DOCKETED	
Docket Number:	21-IEPR-05
Project Title:	Natural Gas Outlook and Assessments
TN #:	239025
Document Title:	Presentation - LADWP's Hydrogen Pathway
Description:	S1.1D Paul Schultz, LADWP
Filer:	Raquel Kravitz
Organization:	Los Angeles Department of Water & Power
Submitter Role:	Public
Submission Date:	7/27/2021 10:47:25 AM
Docketed Date:	7/27/2021

Los Angeles Department of Water & Power

CUSTOMERS FIRST

LADWP's Hydrogen Pathway

IEPR Commissioner Workshop on Hydrogen to Support California's Clean Energy Transition

July 28, 2021

IPP Renewed

Current Intermountain Power Project

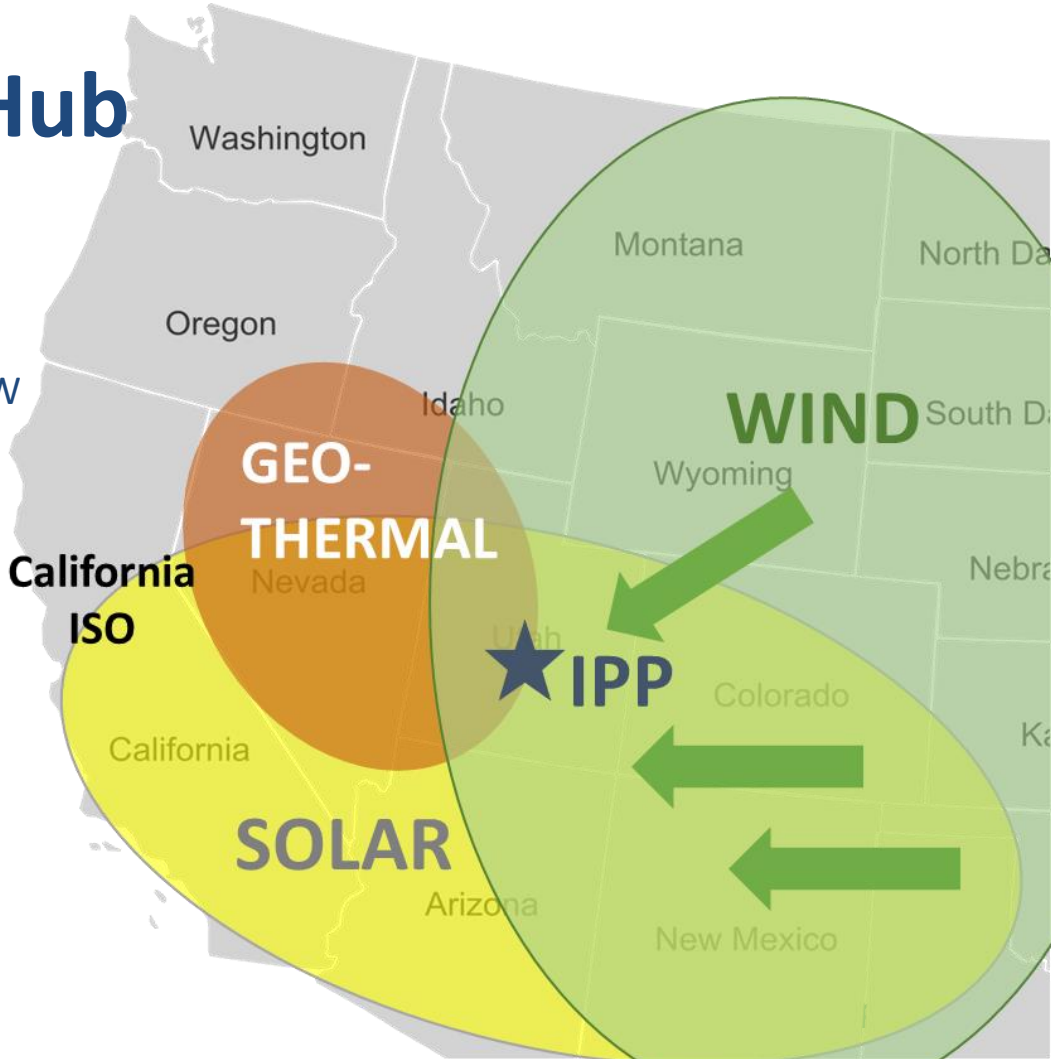
- Located in Delta, Utah
- Owner by Intermountain Power Agency (IPA)
- 35 Project Participants (23 Utah And 6 California Munis, 6 Utah Coops)
- Two Coal Units – 1,800 MW Net Capacity
- Coal Closure by 2025
- Northern and Southern Transmission Systems
  - 2400 MW HVDC STS to Southern California
- LADWP is the Project Manager and Operating Agent

