CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
INTRADEPARTMENTAL CORRESPONDENCE

Date: October 5, 2021

To: Board of Water and Power Commissioners

From: Martin L. Adams, General Manager and Chief Engineer

Subject: Presentation – Energy Storage Update
Board Meeting of October 26, 2021

For your review, please find attached the following PowerPoint presentation:

Power System

- Energy Storage Update

If you have any questions, please contact me at (213) 367-1338.

Attachment

LA100

ACHIEVING 100% RENEWABLE ENERGY IN LOS ANGELES

LA DWP

Energy Storage Update

October 26, 2021

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%**

Common Investments Across All 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

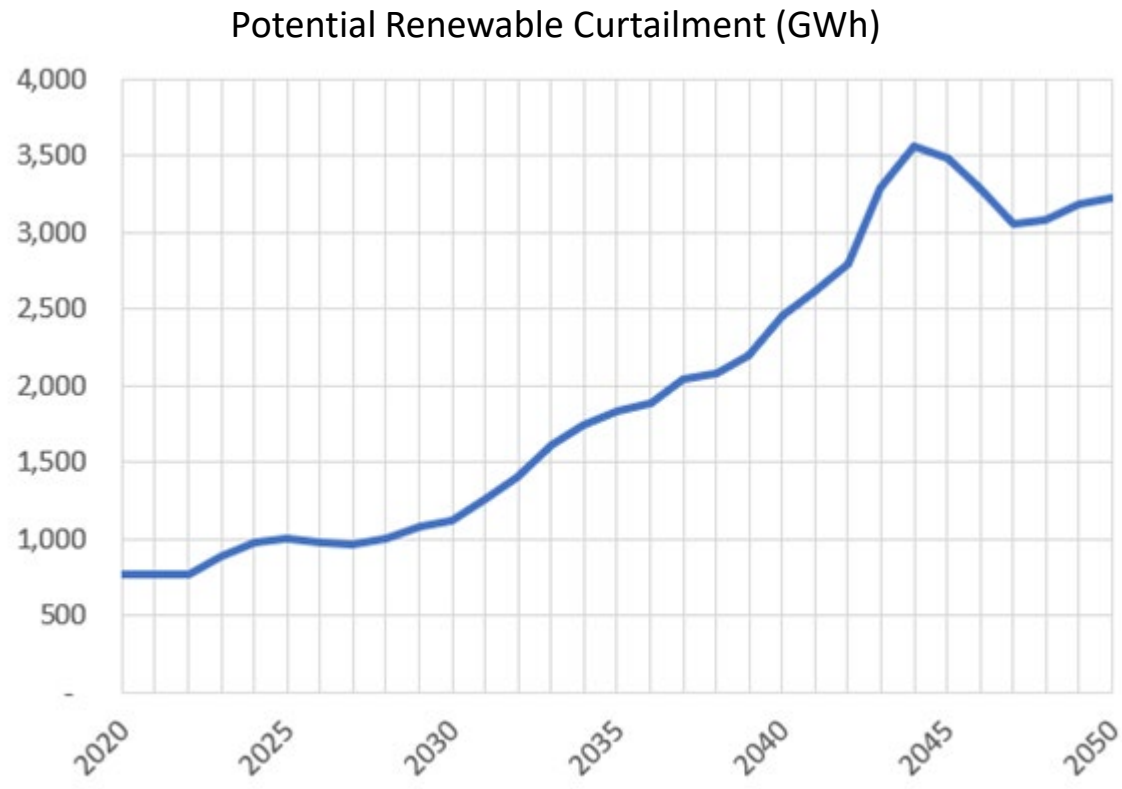
Natural gas	→	Biofuel/ hydrogen
Today: Daily		**Future:** Infrequently

Accelerated Energy Storage

- Build over 1,000 MW of energy storage by 2030 in-basin and out-of-basin
- Utility scale energy storage at or near most in-basin Generating Stations
- Negotiate expansion of Beacon Energy Storage by 25 MW
- Expand energy storage by co-locating storage at all future utility scale solar projects
- Advertised Energy Storage Rolling Request for Proposals in 2021
- Increased usage of Castaic pumped hydro to integrate increased renewables

Energy Storage Applications

- Grid reliability
- Reduce curtailment
- Resource adequacy
- Make renewables dispatchable
- Ancillary services
- Distribution needs
- Energy shift
- Arbitrage



Note: forecasted curtailment levels will be an outcome of the SLTRP and will depend on many factors, including levels of energy storage

