LA100

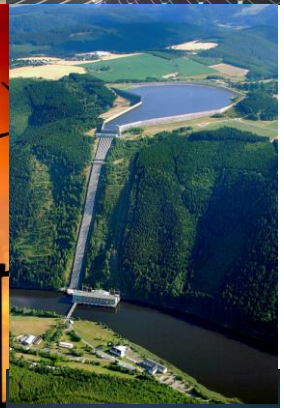
The Los Angeles 100% Renewable Energy Study

The Los Angeles 100% Renewable Energy Study (LA100)

National Renewable Energy Laboratory

March 16, 2021

LA DWP Los Angeles Department of Water & Power | NREL Transforming ENERGY

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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 can **environmental justice communities** benefit from and be part of the solution?
- How might **local jobs** and the **economy** change?

What Makes the LA100 Study Groundbreaking?

First 100% RE study of a large system that must balance electricity supply and demand **at all times**

Complex analysis reflecting **integration** of models that address multiple aspects of the challenge

Unprecedented **detail** in modeling resolution and simulations

LA100 does **not** present recommendations or suggest policies

Components of LA100

The Customer

- CHAPTER 3 **Electricity Demand Projections**
- CHAPTER 4 **Customer-Adopted Rooftop Solar & Storage**

The Power System

- CHAPTER 5 **Utility Options for Local Solar & Storage**
- CHAPTER 6 **Renewable Energy Investments & Operations**
- CHAPTER 7 **Distribution System Analysis**

The Community

- CHAPTER 8 **Greenhouse Gas Emissions**
- CHAPTER 9 **Air Quality & Health**
- CHAPTER 10 **Environmental Justice**
- CHAPTER 11 **Economic Impacts & Jobs**

Advisory Group Provides Input and Review Throughout the Study

Representatives:

- Environmental groups
- Neighborhood councils
- Academia
- Premier accounts
- City government
- Business and workforce groups
- Utilities

Scenarios Based on LA Advisory Group Priorities

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% 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

