

LADWP Energy Storage Update

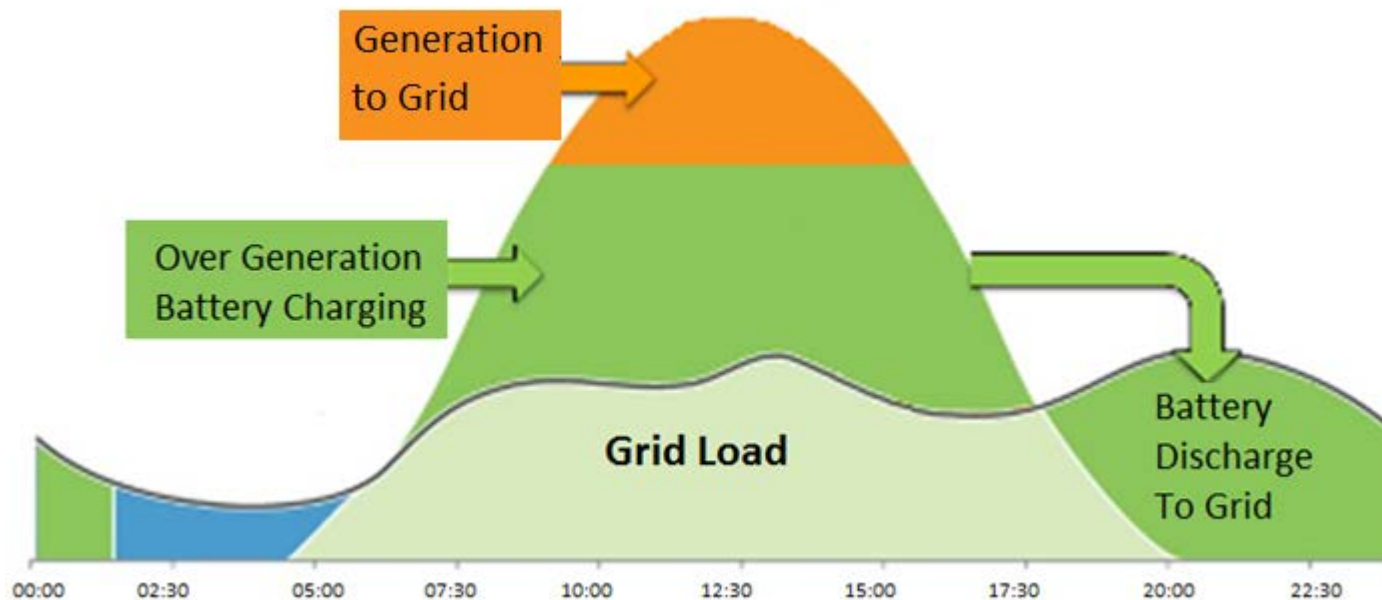
Board of Water and Power Commissioners

August 15, 2017

Putting Customers First   

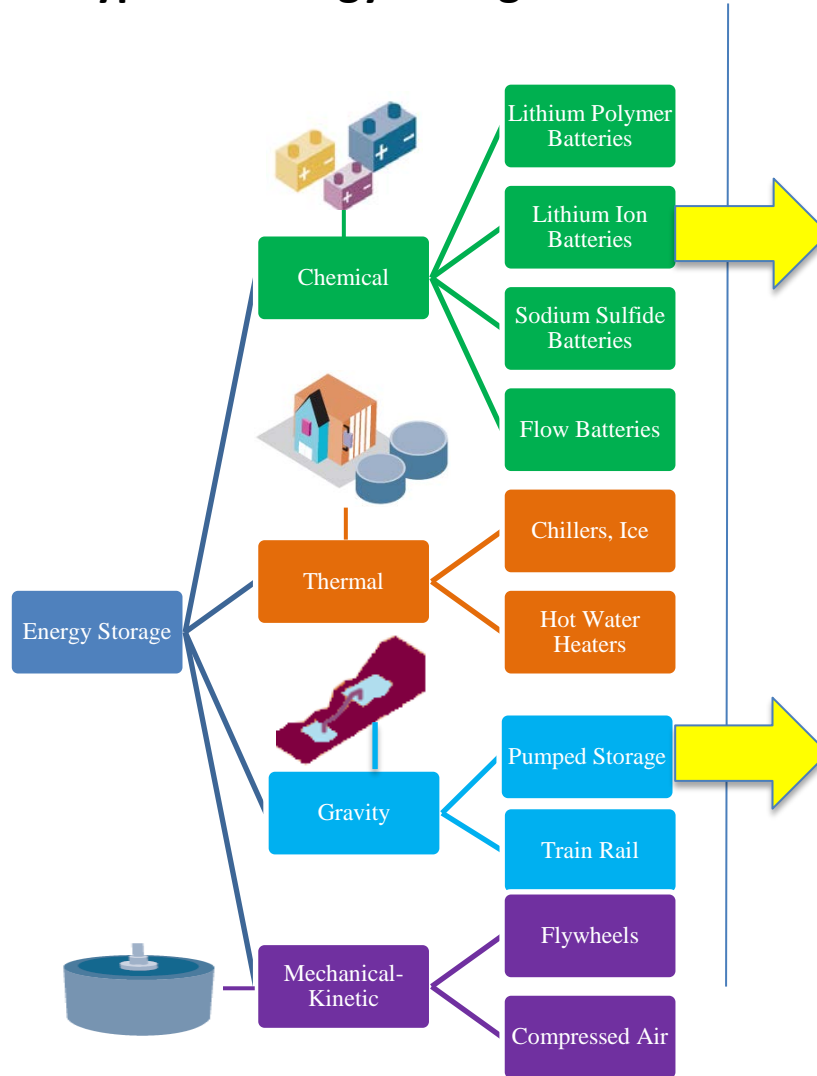
Energy Storage Overview

Energy Storage (ES) is the capture and re-dispatch of already produced energy using various technologies. Essentially, Energy Storage moves energy from one time frame to another.



Energy Storage Technologies

Types of Energy Storage



Energy Storage Applications

- **Power Optimization**

- Power Balancing and Ancillary Services
- Mitigate volatility of renewable energy
- High power output