Type of Energy Storage Technology

Electro-Chemical (BESS)

Thermal

Overview

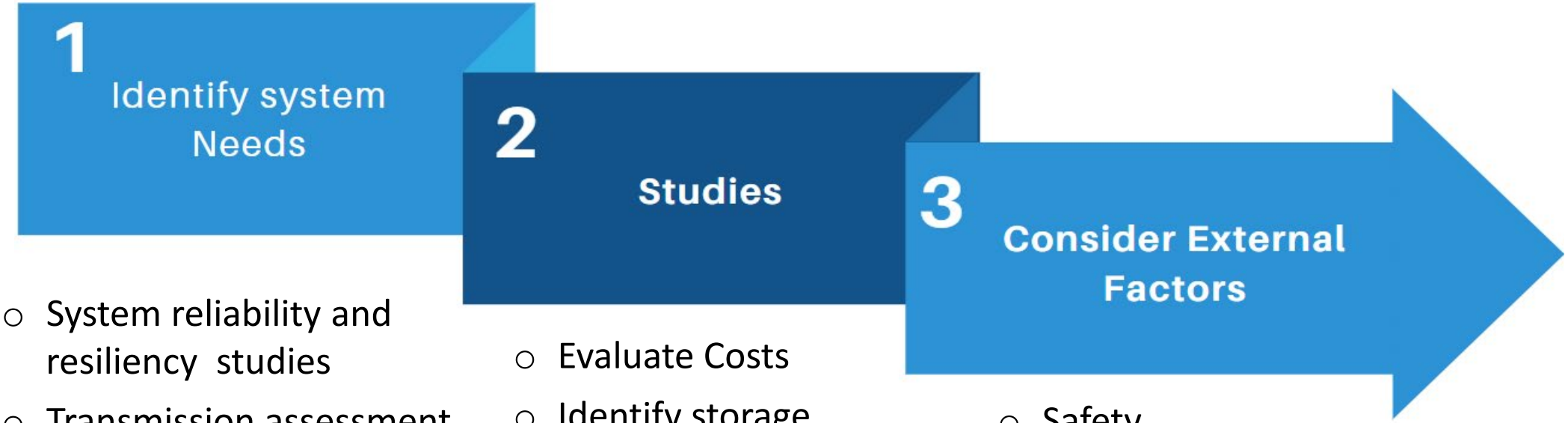
Energy Storage makes electricity available when renewables are not generating.

Mechanical-Kinetic

Gravity

BESS=Battery Energy Storage System

Planning Guidelines



- System reliability and resiliency studies
- Transmission assessment
- Integrating renewable energy
- Reducing peak demand
- Deferring power system upgrades