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

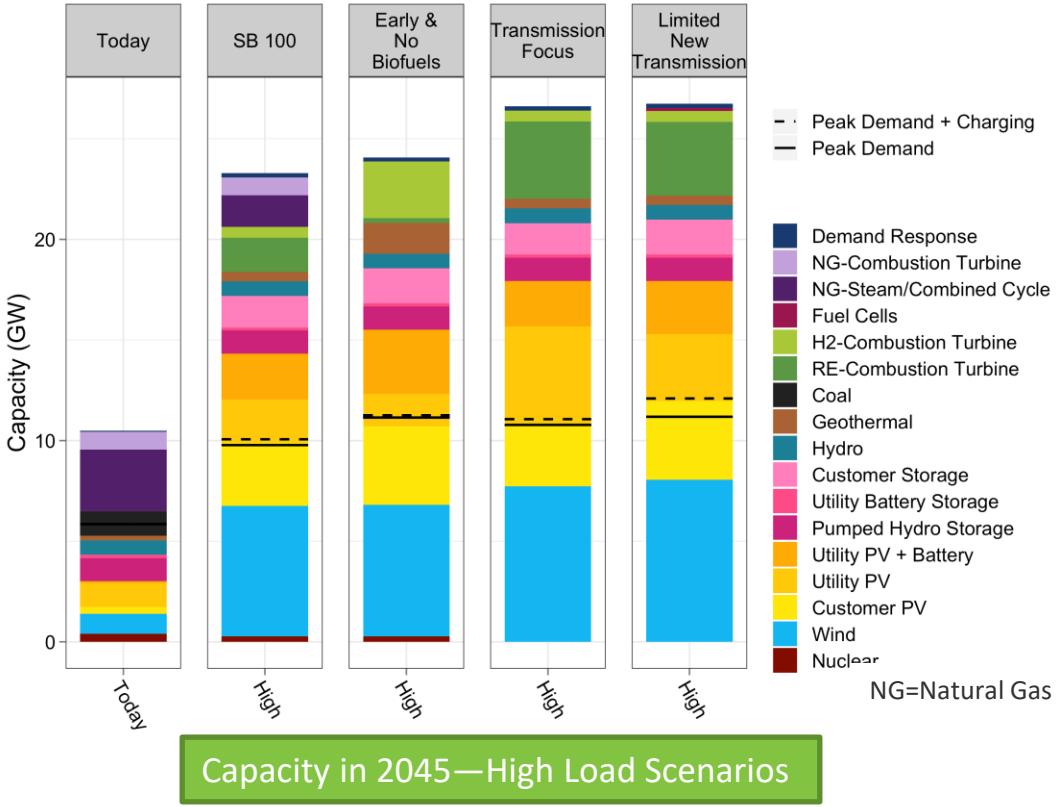
Moderate

High

Stress

100% RE Is Achievable; the Broader the Eligible Solutions, the Lower the Costs

- Wind and solar resources meet the majority of energy needs (70%–90%)
- Storage resources with 4–12 hours of storage are key to enabling increased use of wind and solar
- New in-basin RE-fueled (e.g., hydrogen) power plants that can come online within minutes and run for hours to days comprise the least-cost options to maintain reliability
- Breadth in eligibility of how to meet 100% target can help manage uncertainty of new fuel options (costs, market readiness)



Capacity in 2045—High Load Scenarios

Across All Scenarios

Electrification
Efficiency
Flexible Load

Customer
Rooftop Solar

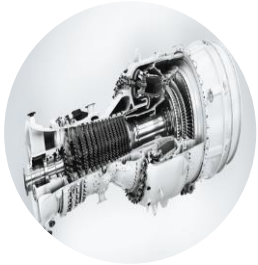
Renewable
Energy

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

Storage

+ >2,600 MW

Distribution,
Transmission



Renewably Fueled
Combustion
Turbines

+>2,600 MW
(in basin)

