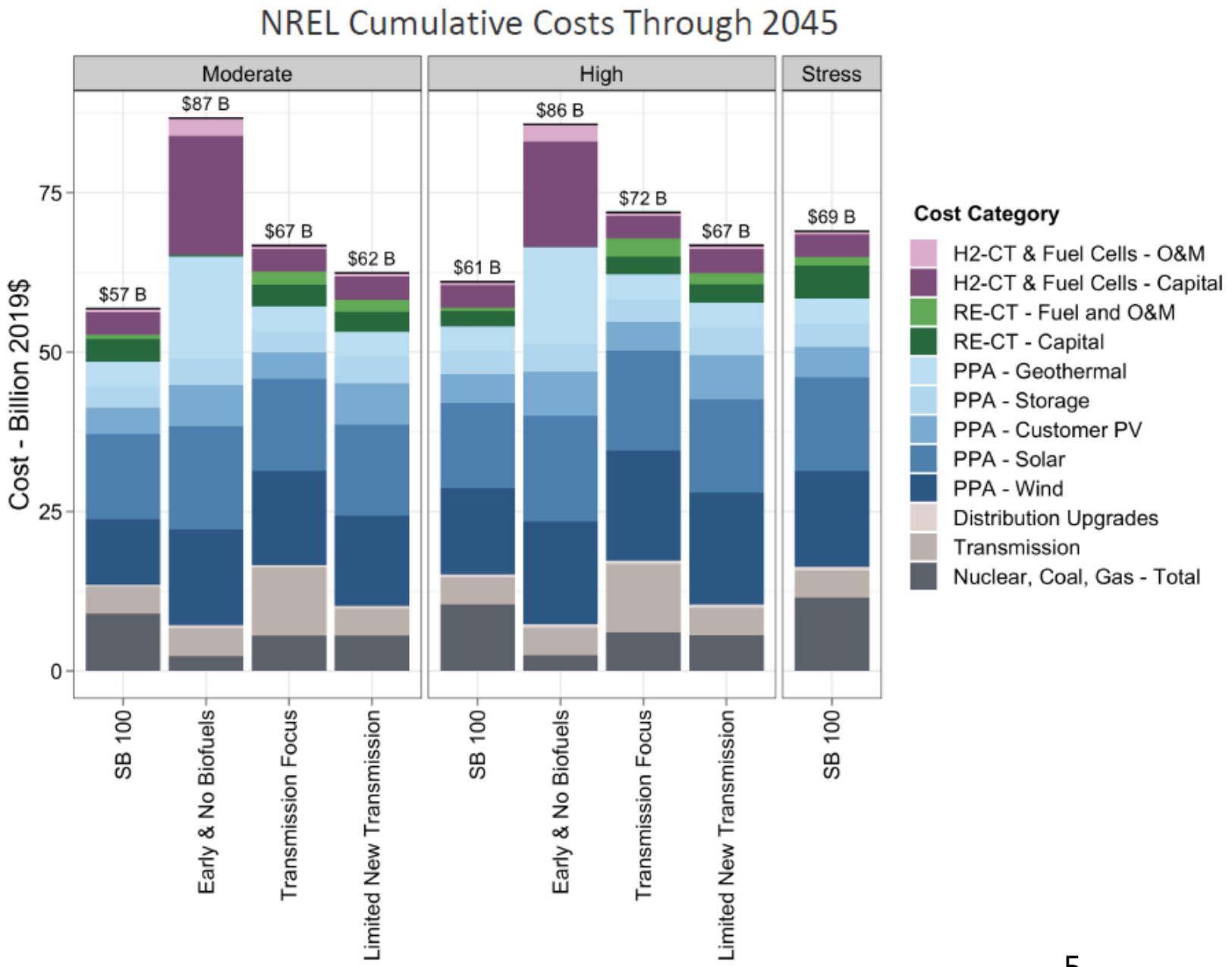
Capacity mix in 2045 for High load scenarios, compared to 2020