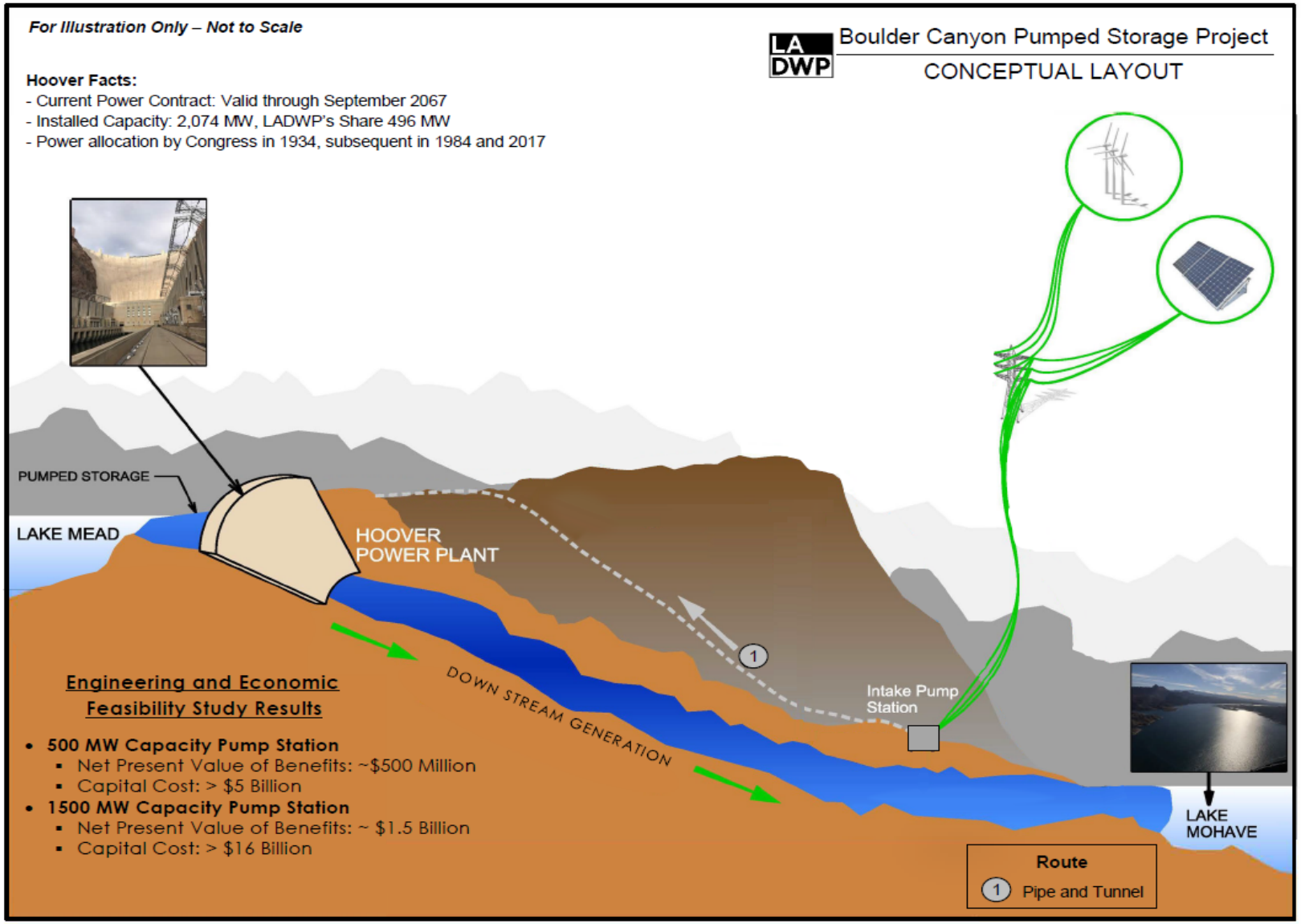
- Evaluate Costs
- Identify storage applications
- Evaluate emerging storage technologies
- Perform studies to assess use case

- Safety
- Regulatory Issues
- Price projections
- End of life applications and disposal
- Environmental impact
- Impact to frontline communities

Various Studies Impacting ES Strategy

- Maximum Generation Renewable Energy Penetration Study
- Study to Comply with SB 801
- System Impact and Feasibility Studies
- Transmission Hosting Capacity
- 10 Year Transmission Expansion Planning
- Reliability & Resiliency Studies
- Distribution System Voltage Conversion Study
- LA100 Study & SLTRP