Renewed Project Scope

- 840 MW Natural Gas Advanced Class Combined Cycle Facility
  - Contract signed with Mitsubishi in February 2020
  - Mitsubishi Power has committed to performance requirements to allow 30% hydrogen fueled units for 2025 and a pathway to 100%
- 2,400 MW HVDC Converter Stations Replacement
- In-Service May 2025

Utah's Renewable Hub

- IPP sits in a confluence of renewable resources
- Currently interconnected about 400 MW of wind generation and geothermal
- 2,300 MW of current solar interconnection requests in queue
- 2,000 MW of Wyoming wind interconnects currently being discussed
- Considered the "Western Renewable Energy Hub"



LA DWP

Green Hydrogen Future

The hydrogen pathway at IPP represents a first-of-its-kind opportunity for the western energy grid. Utilizing its existing transmission capabilities to power hydrogen-generating electrolyzers, the fuel can be either stored in the massive geologic salt formation or burned in the existing combustion generators.

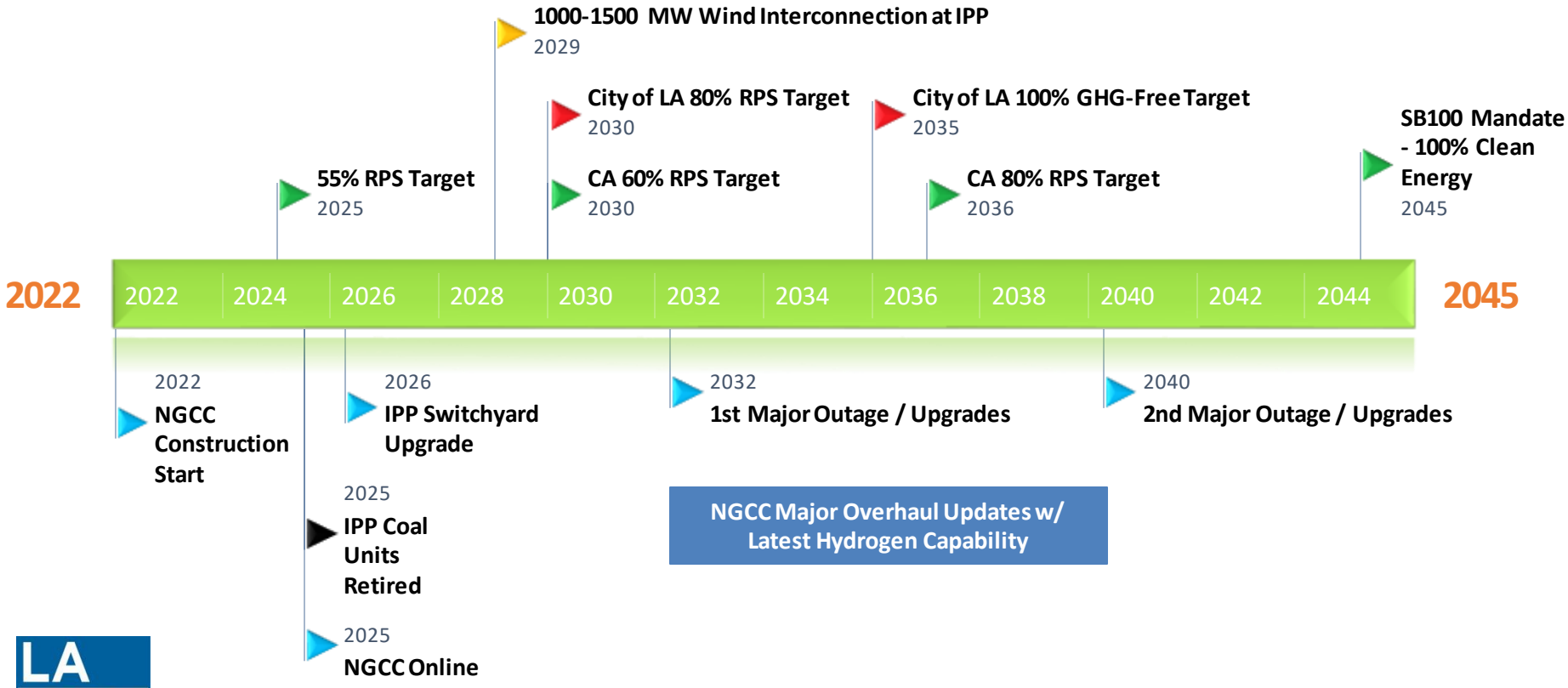
- Solar and wind resources from Wyoming, Utah, Nevada, and California
- NTS and STS required for transmission

- Using renewable energy, electrolyzers change water into hydrogen gas

- Hydrogen fuel is stored in underground salt caverns
- Allows for seasonal shifting on renewable energy