NG = natural gas
H2 = hydrogen
PV = photovoltaics

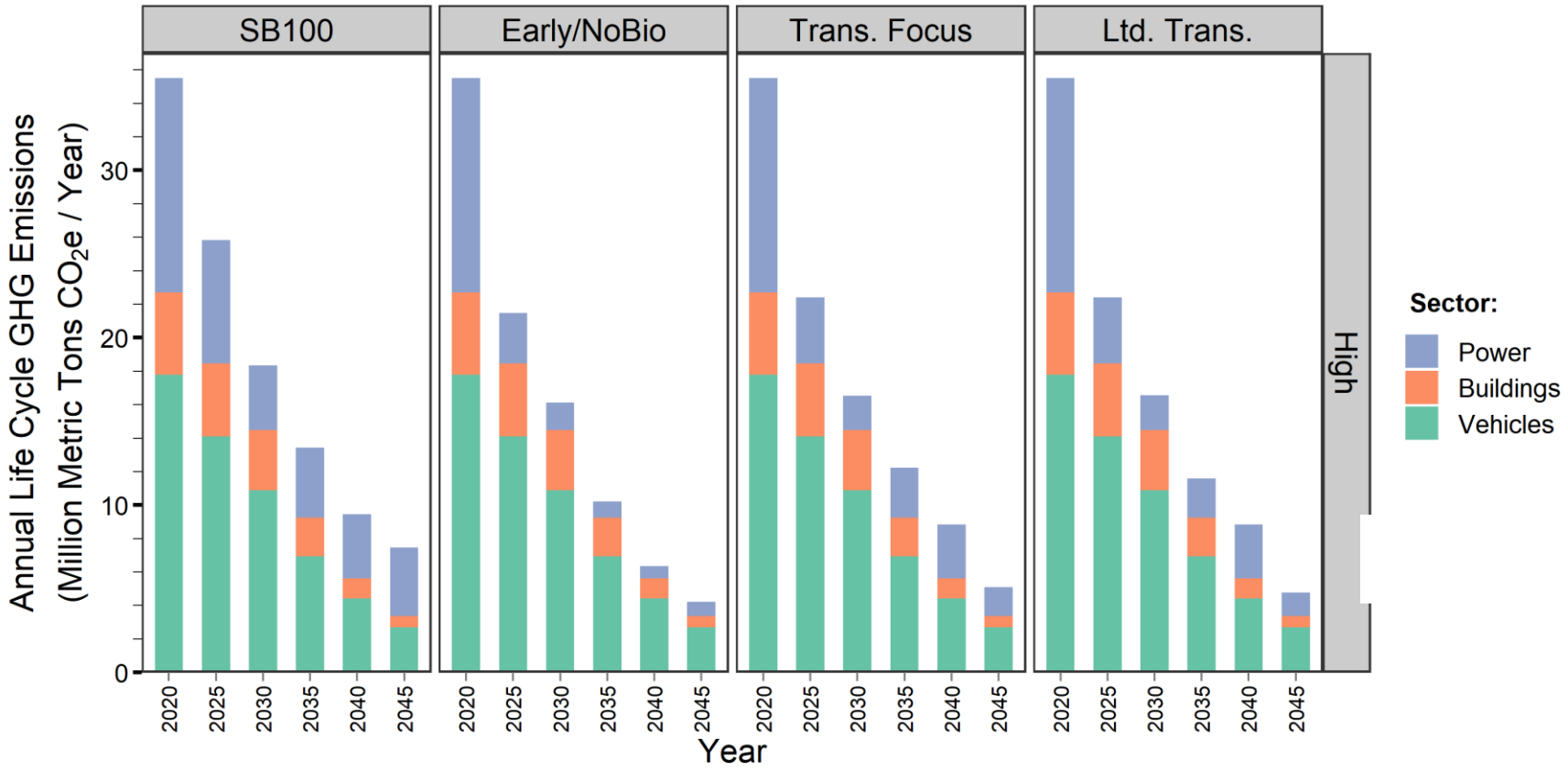
NREL's cumulative costs include financing costs through 2045.

LADWP costs are not included.