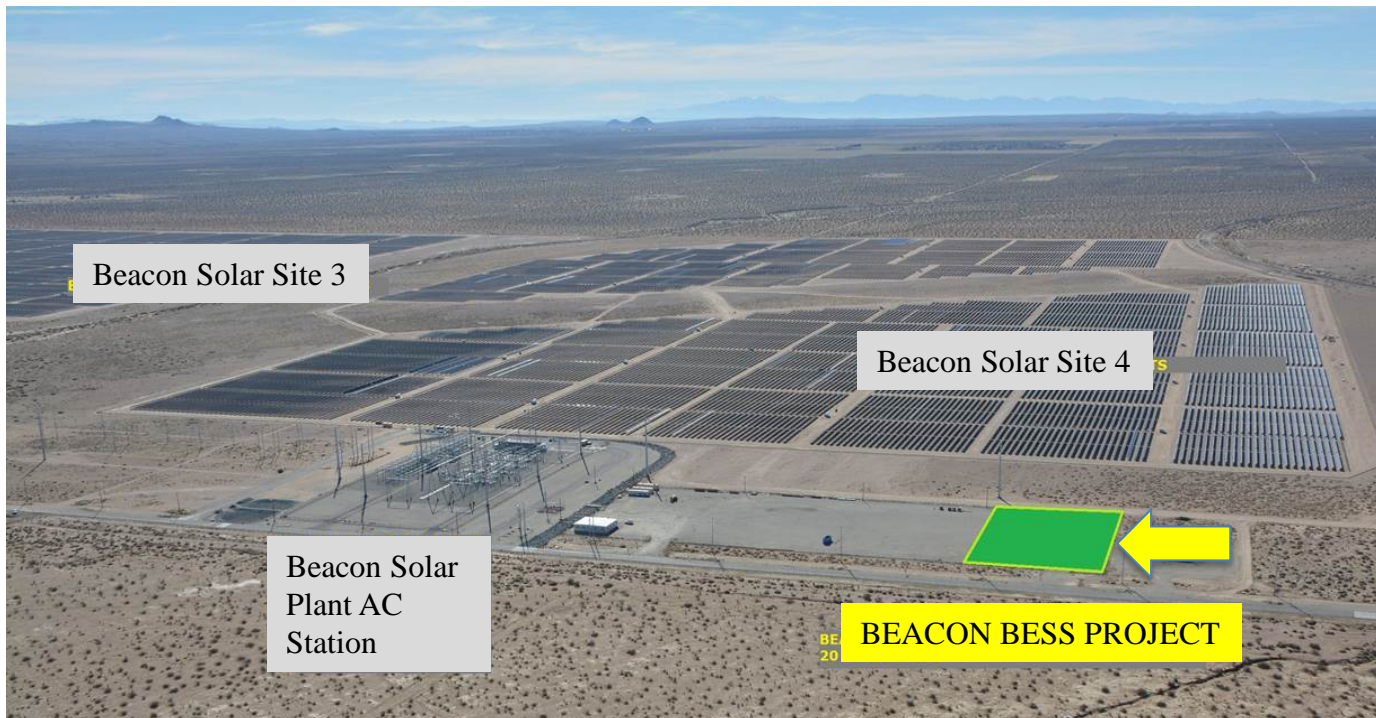
- **Energy Optimization**

- Bulk Storage/Energy Shifting
- Extended duration
- Limited Flexibility

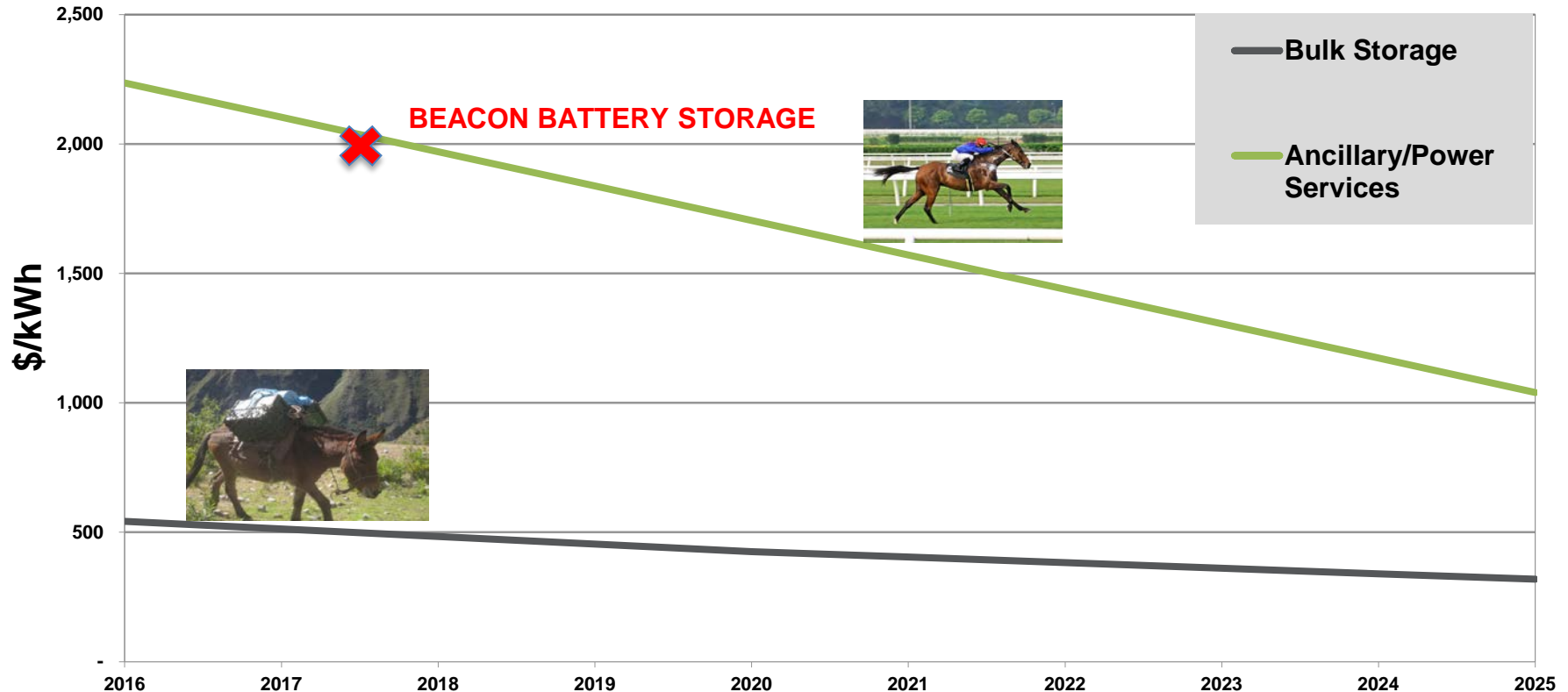


Beacon Battery Energy Storage Project (BESS)

- 20 MW, \$19.2 Million, COD - Q2 2018
- Flexible reserve and system balancing
- Responsive to variable renewable generation sources
- Improve system response to regulatory mandates



Energy Storage Capital Cost Projection



- Utility-scale lithium-ion energy storage costs are decreasing over time
- Source: 2017 LADWP Study