- Combustion technology is capable of mixing hydrogen with natural gas
- New IPP generators will have this capability at 30% on COD

IPP Hydrogen Timeline








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 LA Advisory

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

Across All Scenarios

Electrification
Efficiency
Flexible Load

Customer
Rooftop Solar

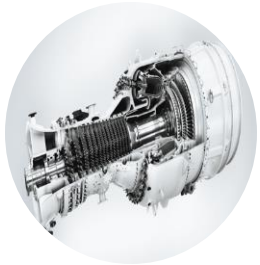
Renewable
Energy

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

Storage

+ >2,600 MW

Distribution,
Transmission



Renewably Fueled
Combustion
Turbines

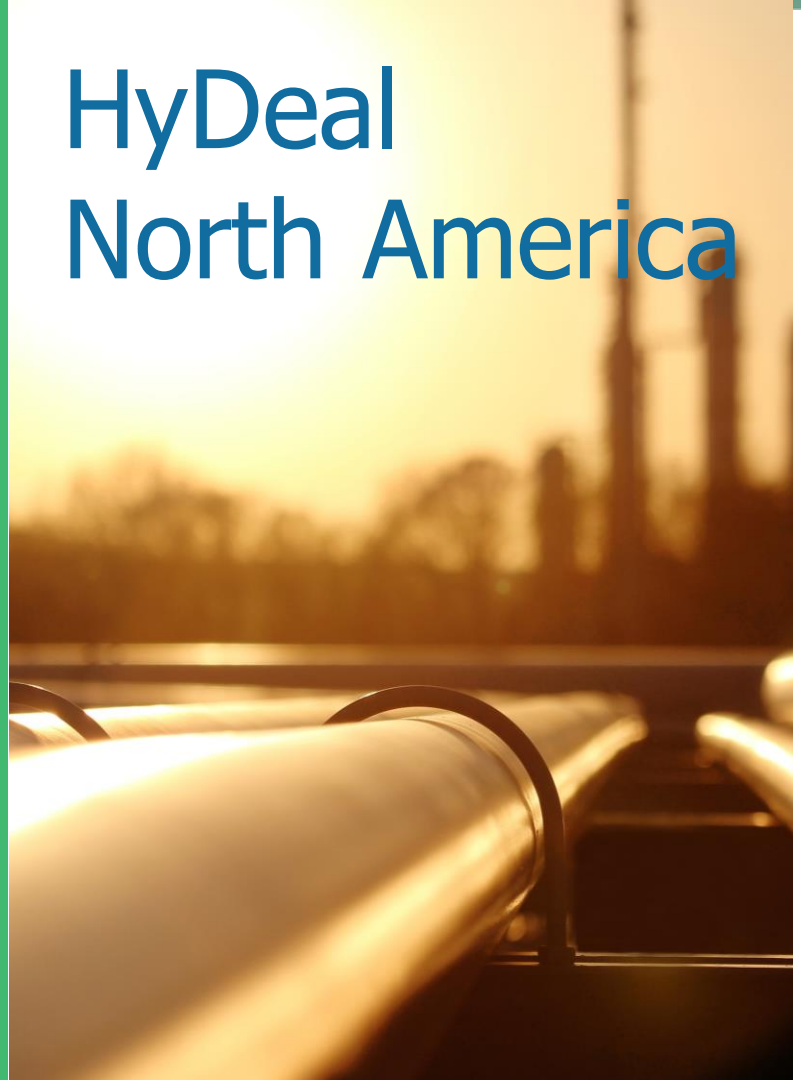
+>2,600 MW
(in basin)

Much More

New

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

HyDeal North America



Plan green hydrogen ecosystems at scale to achieve $1.50/kg delivered cost

Accelerate progress by bringing together:

- key ecosystem stakeholders, including multi-sectoral off takers
- in strategically targeted locations, beginning in SoCal and SLC
- to plan and develop the competitive, high-volume supply chain necessary
- to achieve a $1.50/kg delivered green hydrogen cost for large off takers

HyDeal Los Angeles
Phase 1 Deliverables

Establish an open source platform and process to actively engage stakeholders across the value chain to rapidly develop a green hydrogen ecosystem

- Downstream (Offtakers) - identify qualified, aggregated annual demand (Mt) needed by 2035 on a site-by-site basis
- Midstream (Transport & Storage) - create a system map to meet that demand, combining greenfield and brownfield development
- Upstream (Project Developers) - vet production cost models to achieve $1.50/kg delivered on or before 2035
- Finance and legal participants - achieve in-principle agreement on term sheets for contracts that could underpin large scale investment.

Los Angeles Department of Water & Power

CUSTOMERS FIRST

Thank You