2022 Power Strategic Long-Term Resource Plan Update

Roadmap to 100% Carbon Free by 2035

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LA100 Study Outcomes

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

- 100% renewable energy is achievable through multiple pathways
- Building and transportation electrification key to affordability
- Investment of approx. $57-87B **in addition to existing obligations** (e.g. PSRP)
- Significant job creation (9,500 jobs)
- We can achieve 100% by 2035

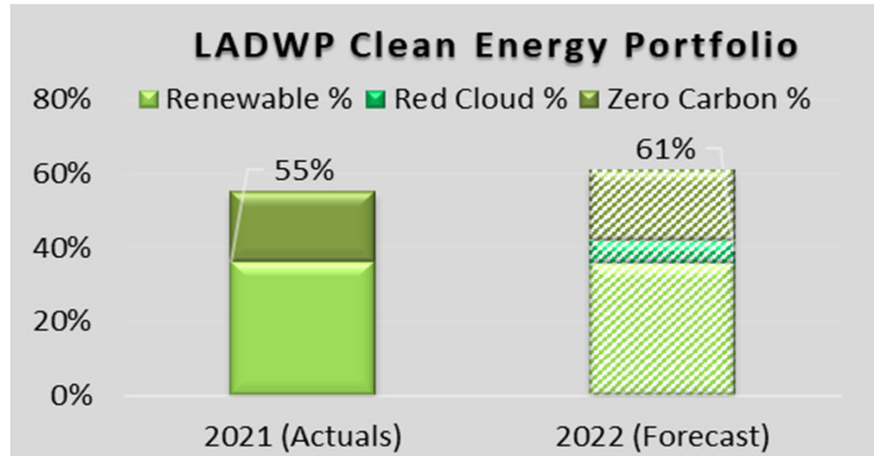
- **There are common investments across all pathways to 100%**

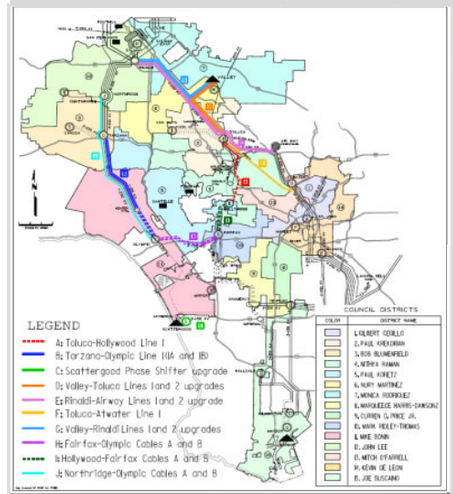
LA100 Next Steps

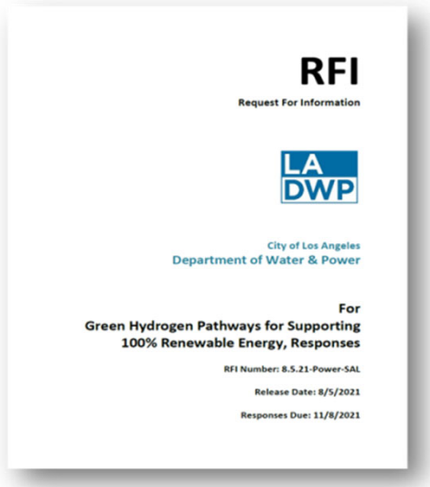
Accelerate to **80% Renewable 97% GHG-Free by 2030**	**Increase to 80% renewable energy by 2030** to achieve 97% GHG free by adding **3,000 MW of new renewables**.
Accelerate **Transmission**	Complete **10 critical transmission projects over 10 years** to maintain grid reliability and meet growing EV, 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**.