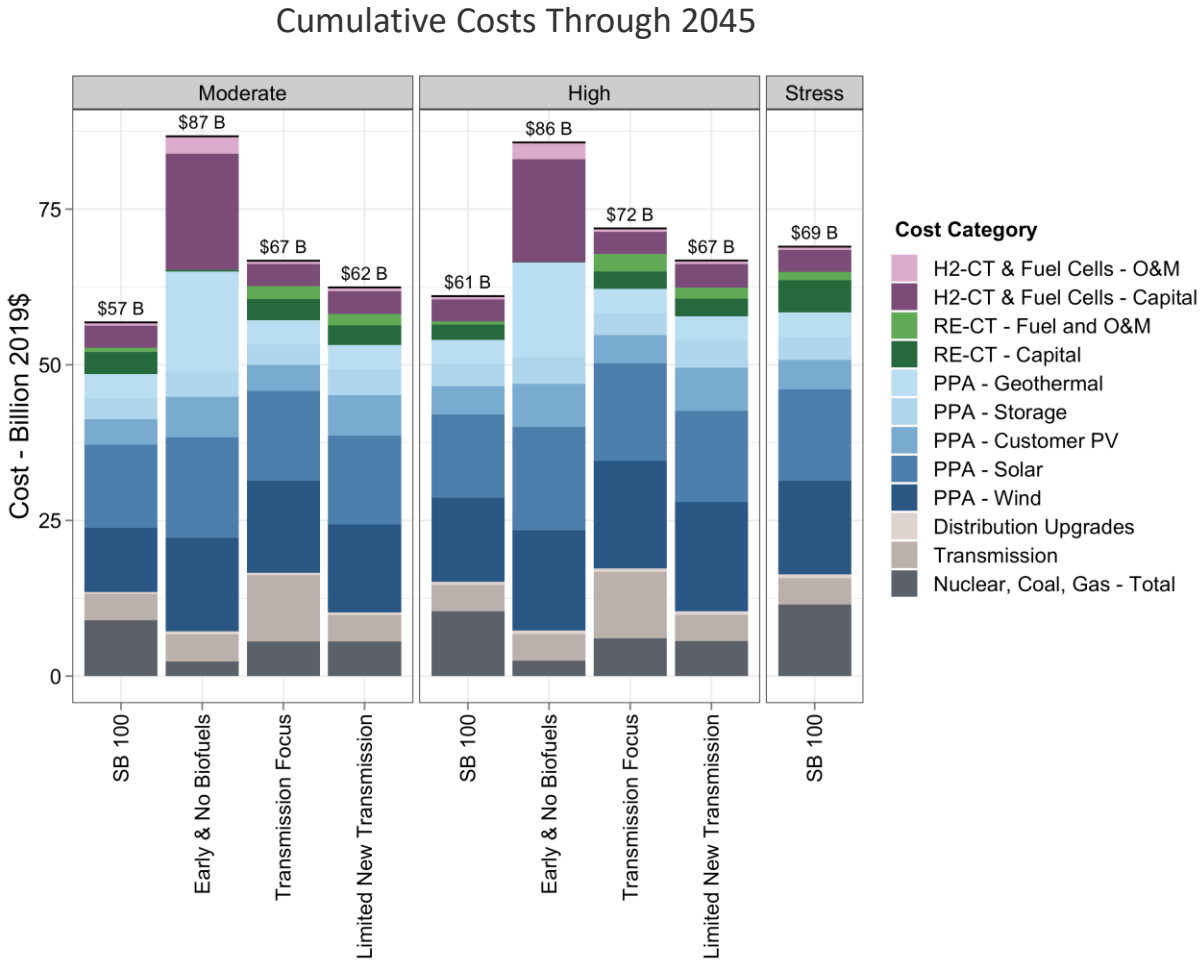
Much More

New

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

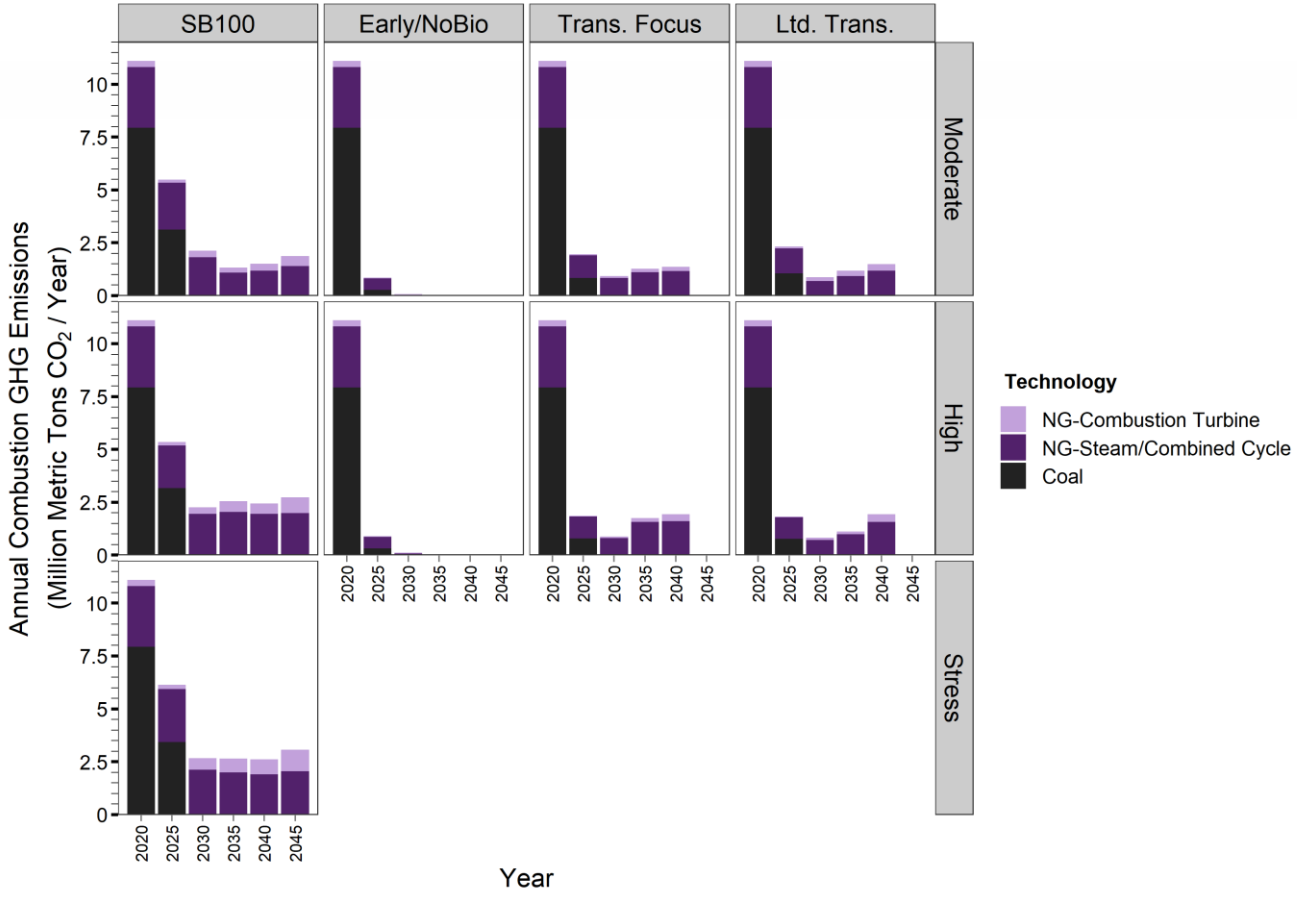
Total bulk system costs are dominated by investment in new solar, wind, and storage.

Pathways that do not allow biofuel plants to be built (i.e., Early & No Biofuel scenarios) result in substantially higher cost.



