

DOCKETED

Docket Number:	19-SB-100
Project Title:	SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future
TN #:	230761
Document Title:	Presentation - Energy Storage Within SB 100
Description:	Presentation by Alexander Morris, California Energy Storage Alliance
Filer:	Harinder Kaur
Organization:	CESA
Submitter Role:	Public
Submission Date:	11/15/2019 3:29:23 PM
Docketed Date:	11/15/2019

Energy storage within SB 100

Alexander Morris, Executive Director

November 18th, 2019



About CESA

The **California Energy Storage Alliance (CESA)** is a 501c(6) membership-based advocacy group committed to advancing the role of energy storage in the electric power sector through policy, education, outreach, and research. CESA was founded in January 2009 by Janice Lin and Don Liddell.

CESA's mission is to make energy storage a mainstream energy resource in helping to advance a more affordable, clean, efficient, and reliable electric power system in California.



California ISO
Shaping a Renewed Future



85+ CESA Members

Board Members



General & Startup Members

174 Power Global
 Able Grid
 Aggeko
 Amber Kinetics
 Ameresco
 American Honda Motor
 Apparent
 Avangrid Renewables
 Axiom Exergy
 Boston Energy Trading & Marketing
 Brenmiller Energy
 Bright Energy Storage Technologies
 Brookfield Renewables
 Clean Energy Associate
 Consolidated Edison Battery Storage
 Customized Energy Solutions

Dimension Renewable Energy
 Doosan GridTech
 East Penn Manufacturing
 E.ON
 EDF Renewable Energy
 Energport
 esVolta
 Form Energy
 Greensmith Energy
 GridWiz
 Hecate
 Highview Power
 Hydrostor
 Li-ion Tamer
 Lendlease Energy Development
 LS Energy Solutions

Malta
 Magnum CAES
 Munich Re
 NEC Energy Solutions
 NEXTracker
 NGK Insulators
 Nuvve
 Pattern Development
 Pintail Power
 PolyJoule
 Power Plus
 Primus Power
 PXiSE
 Quidnet Energy
 Range Energy
 Storage Systems