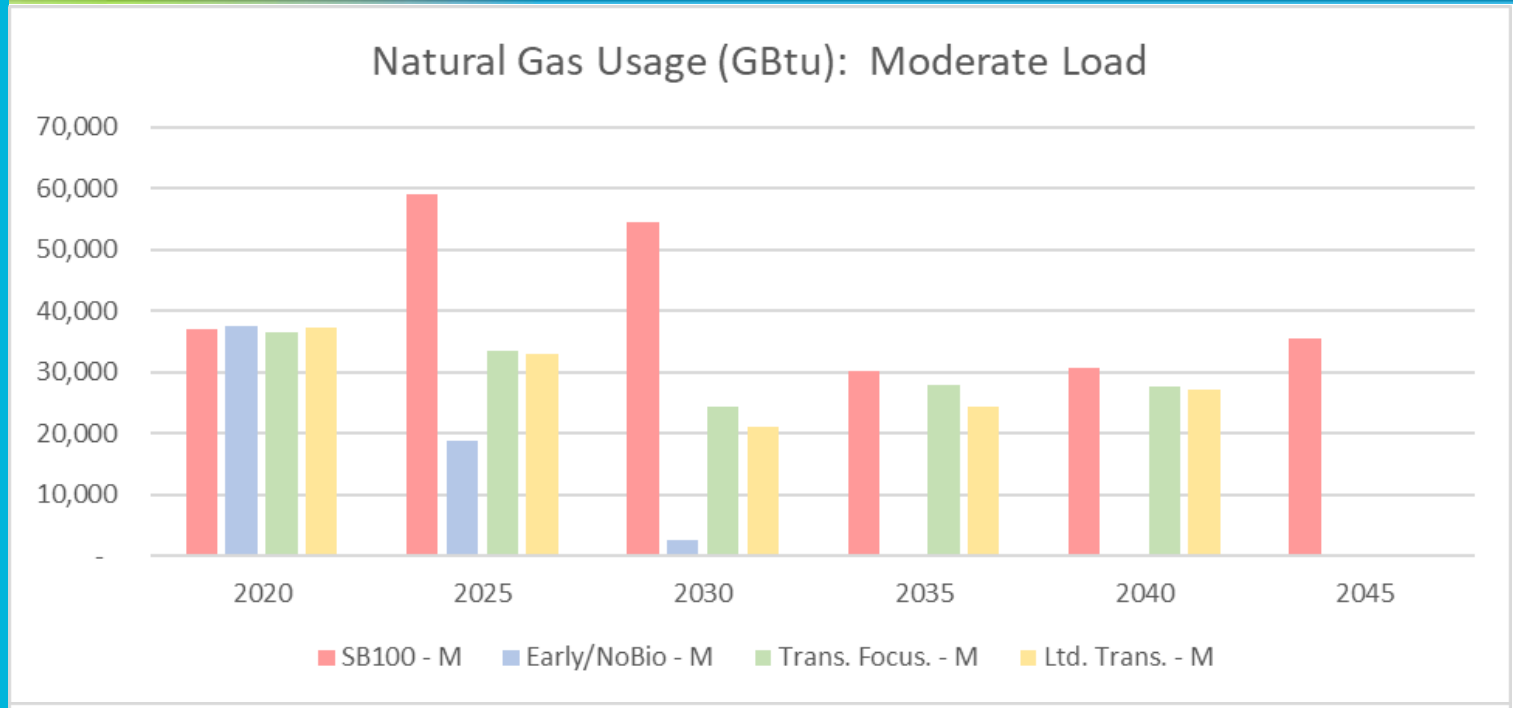


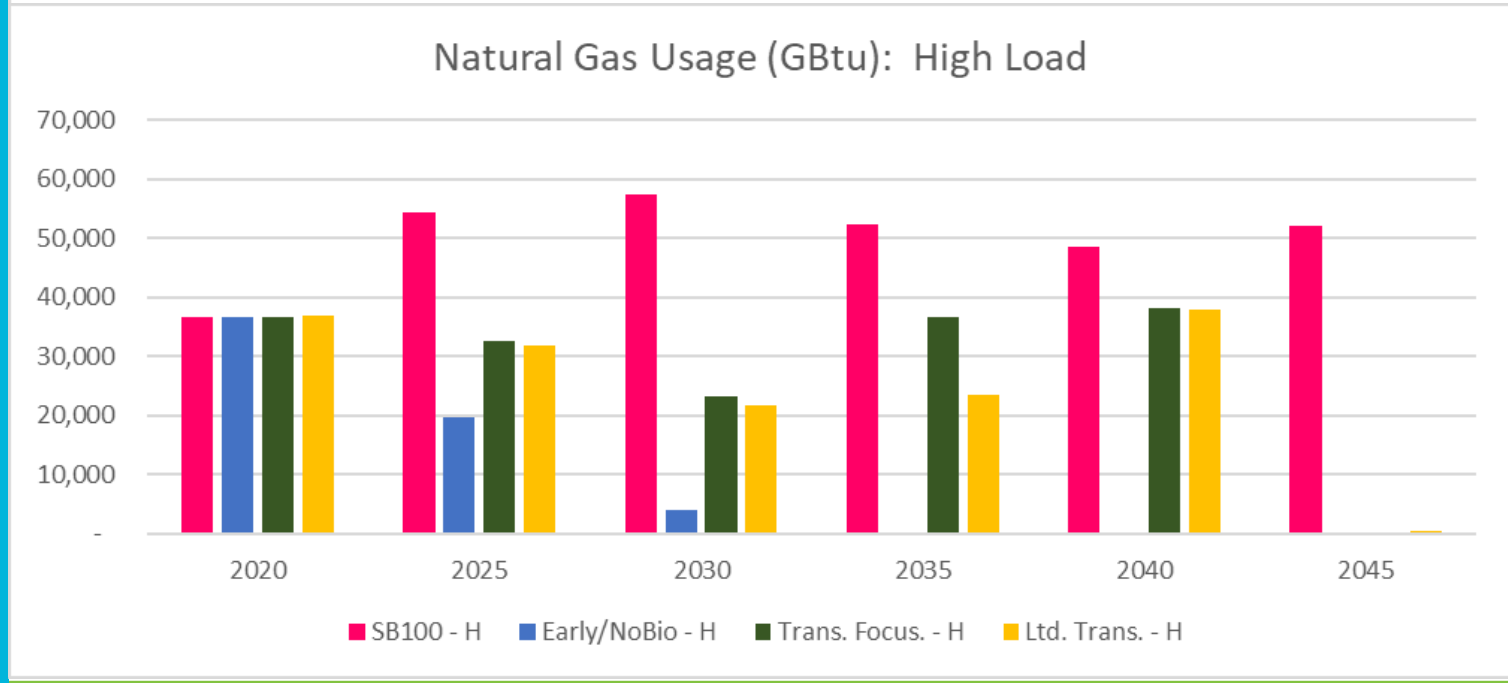
Life-Cycle Greenhouse Gas Emissions

All Sectors



Total Power System Natural Gas Usage Forecast





Across All LA100 Scenarios

Electrification
Efficiency
Flexible Load

Customer
Rooftop Solar

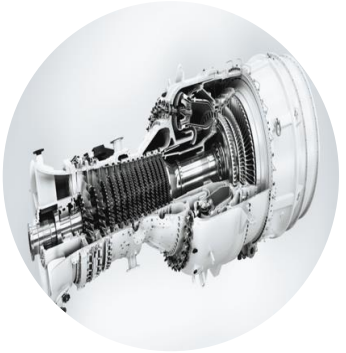
Renewable
Energy

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

Storage

+ >2,600 MW

Transmission,
Distribution



Renewably Fueled
Dispatchable
Turbines

+>2,600 MW
(in basin)

Much More

Natural gas	→	Biofuel/ hydrogen
Today: Daily		**Future:** Infrequently

100% Carbon-Free by 2035

LA100 Study Complete and final report was released on March 24, 2021.

