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2023 Integrated Energy Policy Report (IEPR)

LADWP's Long-term Transmission Roadmap

May 4, 2023

LADWP's Strategic Long-Term Resource Plan

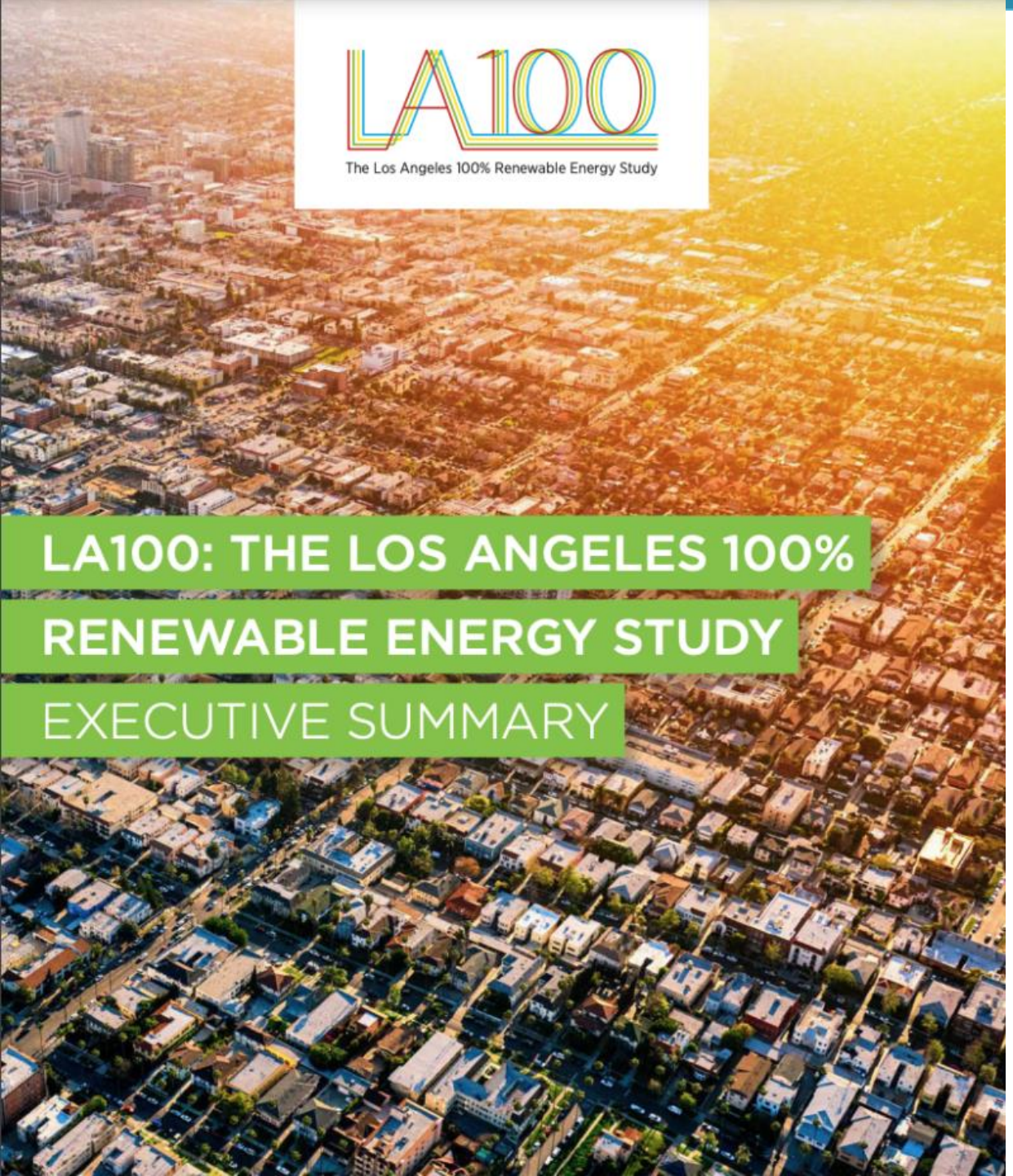
LADWP has been an industry leader in comprehensive planning for our energy future since the 2000 Integrated Resource Plan (IRP) to chart the course for a cleaner, more reliable power future.

In 2017, SLTRP replaced LADWP's traditional IRP, which is now a regulatory requirement and submitted to the California Energy Commission once every 5 years to comply with Senate Bill 350.