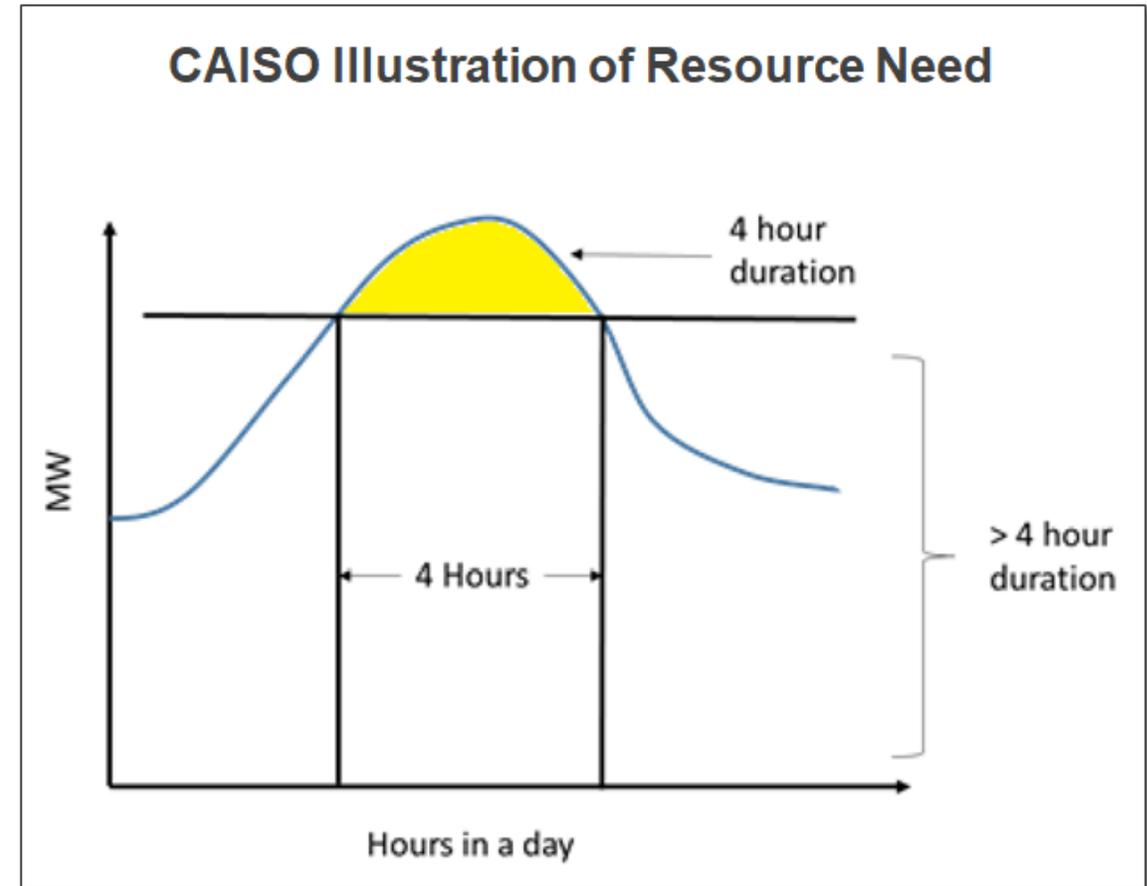
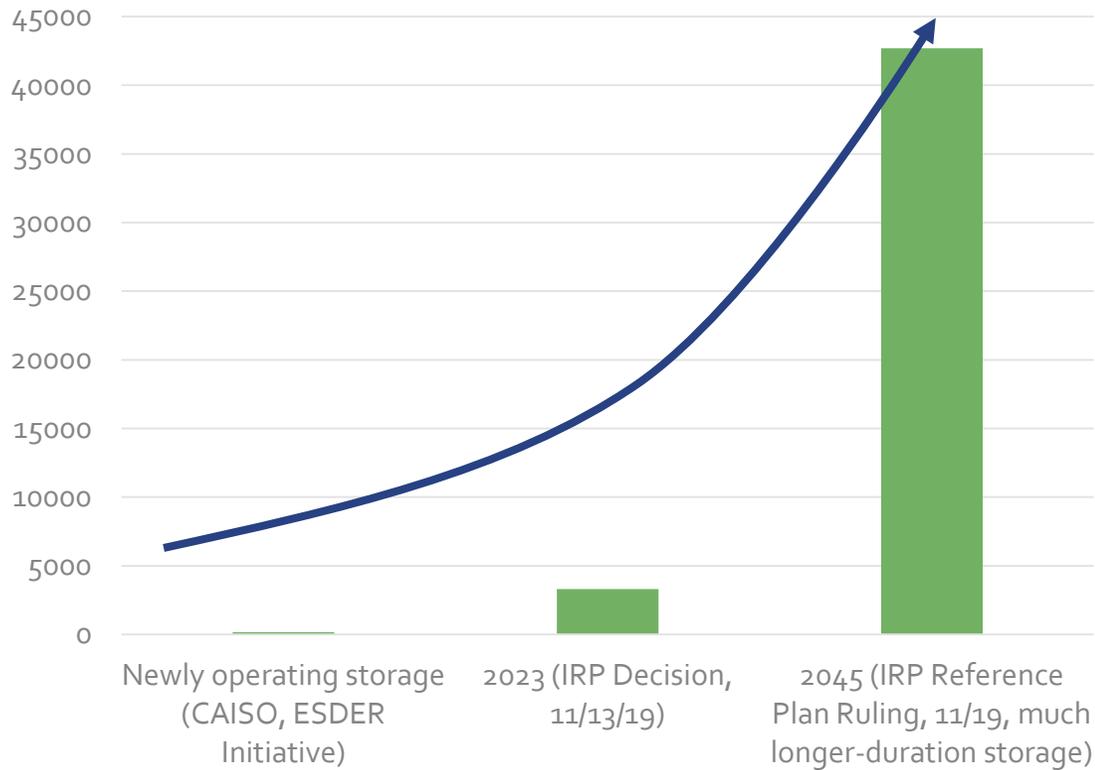
Recurrent Energy
 Reimagine Power
 Shifted Energy
 Sovereign Energy
 Stem
 STOREME
 Sumitomo Electric
 Sunrun
 Swell Energy
 Tenaska, Inc
 UL
 Viridity Energy
 VRB Energy
 WattTime

Key Takeaways and Recommendations

- **Energy storage solutions are essential to deep renewable integration and to the transition away from fossil-fueled generation**
- **The storage needs for CA are mammoth!**
- **CA should continue to develop its energy storage tool-kit to be ready:**
 - **Get started now**
 - **Explore storage diversity**
 - **Build longer-duration storage**
 - **Mitigate resiliency with resources that can be useful year-round**
 - **Actualize MUAs**