LA100 Next Steps - Progress to Date

80% Renewable by 2030	**Red Cloud Wind:** 331 MW in-service Dec 2021 **Eland Solar + Storage:** 2023 commercial operation **Local Solar:** 550 MW in-service to date
Transmission	**Toluca to Hollywood Line 1** permitting in process **Tarzana to Olympic Line 1** permitting in process Biweekly Implementation Meetings on-going
Local Generation	**Green hydrogen Request for Information** (RFI) issued **Scattergood hydrogen capacity** and **Haynes recycled water** Seeking external funding opportunities for green hydrogen
Energy Storage	Installed or contracted **333 MW of energy storage for 2023** Maximize use of solar + storage **Investment Tax Credits** **Scattergood energy storage** conceptual plans
Equitable DERs	**LA100 Equity Strategies Study** on-going through 2023 Expanded **Feed-in Tariff** from 150 MW to 450 MW, advertised **DER RFP**, launched thermostat **demand response** program







LA100

ACHIEVING 100% RENEWABLE ENERGY IN LOS ANGELES

LA100 Study

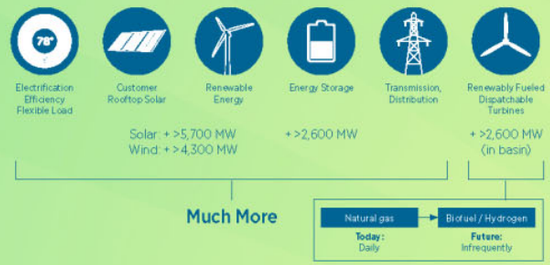
Completed

Unprecedented analysis ID'd multiple paths to achieve 100% target

Considers reliability, equity, sustainability and affordability

- Confirmed 100% by 2035 achievable
- Community & stakeholder input

Common Investments Across All Scenarios



LA100 Equity Strategies

Fall 2021-23

Community-driven, objective to achieve equity

Robust community engagement

Areas of Focus

- Improve air quality
- Energy Efficiency
- Demand management
- EV charging access
- Solar access
- Affordable rates
- Debt relief

2022 SLTRP

Fall 2021-2022 | 2035 & 2045 Targets

Our comprehensive integrated power plan

Recommends path forward to achieve our goals

- Integrates findings of LA100
- Community & stakeholder input
- Prioritizes reliability, resiliency, equity, affordability, sustainability

Considerations

- Workforce
- Building, Operating & Maintaining
- Cost to customers
- Supply Chain Risk
- Implementation and Feasibility

What Is LADWP's SLTRP?

The Strategic Long-Term Resource Plan (SLTRP) is a roadmap to meet L.A.'s future energy needs and regulatory mandates while maintaining reliable service and reduce emissions in a cost-effective manner. ***SLTRP was paused during LA100 Study***

Outcome: Develop a recommended scenario that guides our near-term actions and future energy planning to achieve **100% carbon free by 2035** and **through 2045.**

2022 SLTRP will also be supported by:

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

2022 SLTRP Timeline

2022 Strategic Long-Term Resource Plan (SLTRP) – Core Scenarios

Los Angeles Department of Water & Power

SCENARIOS (100% Carbon Free by 2035)

CLEAN ENERGY TARGETS

	SB 100 Reference Case	Case #1	Case #2	Case #3
Total Renewable Portfolio Standard 2030	60%	80%	90%	90%
Total Clean Energy (Renewable, Hydro and Nuclear) Penetration Achieved 2035 vs. 2045	2035 80% 2045 90%	2035 100% 2045 100%	2035 100% 2045 100%	2035 100% 2045 100%
Distributed Energy Resource Deployments	Reference Levels	High Levels	High Levels	Highest Levels

2022 SLTRP Sensitivities

Commodity Prices	Examples	Price Sensitivity Scenarios Applied to 100% carbon free by 2035 Scenarios
Fuel Prices*	Natural Gas, Green Hydrogen, etc.	High/low sensitivities
GHG Prices*	GHG Allowance Prices	High/low sensitivities
Renewables and Energy Storage Prices*	Solar, Wind, Geothermal, Li-Ion, flow, etc.	High/low sensitivities

**bookend scenarios to evaluate price sensitivities by matching low and high commodity prices:*

- ***Low Bookend:*** *Low natural gas prices, low hydrogen prices, low GHG prices, low renewable and energy storage prices*
- ***High Bookend:*** *High natural gas prices, high hydrogen prices, high GHG prices, high renewable and energy storage prices*