Greenhouse Gas Emissions

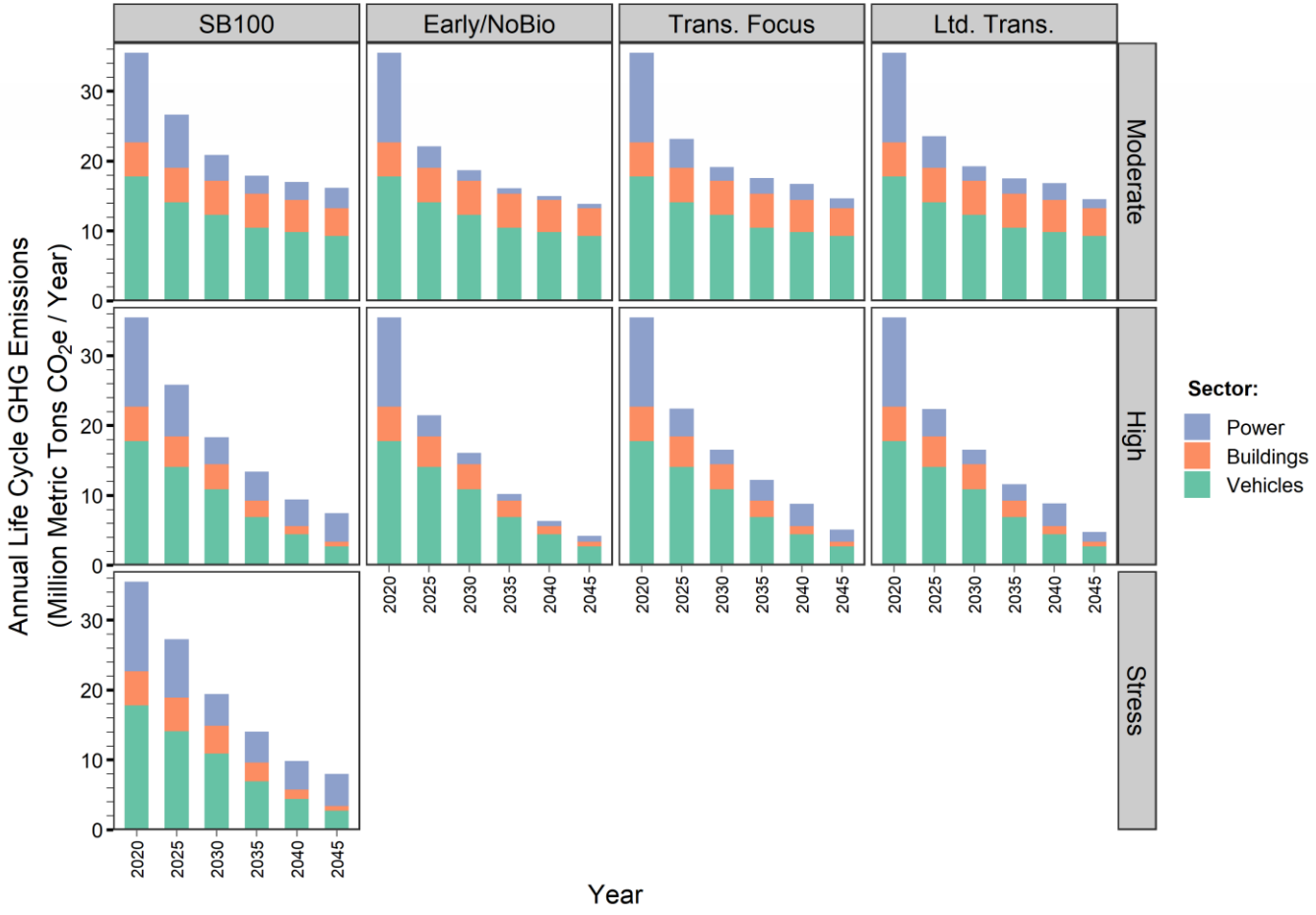
Significant drops in power-sector emissions by 2030 across all scenarios due to elimination of coal at Intermountain Power Plant



Life-Cycle Greenhouse Gas Emissions

All Sectors

Electrifying buildings and cars (middle “High” row) results in least overall emissions, especially by 2045



Other Components of LA100

- **Air quality** changes to ozone and $PM_{2.5}$ concentrations
- **Health impacts** (select morbidity and mortality) from changes in exposure to ozone and $PM_{2.5}$
- **Monetization** of benefits (health and greenhouse gases)
- **Environmental justice analysis** using CalEnviroScreen
- **Net economic impacts** within the City of LA
- **Workforce needs** within and outside of the LA basin
- Projections of **customer solar and storage**
- Locations for **LADWP-procured solar and storage**
- **Upgrades** and associated costs on the **distribution grid**