Updated yearly; extensive stakeholder engagement every 2 years.

Paused after 2017 until completion of LA100 Study and re-started in 2022.

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.



LA100 STUDY

Final Report was Released on March 24, 2021

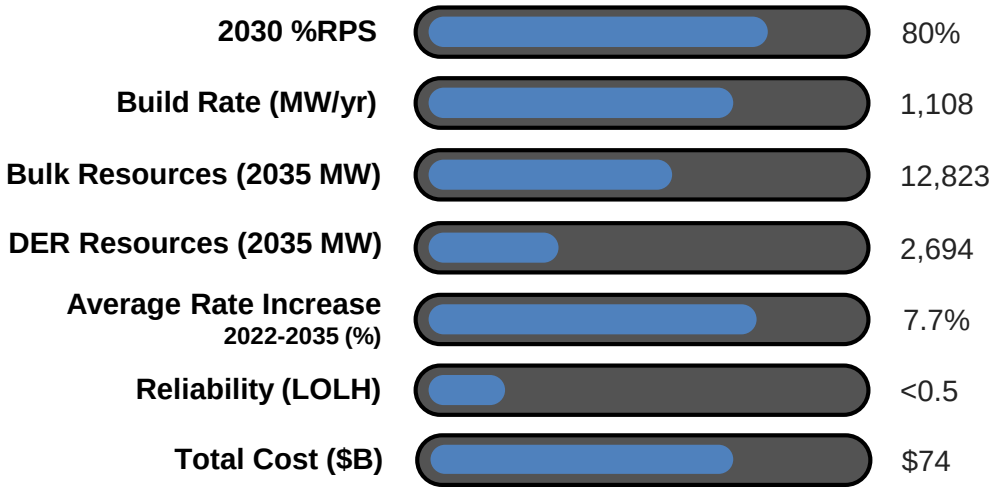
OVERVIEW

- **Technically achievable** through multiple pathways, including by 2035
- Building and transportation electrification required for air quality improvements & affordability
- Investment of approx. **$57-87B** **in addition to** existing obligations (e.g. PSRP)
- Significant job creation (9,500 jobs)

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

*Important Caveats: https://www.nrel.gov/docs/fy21osti/79444-ES.pdf (page 23)

2022 SLTRP Recommended Case



Cost

(based on net present value)

- Fixed Cost
  Debt service, Capital, Fixed O&M, Power Purchase Agreements, etc.
- Variable Cost
  Fuel, GHG allowances, NOx credits, Variable O&M, etc.

Firm Generation

- LA100 determined that in all scenarios firm, **dispatchable generation** was required by 2035.
- LADWP expects to minimize use of in-basin green hydrogen turbines to provide only **backup power** in case of transmission loss (e.g. wildfire) or low renewable energy output.
- Firm generation provides **resiliency during outages** and supports development of new transmission pathways.

Build Rates

- Average build rate from 2018 to 2021 has been **200 MW per year**
- Includes both **utility** and **customer-sided** clean energy resources

Bulk Power Resources include:

- Utility Scale RPS
- Utility Scale Energy Storage
- In-Basin Hydrogen

Distributed Energy Resources include:

- Distributed Solar
- Distributed Energy Storage
- Demand Response

Caveats & Challenges

Challenges in Achieving LADWP's Decarbonization Goals in an Affordable, Equitable, and Reliable Way

Implementation Feasibility

- Human Resources, outage constraints, buildout schedule, real estate, and supply chain must be vetted and ramped up to support the buildout of clean energy resources.

System Reliability

- Firm, dispatchable capacity in-basin needs to be retained even in a decarbonized future Power System for reliability and resiliency.
- Address climate change impacts to reliability

Affordability and Equity

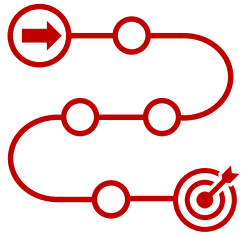
- Additional flexibility in planning to optimize resources is needed to improve cost affordability and minimize energy burden.
- Incorporate LA100 Equity Strategies

Availability of Technology

- Monitor emerging technologies for readiness and feasibility.
- Availability of certain resources (e.g. geothermal)

Power System Roadmap and Next SLTRP

- There is a critical need to review internal and external constraints, optimize future resource plans, which may ultimately impact clean energy goals.