Implementation Risk	Description	"What-if" Sensitivities Applied to Tentative Recommended Case (based on preliminary results)
Emerging Technologies	No Combustion Alternatives	Long duration capacity (e.g. Hydrogen Fuel Cells)
Demand Side Resources	Demand Response	Reaching only half of the 576 MW of DR by 2035
Transmission	Transmission Upgrades (over 10 projects by 2030)	More difficult in-basin upgrades not completed by 2030
Load	Transportation/Building Electrification	Low Load and High Load

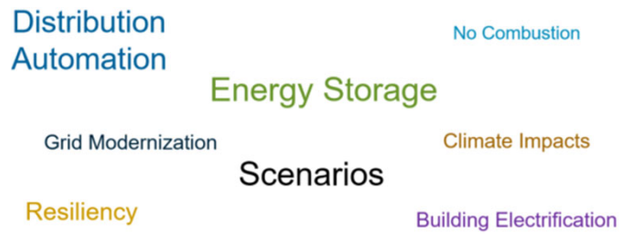
Advisory Group Meeting Plan

Phase 1 | Q3 2021 Launch & Laying Foundation	Phase 2 | Q3 2021 Scenario Development	Phase 3 | Q4 2021 Modeling	Phase 4 | Q1-2 2022 Results	Phase 5 | Q2-3 2022 Outreach
#1 September 23 • Advisory Group Launch • LADWP Overview • LA100 (Achieving 100% Renewable Energy) • 2022 SLTRP Orientation • Advisory Group Protocols & Operating Principles	**#4 October 22** • Customer Focused Programs - Energy Efficiency & Building - Electrification - Transportation Electrification - Demand Response • Draft Scenario Matrix	**#7 December 17** • LA100 Equity Strategies Overview • Energy Storage Presentation • 2022 SLTRP What-If Sensitivities Discussion • Final Scenario Matrix	**February** ***(Email Update)*** • Modeling Progress Check-in, • Upcoming Board Meetings	**#9 June 9** • Preliminary Results on What-if Sensitivities **May – August TBD** Community Outreach Meetings
#2 September 30 • *LA100 Study Review (NREL) at 9 am* • LA100 Rates Analysis (OPA) at 10 am • LA100 Next Steps (LADWP) • LA100 Assumptions (PSRP) • Consider Topics for October 22 • Consideration of Scenario Definition	**#5 November 10** • LA100 "No Combustion" Scenario • 2022 SLTRP Assumptions • Metrics & Evaluation Process • Scenario Considerations • Refine Scenario Matrix	**November – May** • Internal Modeling • Analysis of Scenarios	**#8 April 28** • Preliminary Results on Core Scenarios • (Capacity Expansion, LOLP and Production Cost Model)	**#10 August 11** Public Outreach Results **August** Review Draft 2022 SLTRP
#3 October 08 • SLTRP Deep Dive • SB100 Review (LADWP) • 100% Carbon-Free by 2035 Requirements (NREL) • Green Hydrogen in LA (LADWP) • 2022 SLTRP Key Considerations and Potential Scenarios	**#6 November 19** • Distribution Automation • 2022 SLTRP Advisory Group Feedback and Refined Draft Scenario Matrix • 2022 SLTRP What-If Sensitivities Discussion	Modeling Underway	**TBD** Potential field trip	**September** Submit Final 2022 SLTRP for approval

Advisory Group Feedback

AG Feedback from first 7 Meetings

1) **Model only 100% Carbon Free by 2035 scenarios**
2) **Include a "No Combustion" scenario and long-duration energy storage**
3) **Understand capital expenditures and cost, customer cost to electrify**
4) **Model emerging technologies and develop a process to evaluate**
5) **Explore "low load" sensitivities and impact to rates**
6) **Ensure environmental justice and study local air quality impacts**



LADWP's Efforts to incorporate:

1) All scenarios comply with City Council Motion for 100% carbon free by 2035
2) "What-If" Sensitivities added. Presentation given on energy storage
3) SLTRP will evaluate cost & rates
4) Developing a process for "Technology Scouting and Innovation Assessment"
5) Will model a "low load" sensitivity
6) Partnering with NREL to conduct Local Air Quality and Health Impacts for SLTRP