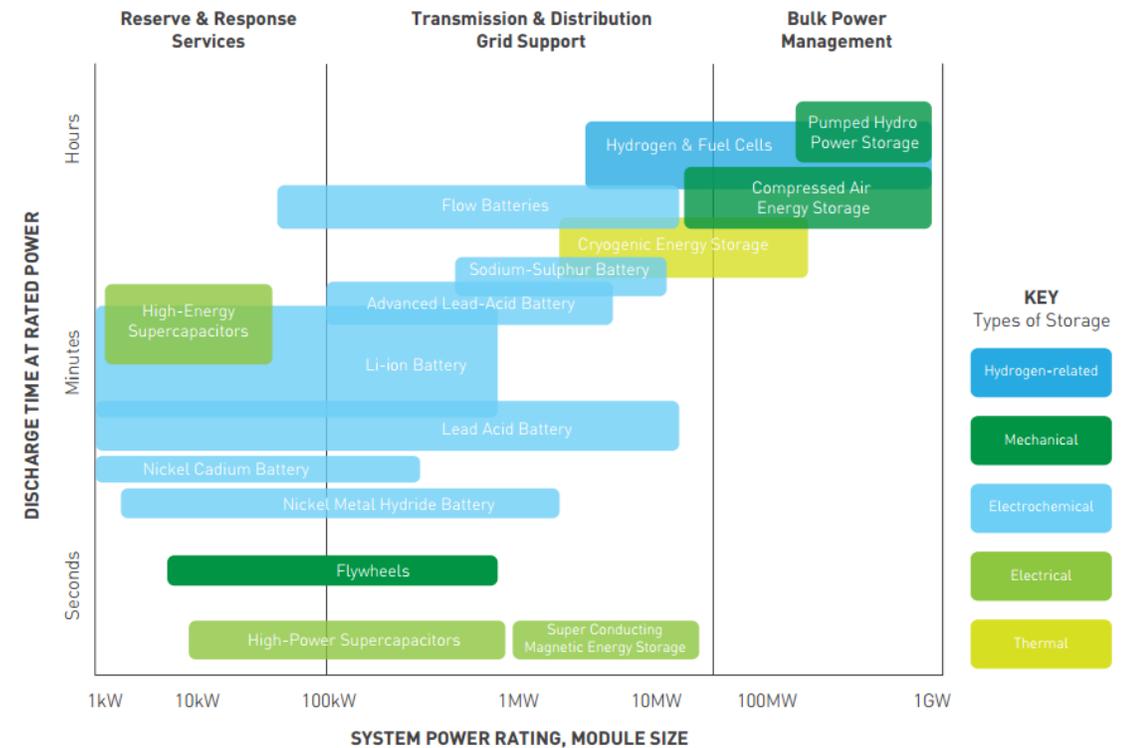
Storage is essential to meet future grid needs