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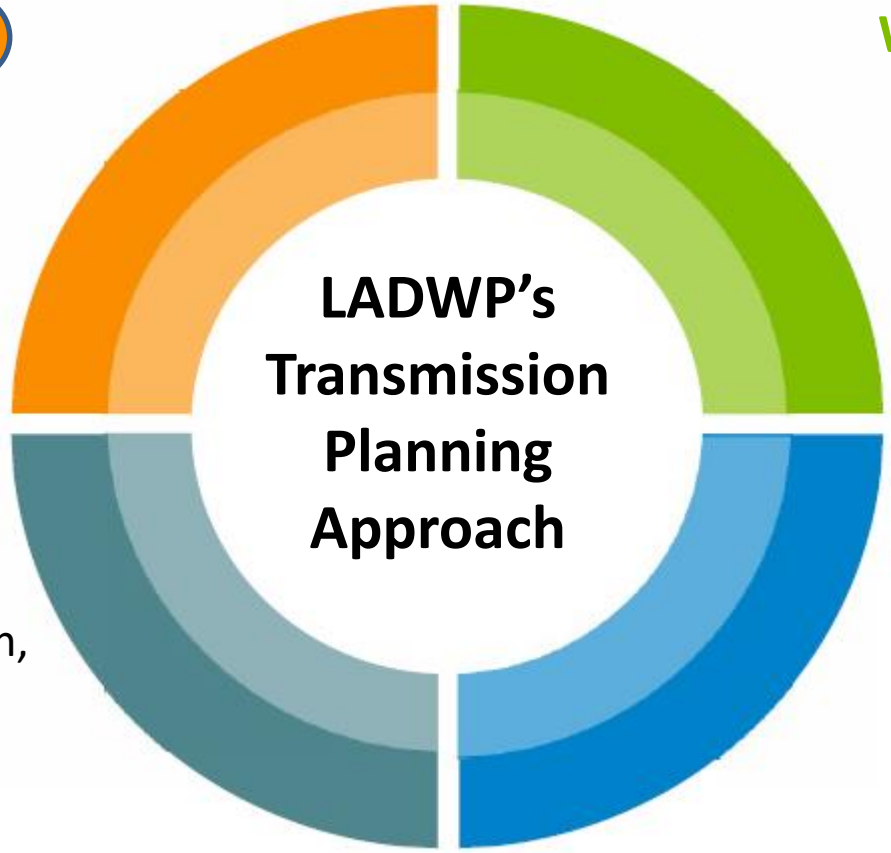
DWP's Transmission Planning Overview: Ten Year Assessment

The Transmission Planning Process Provides a Comprehensive Approach To Identify LADWP Grid Needs

What Is Transmission Planning? 1

A process of assessing LADWP's transmission systems and its ability to deliver electricity safely, reliably and efficiently over a ten year outlook.



What Are The Key Inputs? 2

Transmission planning considers load growth forecast, plans for new generation capacity, generator retirement, and interconnection analysis.

Who Are The Stakeholders? 4

Internal: Resource Planning, Grid Ops, Transmission engineering, Station Design, Financial Service Organization, and Distribution Engineering

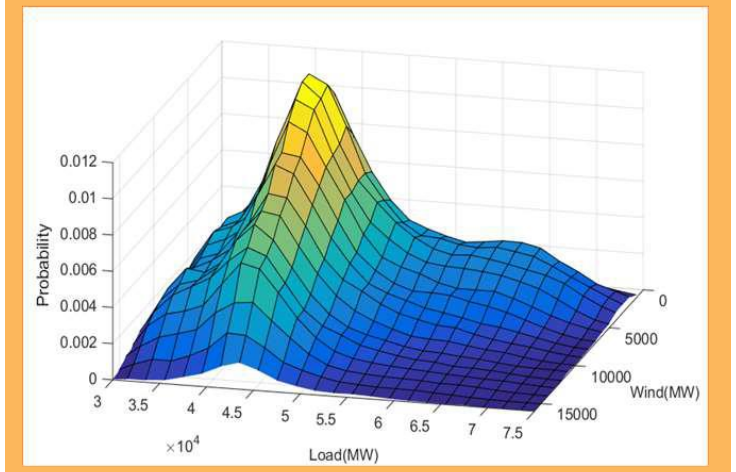
External: Regional planning agencies, neighboring utilities, and the general public.

What Is The Outcome? 3

Develop recommendations for system upgrades to meet load forecast and reliability needs. The **Ten Year Transmission Assessment Plan**, is performed annually and is a regulatory requirement.

