3RD ANNUAL ENERGY STORAGE GRAND CHALLENGE SUMMIT

Storage Innovations 2030: Accelerating the Future of Long Duration Energy Storage Overview

ENERGY STORAGE GRAND CHALLENGE
U.S. DEPARTMENT OF ENERGY

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Storage Innovations 2030: Overview

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Storage Innovations 2030: Technology Liftoff

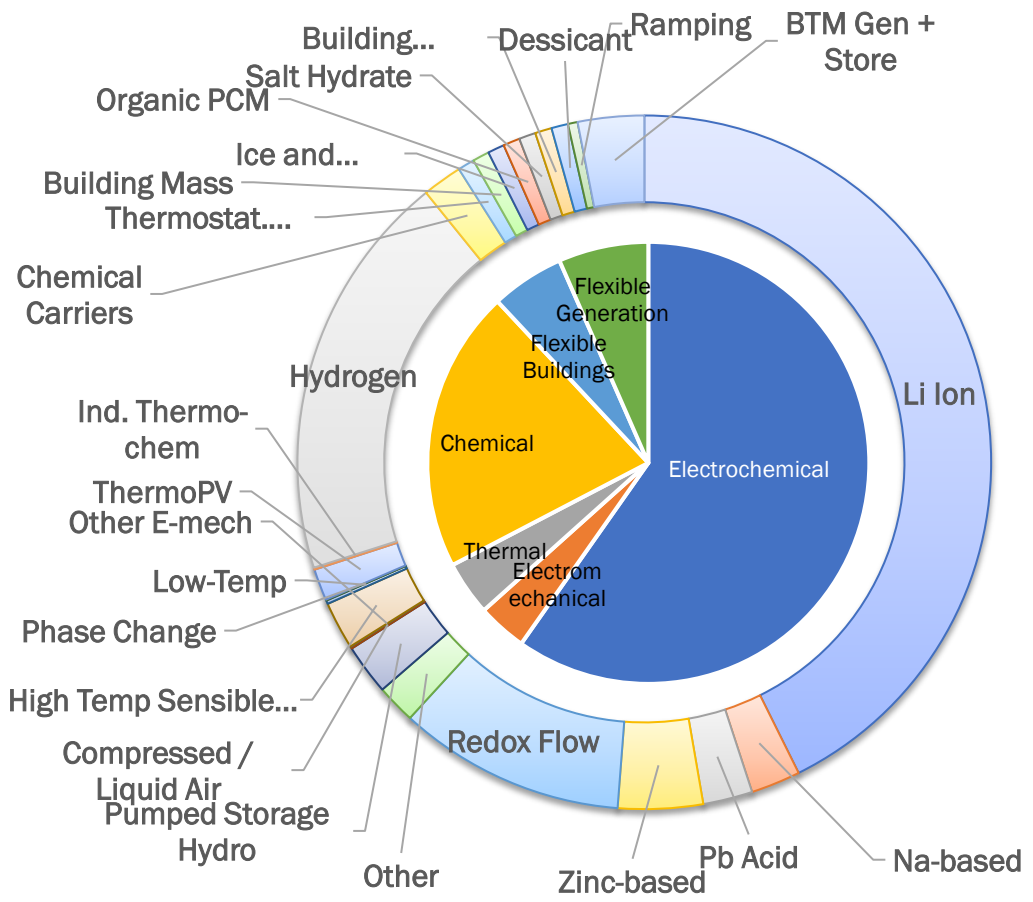
$15M OE funding opportunity for pre-competitive R&D partnerships…

How did we get here?

Historically: 30+ technologies supported by DOE

Bidirectional Electric Storage	Electrochemical	Li-Ion & Li-Metal
		Na-Ion
		Na-Metal
		Lead Acid
		Zinc
		Other Metals (Mg, Al)
		Redox Flow
		Reversible Fuel Cells
		Electro-Chemical Capacitors
	Electromechanical	Pumped Storage Hydro
		Compressed Air
		Liquid Air
		Flywheels
		Geomechanical
		Gravitational
Crosscutting	Power Electronics	Power Electronic Systems

Thermal & Chemical	Thermal	High-Temperature Sensible Heat
		Phase Change
		Low-Temperature Storage
		Thermo-Photovoltaic
		Thermochemical
	Chemical	Chemical Carriers (e.g., Ammonia)
		Hydrogen
Flexible Generation & Loads	Flexible Buildings	Thermostatically Controlled Loads
		Building Mass
		Ice & Chilled Water
		Organic Phase Change Material
		Salt Hydrate
		Thermochemical
		Desiccant
	Flexible Generation	Ramping
		Behind-the-Meter Generation Plus Storage



2030: Low-Cost Long Duration Storage

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		Na-Metal
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		Zinc
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2030

Long Duration Storage Shot

$0.05/ kWh Levelized Cost of Storage

What RD&D Pathways get us to the 2030 Long Duration Storage Shot?