On April 19, 2021, in the State of the City address, Mayor Garcetti announced LADWP would adopt a goal to be **100% carbon-free by 2035** as well as:

- Provide energy mix that is 80% renewable and 97% carbon free by 2030
- Transition Scattergood to run on green hydrogen
- Decrease demand on Valley Generating Station
- New Mexico Wind Farm and Navajo Nation Solar and Storage partnership
- Green hydrogen at IPP

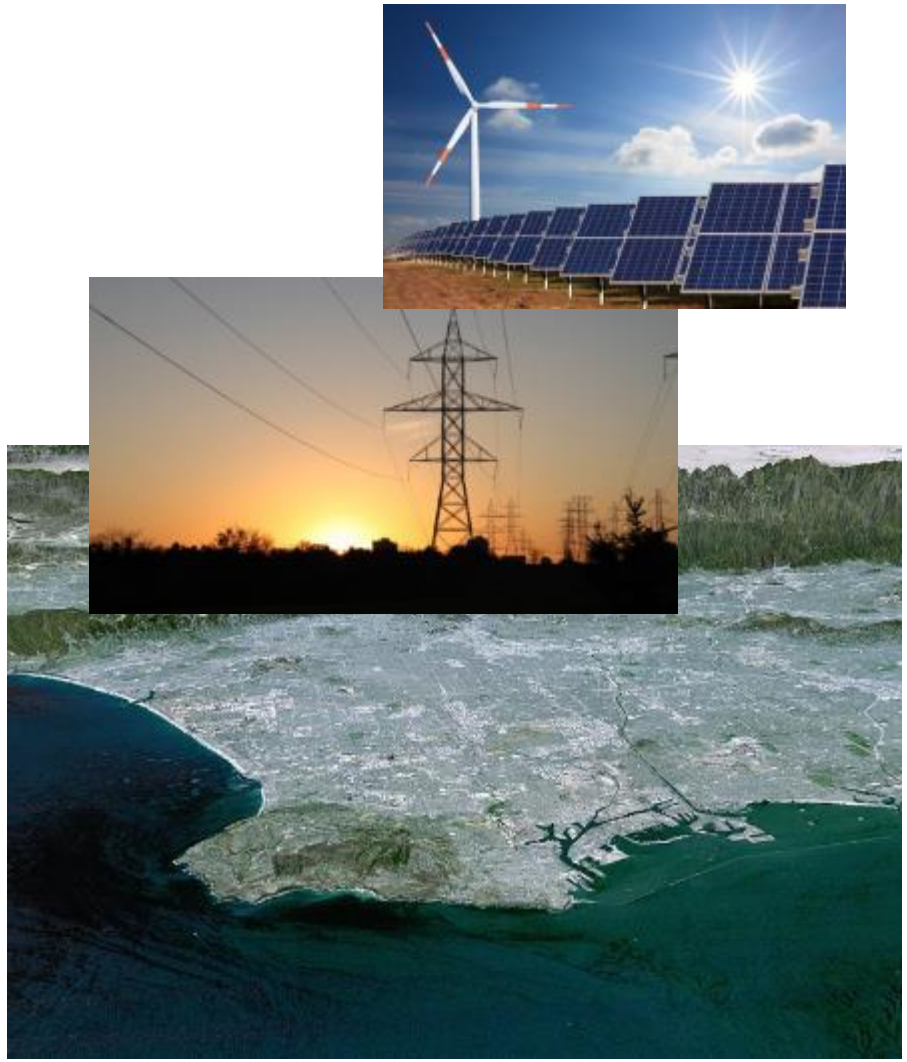
Green Hydrogen in Los Angeles

- Bringing Hydrogen into the LA Basin
  - LA100 Study (NREL)
  - Green Hydrogen RFI & HyDeal LA
  - Scattergood Generating Station
  - Dramatic reduction in gas across all fleet, particularly at Valley Generating Station
- IPP
  - M501 JAC Gas Turbine
  - 30% Hydrogen in 2025
  - Salt Dome H_2 Storage
- Existing Infrastructure
  - Turbines to Retrofit
  - Heat Recovery Steam Generators
  - Experienced Work Force