Outreach Timeline

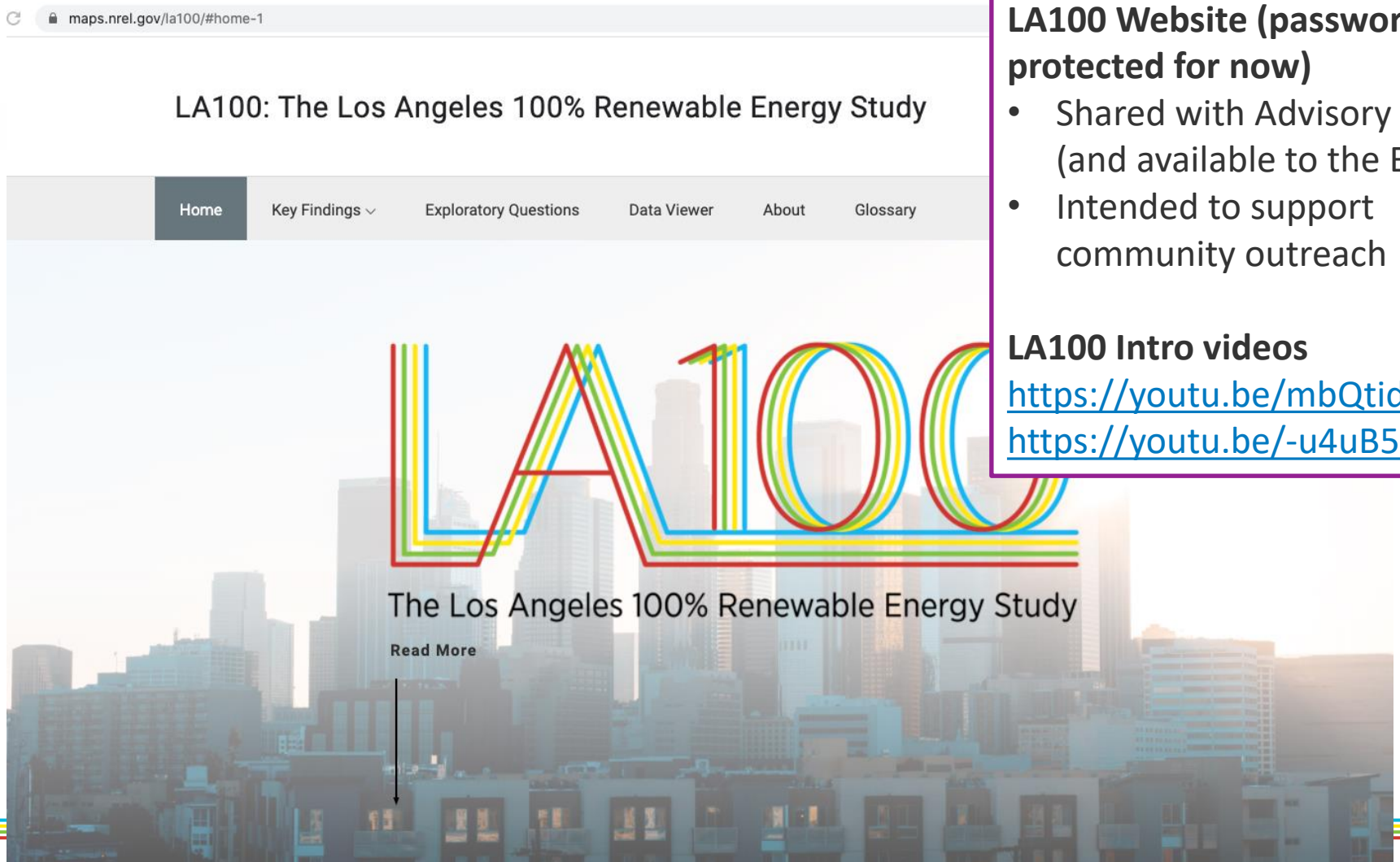
January – March: Community outreach by LADWP and NREL

- Meetings spanning morning, afternoon, evening, and weekend
- Additional presentations to NC Alliances

March 2021—Delivery of final report and interactive website

Outreach Dates

1. Thursday afternoon, Jan 21, 1:00-2:30 pm
2. Thursday evening, Jan 21, 6:30-8:00 pm
3. Friday afternoon, Jan 22, 1:00-2:30 pm
4. Saturday morning, Jan 23, 10:00-11:30 am
5. Saturday morning, February 6, 8:30-10:00 am



LA100 Website (password protected for now)

- Shared with Advisory Group (and available to the Board)
- Intended to support community outreach

LA100 Intro videos

https://youtu.be/mbQtidp1HCQ
https://youtu.be/-u4uB5H2u5g

Thank you!

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