Markers in Storage Deployments



A tool-kit with many storage technologies will help in SB 100 achievement

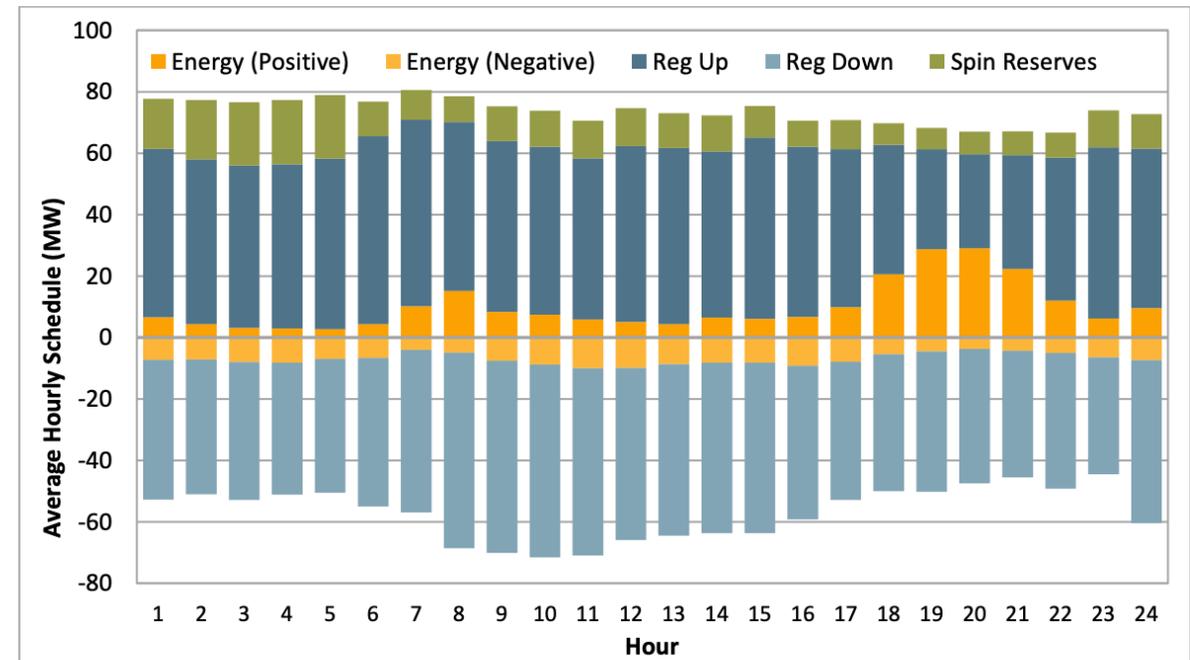
- Energy storage is a resource class comprised of many technologies with distinct applications and degrees of maturity
- The tool-kit is being built but more diversity and sophistication should be pursued
 - Tool-kit should meet grid needs: reliability, renewable shifting, local 'long-hold', flexibility, resiliency, customer, hybridization.



What CAISO storage does today

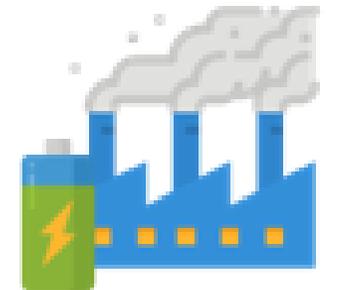
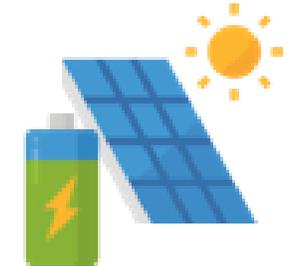
- ~ 150 MW of installed energy storage capacity in CA (excluding pump-hydro)
 - CAISO capacity ~ 50,000 MW
- Batteries to date often scheduled for Regulation Service
 - ‘Premium’ product so compensated most highly
 - Market will saturate quickly, e.g. 400-800 MW.
 - Regulation is \$189 million out of \$10.8 billion a year
- More ‘energy arbitrage’ roles expected as penetrations of storage increase

Figure 1.11 Average hourly battery schedules (2018)