~20 various presentation topics given at SLTRP meetings to date

PUBLIC OUTREACH PLAN

AG Meetings

PURPOSE:
Provide perspectives on major issues that LADWP will face in the next 25 years, input and review of strategic scenarios that are used in the resource analysis, and input on final recommendations and near-term actions

PURPOSE:
Conduct community meetings at the beginning of the review and comment period and use other communication methods to provide information and publicize opportunities to provide input

Public Workshops

PUBLIC WORKSHOPS

4 Meetings Total

- Public Meeting #1 & #2 – May 2022
- Public Meeting #3 – July 2022
- Public Meeting #4 – August 2022

2022 SLTRP

LA DWP Los Angeles Department of Water & Power

2022 SLTRP Relationship to Equity Strategies (ES)

Local Air Quality (LAQ) Modeling

- Emissions inventory, identify mass of pollutants released into the atmosphere from various sectors (i.e. buildings, transportation, bus/trucks)
- Air quality and health impacts in basin during high peak and stress load condition, including week timeframe analysis

Potential Targeted & Expanded Outreach

- 10 Advisory Group Meetings an increase from original goal of 5 meetings
  - 7 completed
  - 3 upcoming
- 4 Public Workshops
  - Transparency
  - Broad community outreach
  - Opportunity to provide input

Additional Priorities Identified by ES

- Understanding who will benefit from the clean energy transition
- Avoid burdening low-income ratepayers
- Ensuring benefit to renters
- Ensure disadvantaged communities benefit through pollution reduction, improved public health, energy efficiency, and green job creation

2022 SLTRP

- Tenets of energy justice will be in the decision-making process for the SLTRP
- Recommendations of the LA100 ES will be incorporated into the SLTRP

Board Update on LA100 Equity Strategies expected in April 2022

LA DWP Los Angeles Department of Water & Power

Risk Factors

Identified Risk Factors	How 2022 SLTRP will Assess and Address
Cost and Rate Impacts	Price sensitivities to bookend costs
Transmission Builds	Seek legislative relief for permitting
Staffing and Workforce	Integrated Human Resources Plan
Electrification Adoption Rates	Load Sensitivities
Reliability	Conduct modeling to simulate variability of weather (stochastics)
Resiliency	Simulate the effects of wildfires and other natural disasters
Supply Chain	Identify bottlenecks and impacts to scale and cost
Implementation and Feasibility	LA100 Implementation Efforts

Risk Factor – Electrification Adoption Requires Distribution Investments

- Capacity Needs for Electrification
  - Over 650 MW Receiving Station capacity shortfall by 2040
  - Over 800 MW of Distributing Station capacity shortfall by 2040
  - These require the building or expansion of 20 new stations
  - **In the last 20 years LADWP has built four stations**

- Hundreds of Stressed Distribution Assets
  - A third of all feeders (>500 distribution lines) are over capacity
  - **Existing replacement targets need to increase several fold**

LA100 Study –

Maintaining low rates requires high electrification

2022 SLTRP Next Steps

Short-term

Complete Modeling of Core Scenarios

- Finalize Modeling Assumptions
  - Set up IPP hydrogen model – February 2022
  - Set up candidate resources for capacity expansion modeling – February 2022
  - Update production cost modeling data (e.g., fuel pricing, customer load, etc.) – February 2022
- Capacity expansion modeling – March 2022
- Resource adequacy modeling – March 2022
- Production cost modeling – April 2022
- Conduct price sensitivities – April 2022
- Preliminary results – May 2022

Public Outreach Meetings – May 2022

Long-term

Compile SLTRP Document

- Update and compile SLTRP document – Ongoing through September 2022
- Submit SLTRP document for review – August 2022
- Issue final SLTRP document for Board review – September 2022
- Submit IRP based on 2022 SLTRP to CEC – 2023 through 2024
- Launch next SLTRP – 2023 or 2024

Additional Advisory Group Meetings

- AG Meeting #8 – April 2022
- AG Meeting #9 – June 2022
- AG Meeting #10 – August 2022

Discussion and Q&A