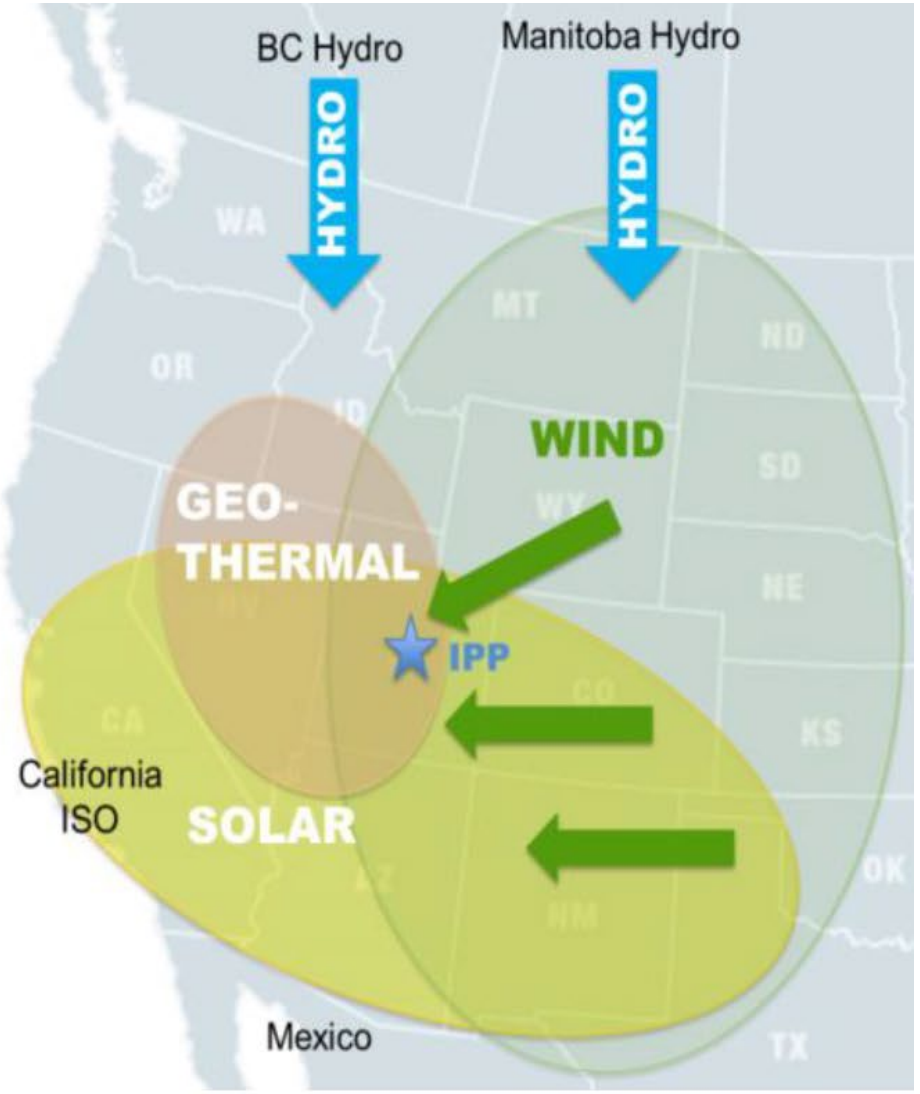
Boulder Canyon Pumped Storage



Green H2 Production & Storage @ IPP in Utah

Unlocking IPP's Potential

- Proximity to regional renewables
- Transmission system
- Water rights
- Over 4,000 acres of land
- Unique underground salt formation ideal for fuel storage
- Highly skilled workforce at IPSC



Intermountain Power Agency
Energy for Today & Tomorrow

Accomplishments

Beacon BESS

JFB Flow BESS

JFB Lithium-ion BESS

Fire Station 28 BESS

Truesdale Training Center

La Kretz Center BESS

Castaic Pumped Storage

Springbok 3 BESS

2030 In-Basin Tentative Targets

Facility	Technology	Ownership	COD	Capacity (MW)
Utility Scale at or near Generating Stations	TBD	Utility	Q2 2028	270
Behind the Meter (Batteries)	Li-Ion	Customer	Various	50
Distributed Storage	Li-Ion	Utility	Q1 2023	10
RS-X	Li-Ion	Utility	Q2 2025	30
Target Goal				**360**

2030 Out-of-Basin Tentative Targets

Facility	Technology	Ownership	In Service	Capacity (MW)
Beacon	Non-Battery Solution	APA	Q4 2023	25
Eland I & II	Li-Ion	PPA (PV+S)	Q4 2023	281
Generic - PPA	Li-Ion	PPA (PV+S)	Q4 2023	75
Generic - PPA	Li-Ion	PPA (PV+S)	Q4 2024	300
Target Goal				**681**

Upcoming Projects

Eland 1 & 2 Solar Storage Center

LA Zoo Resiliency Project

RS-X BESS

Green Meadows Resiliency Project

Battery Recycling and Disposal

- EPRI conducted study on industry overview and cost estimates of battery recycling:
  - Battery Recycling Process & Regulation
  - New players in battery recycling
  - Cost and Economics of Recycling
    - Large Lithium Ion (Beacon BESS)
    - Smaller mixed use systems (JFB Lithium & Flow BESS)
    - Other Lithium Chemistries
  - Next Steps

Battery Recycling Process

- Components physically separated before valuable materials recovered during recycling, via solvent- & heat-based processes.
    - Metal Solids & Alloys, i.e. Cobalt, Nickel, Copper
    - Waste gases cleaned, waste products sold or disposed
- Beacon BESS: 382,000 lbs. to be recycled, at the cost of additional 6% of initial capital investment.

Heat-Based Recovery

Solvent-Based Recovery

Source: EPRI BESS Recycling & Disposal Investigation Update

Next Steps

- Updating near-term and adopting long-term energy storage goals as part of 2022 SLTRP process
- Evaluation and piloting of long-duration energy storage technologies for potential use in-basin
- Seek Federal and State funding opportunities to pilot storage technologies
- Evaluation of competencies and staffing for operations and maintenance of storage through the Integrated Human Resource Plan

Questions?