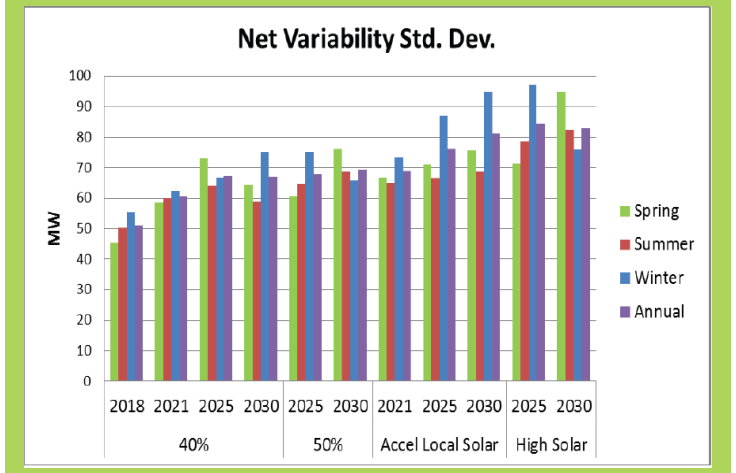
DWP's Transmission Planning Overview: Ten Year Assessment (Cont'd)

Transmission Planning Reliability Assessment Framework



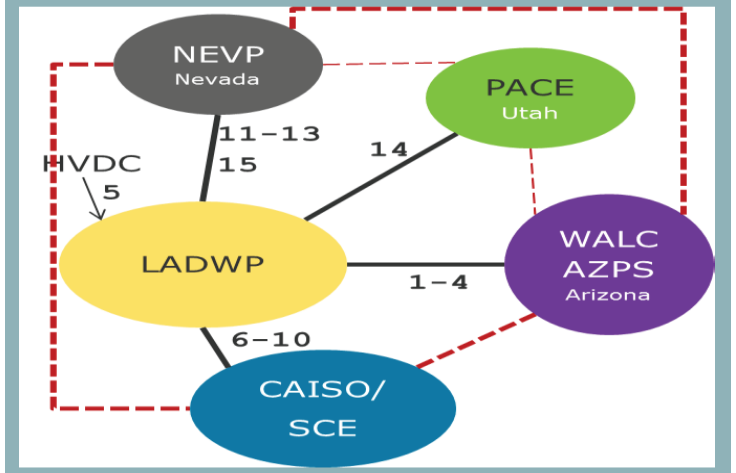
Develop Base Case Scenarios

Compile historical profiles of load, generation resources, and demand-side resources to develop power flow cases by season.



Analyze Each Scenario

List all plausible contingencies to probabilistically assess reliability of each scenario with and without upgrade options to identify the best system reinforcement solutions.