100% Carbon-Free; Potential Aliso Canyon Considerations

In-Basin Transmission Upgrades

- 10 in-basin upgrades necessary over next decade
- Outage coordination will be a significant challenge, even under normal circumstances
- Planned and unplanned outages require in-basin capacity to maintain reliability
- **Maintenance and upgrade outages typically happen in the winter, outside of summer peak but coinciding with gas system peak**



Decarbonizing In-Basin Generation

- LA100 shows dramatically reduced gas usage followed by full decarbonization of in-basin capacity
- Over the next decade: **significantly reduced gas usage, but continued high peak demand**
- Construction & retrofit for H2 at In-Basin stations to decarbonize & maintain reliability and resilience to fully decarbonize by 2035

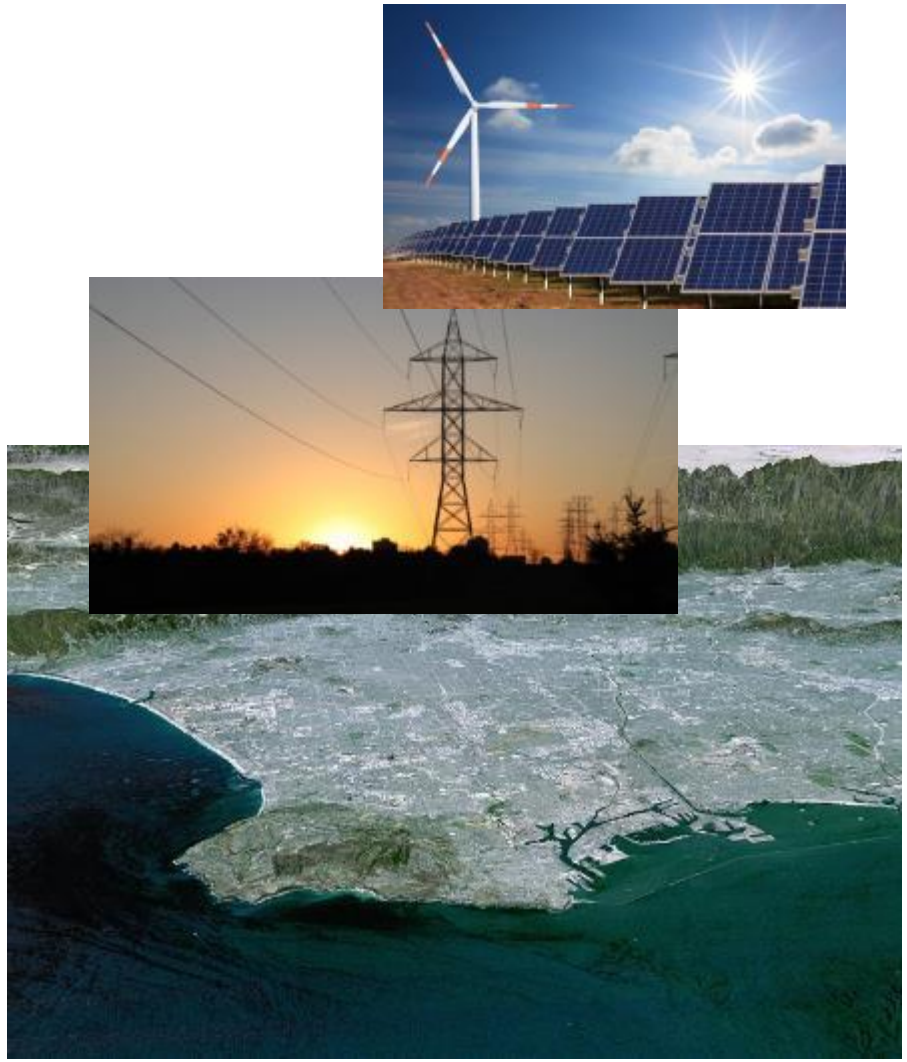
100% Carbon-Free; Potential Aliso Canyon Considerations

Electricity Demand Growth in Urban Areas

- Airport, Port Electrification, Vehicle and Building Electrification, 2028 Olympics
- Much of this happening over the next decade
- Critical to broader decarbonization efforts
- Critical to the affordability of our electric grid transformation