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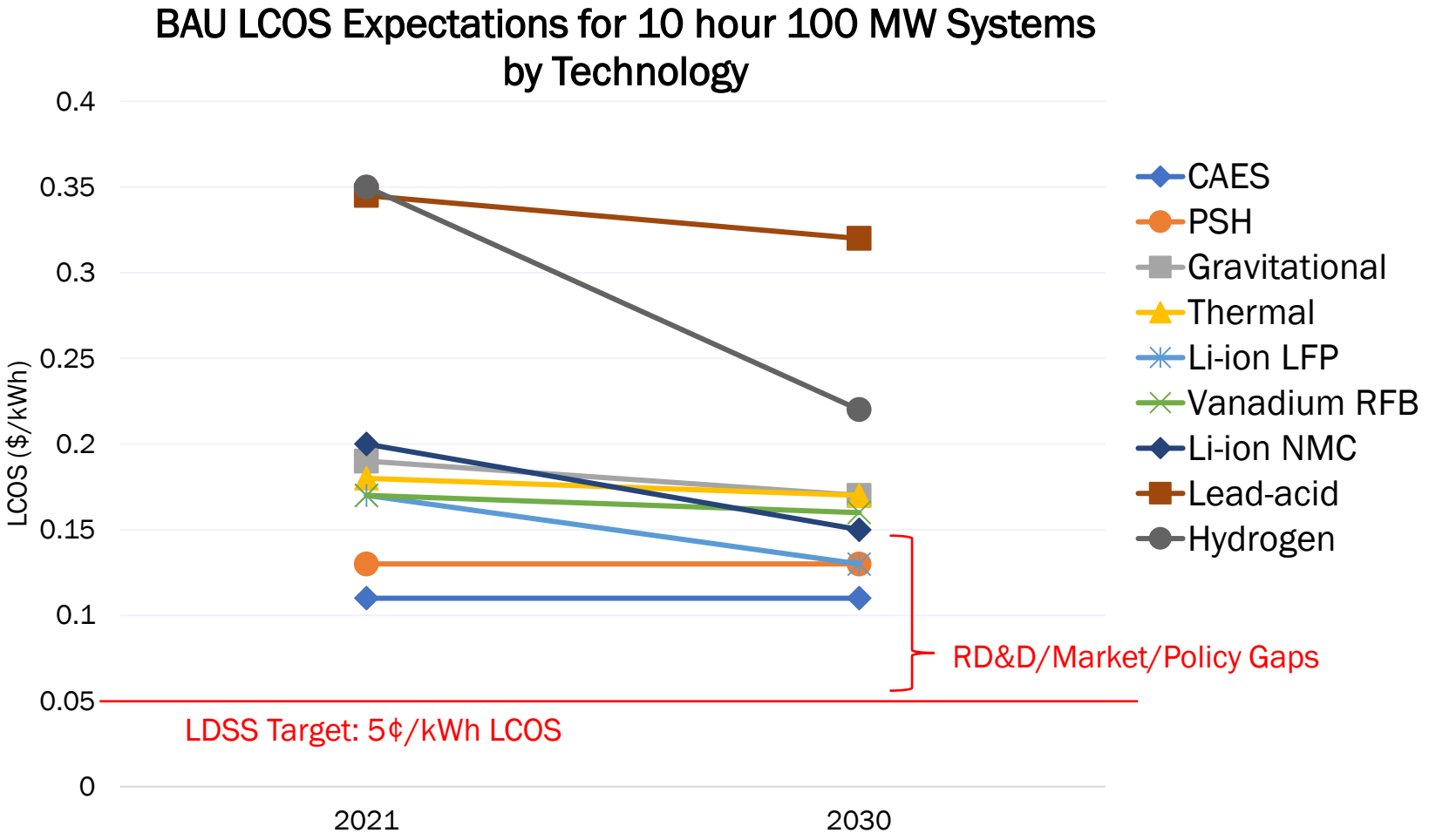
Long Duration Storage Shot Goal for LDES



Source:DOE/ESGC Cost and Performance Report

- 5¢/kWh LCOS enables dispatchable clean energy at competitive costs
- **Business as usual LCOS expectations will not achieve this goal**

DOE, 2022 Grid Energy Storage Technology Cost and Performance Assessment, August 2022.

Solution: Storage Innovations 2030 Strategy

Crafting DOE's Long Duration Energy Storage Strategy

SI - Framework

Systematic and numerical analysis of highest-impact R&D activities to reach 2030 cost targets

SI - Prize

Competitive evaluation and exploration of emerging, innovative storage technologies

SI – Flight Paths

Collaborative industry discussions around pre-competitive R&D opportunities.

LDSS Technology Strategy Assessments

- **Released on July 19th, 2023**
- Results from the Flight Paths and Framework stakeholder engagement and analysis efforts

Eleven Reports Released

1. Methodology
2. Lithium-ion Batteries
3. Lead-Acid Batteries
4. Flow Batteries
5. Zinc Batteries
6. Sodium Batteries
7. Pumped Storage Hydropower
8. Compressed Air Energy Storage
9. Thermal Energy Storage
10. Supercapacitors
11. Hydrogen Storage

+ Crosscutting/ summary report planned!

SI 2030: Technology Liftoff

SI 2030 Technology Strategy + Structured Technology Partnerships + Pre-competitive R&D + $5 million awards

RFI Released	RFI comments due	FOA Opens	Concept Papers Due	Full Applications Due	Selections Made
March 8, 2023	April 3, 2023	July 25, 2023	September 15, 2023	December 4, 2024	Q1 2024

The rest of the day…

- SI Flight Paths Overview
- SI Framework Overview
- 3-minute Technology Pitches
- Technology Discussion Breakout Rooms