Assembly Bill (AB) 2514

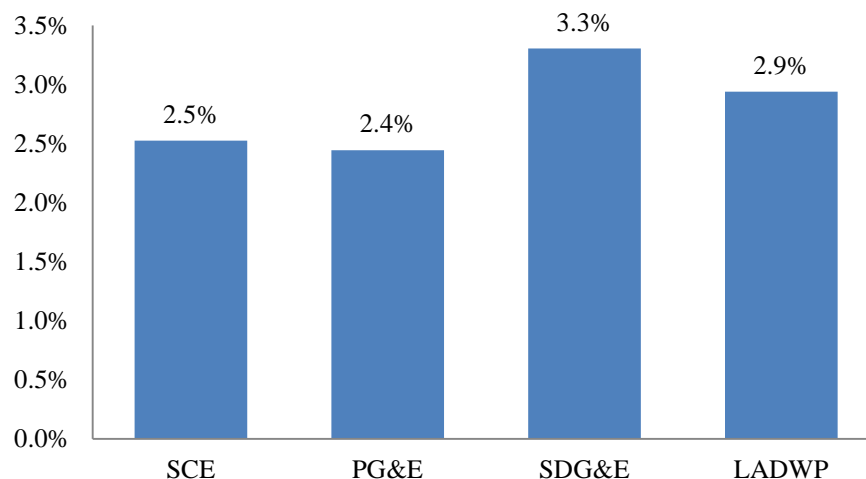
- Publicly-Owned Utilities (POU) adopt Energy Storage targets
- September 2014 - LADWP Board approved Energy Storage target of 178 MW by December 31, 2021
- December 2016 - LADWP achieved 22.6 MW of Energy Storage
- September 2017 – LADWP to report to CEC Board approved energy storage targets

Energy Storage 2021 Targets Status

CONNECTION LEVEL	PRE 2010 EXISTING ES	2014 BOARD APPROVED		LADWP UPDATE	
		2016 Targets	2021 Targets	Achieved	2021 Targets
Generation	1,275 MW	21 MW	60 MW	21 MW	128.4 MW
Transmission	-	-	50 MW	-	
Distribution	-	-	4 MW	-	25 MW
Customer	9.08 MW	3.08 MW	40.3 MW	1.6 MW	2 MW
Subtotal	1,284.08 MW	24.08 MW	154.3 MW	22.6 MW	155.4 MW
Total	1,284.08 MW	178 MW		178 MW	

Energy Storage Targets (AB 2514)

Utility	Procurement Target—2021
Los Angeles Department of Water and Power (LADWP)	178 MW
SCPPA (Glendale)	1.5 MW
SCPPA other member utilities (Burbank, Pasadena, Riverside, Anaheim etc.,)	0 MW
San Diego Gas and Electric (SDG&E)	165 MW*
Southern California Edison (SCE)	580 MW*
Pacific Gas and Electric (PG&E)	580 MW*



■ **Energy Storage Target Compared to 2015 Projected Peak Load

* <http://www.cpuc.ca.gov/General.aspx?id=3462>

** <http://www.energy.ca.gov/2013publications/CEC-200-2013-004/CEC-200-2013-004-SD-V2.pdf>

LADWP Energy Storage Achievements

- 12 kW Fire Station 28 Solar and Storage
 - Emergency Backup and Demand Response
- 60 kW at La Kretz Innovation Center
- 9 kW Lithium Ion Battery at the Future Smart Grid Regional Demonstration
- LADWP interconnected 247 kW of battery storage at various customer sites
- LADWP installed 9.08 MW of Thermal Energy Storage at USC, UCLA, etc.,



LADWP Energy Storage Workforce Training

TRUESDALE TRAINING CENTER

- 50 kW Kokam Peak Shaving
- 5 kW Tesla PowerWall 2.0
Residential Solar + Storage
- 1.6 kW Solar Flex
Residential Solar + Storage
Backup



Planned Energy Storage Projects

- 200 kW John Ferraro Building (JFB)
- DS-86 Substation - 2.5 MW Battery Energy Storage
- Partnership with LA Zoo Battery Energy Storage (Estimated 1 MW)
- Partnership with Department of Recreation and Parks
- Distributed Energy Resources Integration Pilot - energy storage, solar, electric vehicles, and demand response

Customer Energy Storage Initiative

Since 2011- Eleven LADWP customers with 247 kW energy storage

- Backup and peak shaving

Self-Generation Incentive Program (SGIP)

- State sponsored rebate program
- \$560 million budget through 2019
- 175 applicants totaling 2.2 MW (as of 7/31/17)

LADWP's SGIP Efforts

- Technical
- Safety
- Policy

Upcoming Energy Storage Legislation

Proposed Senate Bill 801 (SB 801)

- Directs LADWP to deploy cost-effective and feasible 100 MW for four hours energy storage by June 1, 2018

Proposed Senate Bill 700 (SB 700)

- Directs Publicly Owned Utilities to provide an incentive for customer owned energy storage system
- On hold until 2018

Upcoming Actions

- **Solar + Storage Power Purchase Agreements Solution**
 - Evaluating Solar and Storage paired power purchase proposals
 - Takes advantage of Incentive Tax Credits (ITC) for value to LADWP
- August 15, 2017 – Beacon Energy Storage Project goes to Board
- September 2017, LADWP is required to file updated Board approved Energy Storage targets to CEC

Questions?