Low Frequency, High Impact Events

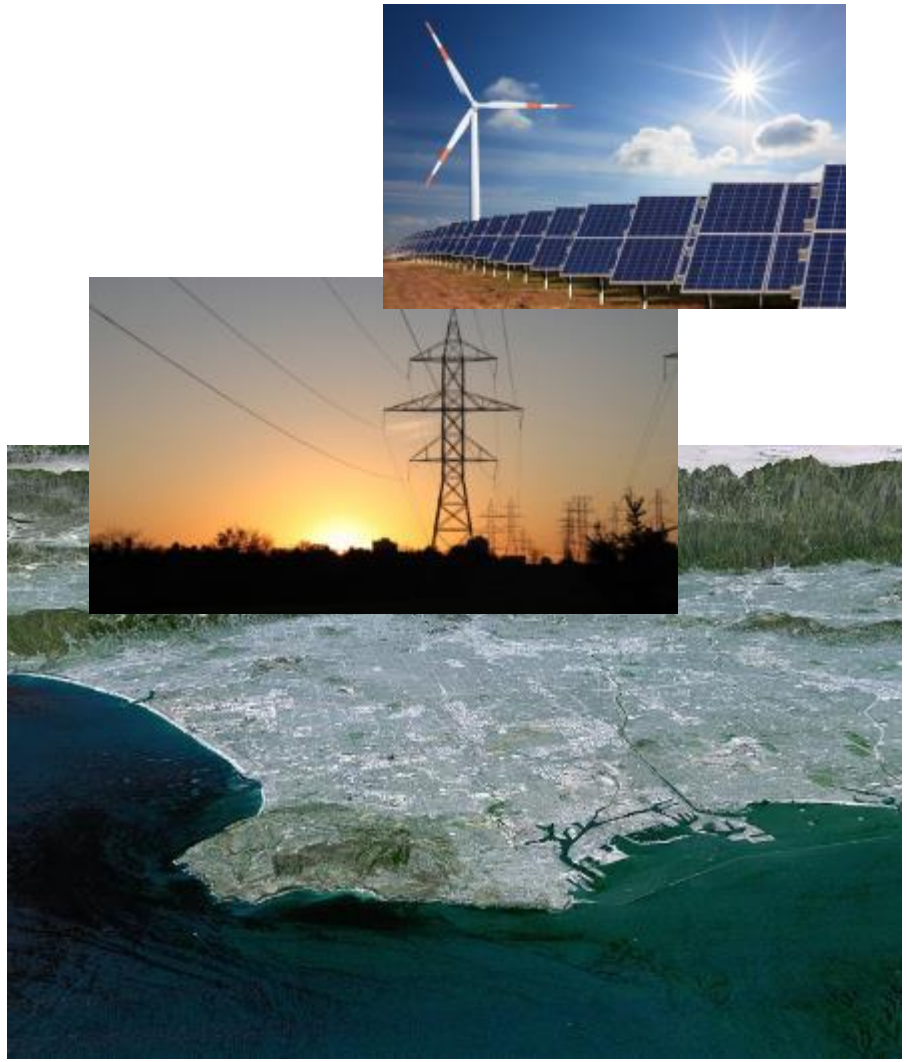
- Saddleridge Fire ‘19, Blue Cut Fire ’16, Sayre Fire ’08, Northridge Earthquake ’94
- **Need an approach to resilience in Aliso modeling**
- Impacts include lives lost, economic impacts, and **potential risk for broader decarbonization effort**



100% Carbon-Free; Potential Aliso Canyon Considerations

Complexity of the Grid

- Dependencies on weather, water, communications, cyber security, customer participation and in the immediate term, reliable gas supply
- Interconnectedness and uniqueness of utilities / balancing authorities
- Complexity increasing under changing legislative and regulatory landscape, evolving technology, wildfires, drought



Need for Robust, Ongoing Modeling

- Sub hourly modeling
- Annual or biennial reliability modeling
- Factor in regional transformation efforts
- Approach to modeling resilience
- Continued engagement