Recommend Transmission Upgrades

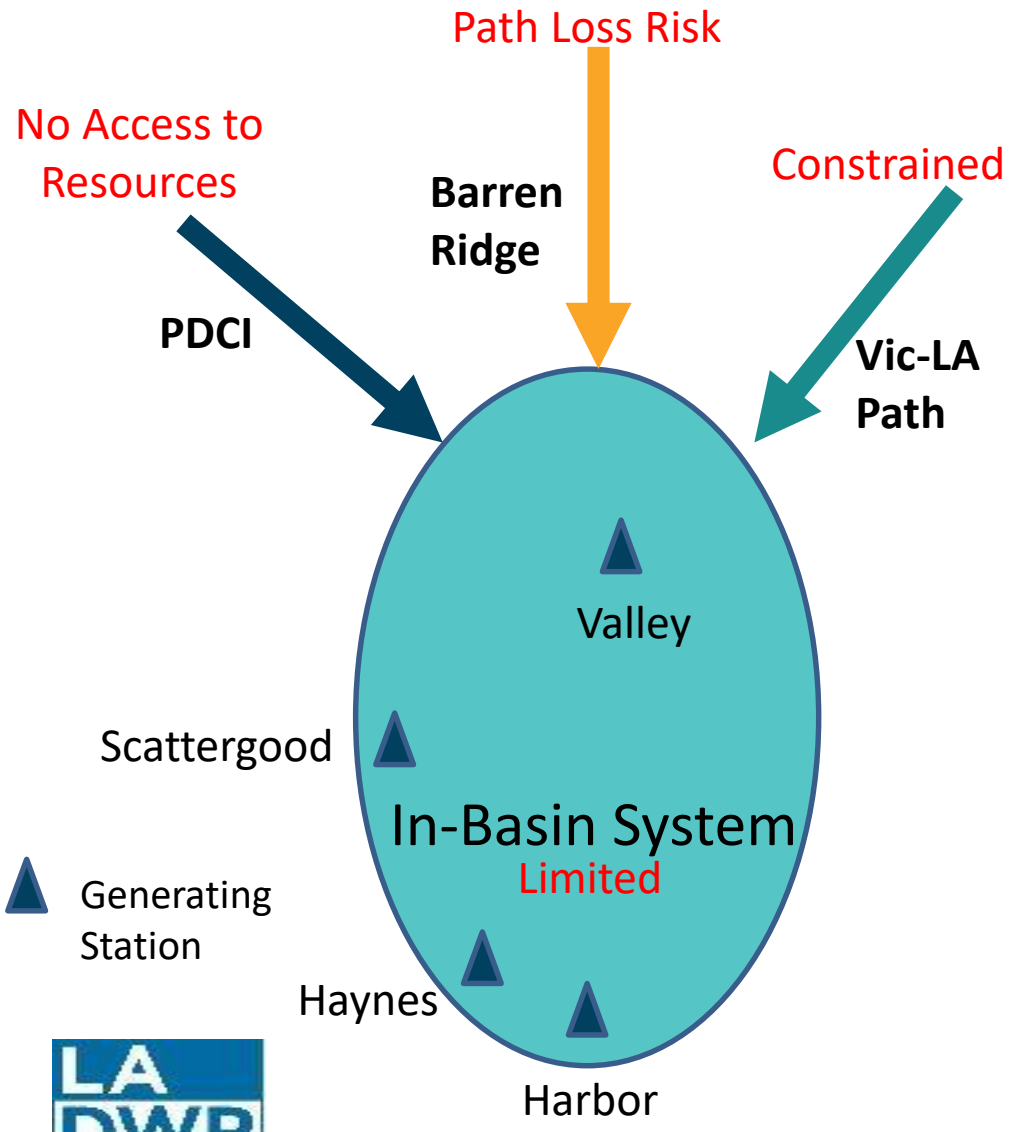
Includes overhead transmission, underground transmission, and transmission facilities/equipment upgrades required for system reliability.

DWP's Transmission Planning Overview: Strategic Transmission Plan

Transmission Is a Big Piece of the Puzzle As Acknowledged in LA100

- LA100 Study identified transmission need, but did not specify projects
- "Chicken or the egg" relationship between transmission and resources
  - Resource plans depend on availability of transmission
  - Transmission investment depends on location of resources
- The LADWP's Strategic Transmission Plan study is intended to identify transmission necessary to make LADWP's Strategic Long-Term Resource Pan (SLTRP) achievable

DWP's Transmission Planning Overview: Strategic Transmission Plan (Cont'd)



Current State of LADWP's Transmission System

Transmission System Limitations

- Major transmission path constraints
- Limited in-basin transmission capacity
- Current planning horizon is for 10 years or less

Necessary Measures

- Develop a Strategic Transmission Plan with a 15-20 year horizon
- Relieve existing transmission constraints
- Expand transmission capacity
- Meet anticipated load increase

DWP's Transmission Planning Overview: Generator Interconnection

Generator Interconnection Is a Critical Aspect of DWP's Transmission Planning Process.

LADWP's Generator Interconnection Study Process:

- Is a serial "first come, first served" process
- It involves connecting new large-scale generators to the existing grid
- This process ensures safe, reliable, and cost-effective interconnection
- This process is part of the transmission planning process which includes:
  - System Impact Study (SIS)
  - Facility Study (FS)
  - Interconnection agreement negotiation

DWP's Transmission Planning Overview: Generator Interconnection (Cont'd)

LADWP's Generator Interconnection Process Reform

LADWP Is Currently Reforming its Interconnection Process Due To:

- Large volume of Interconnection Requests
- Significant delays from SIS Re-Study and drop outs
- Inefficiencies in serial "first come, first served" study process approach

Moving Forward, LADWP Will:

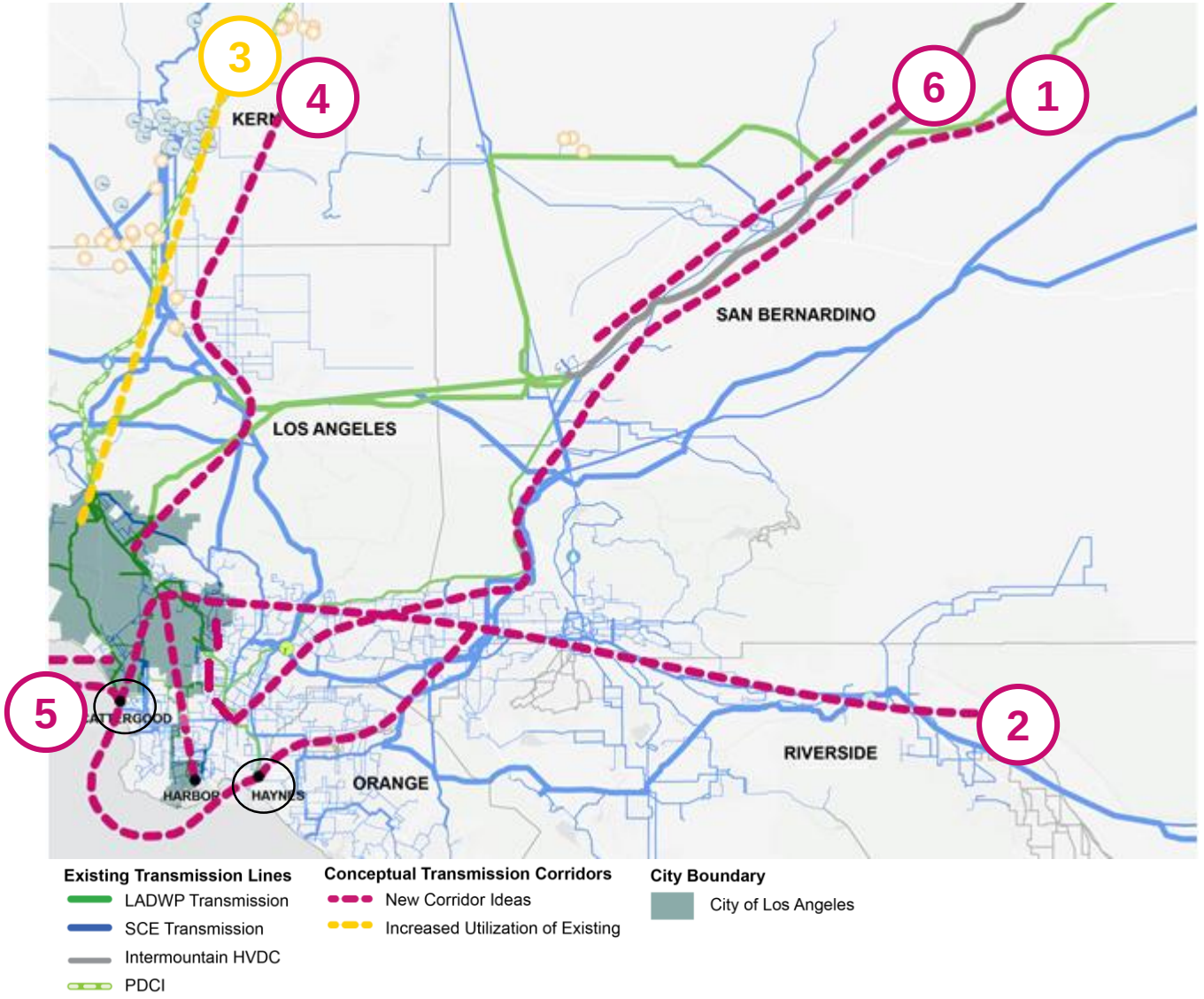
- Eliminate the serial "first-come, first-served" study process currently in place
- Instead use a "first-ready, first-served" cluster study process
- Require customers to satisfy additional financial commitments and readiness requirements

Anticipated Start of Cluster Study Process: Spring 2024

Transmission Plan Summary: Strategic Transmission Plan

Projects Under Consideration

1. Upgrade 287 kV Corridor from LA Basin to LV
2. New Corridor Heading East
3. Increase Utilization of PDCI
4. Diverse Path to Barren Ridge Area
5. Submarine Cable
6. Upgrade IPP Southern Transmission System



Transmission Plan Summary: Strategic Transmission Plan (Cont'd)

- Joint Transmission Projects Collaboration
  - Accelerated delivery of transmission projects
  - Geographic diversity
  - Resiliency
  - Operating Agent
  - Mitigation of financial and schedule risks

- Collaboration with U.S. Department of Energy
  - National Transmission Planning

Questions?