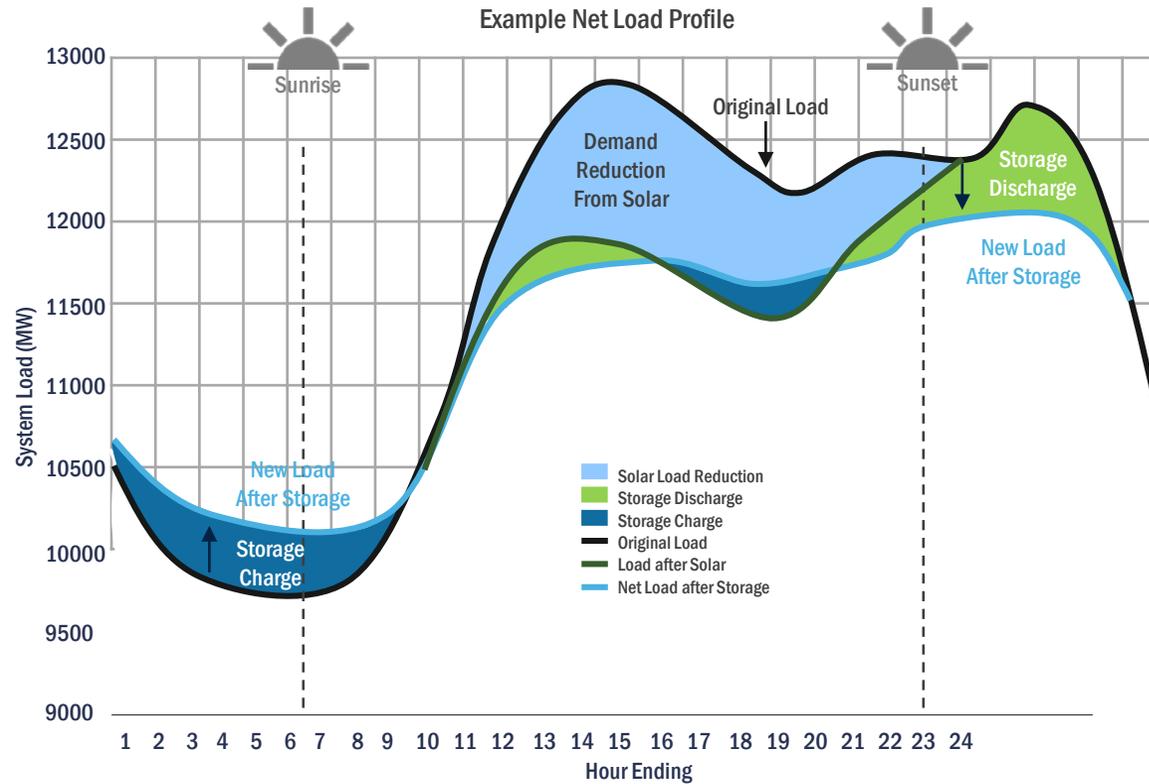
What storage will do in the future

- Storage is fundamental to further renewable integration
 - Firm renewable generation
 - Enable time arbitrage
- Storage can accelerate the transition away from fossil-fueled generation
 - Improve operational characteristics
- These applications are technologically feasible today;
- Regulatory and market structures need to continue to evolve



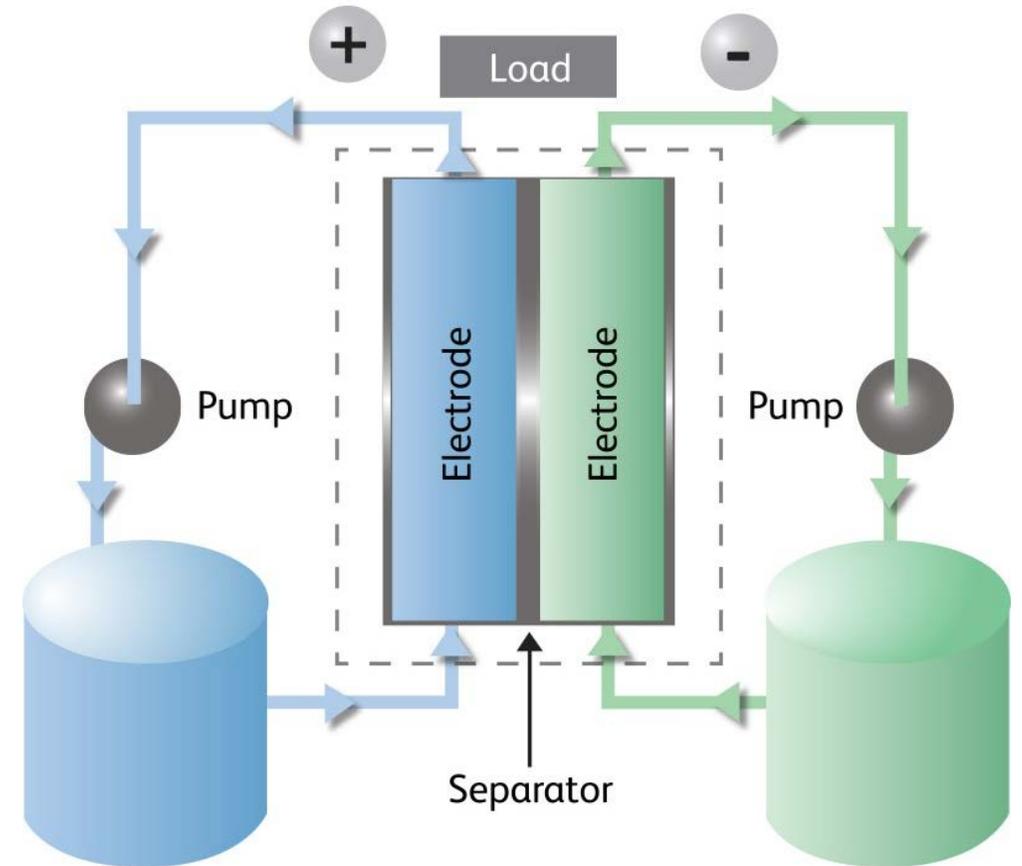
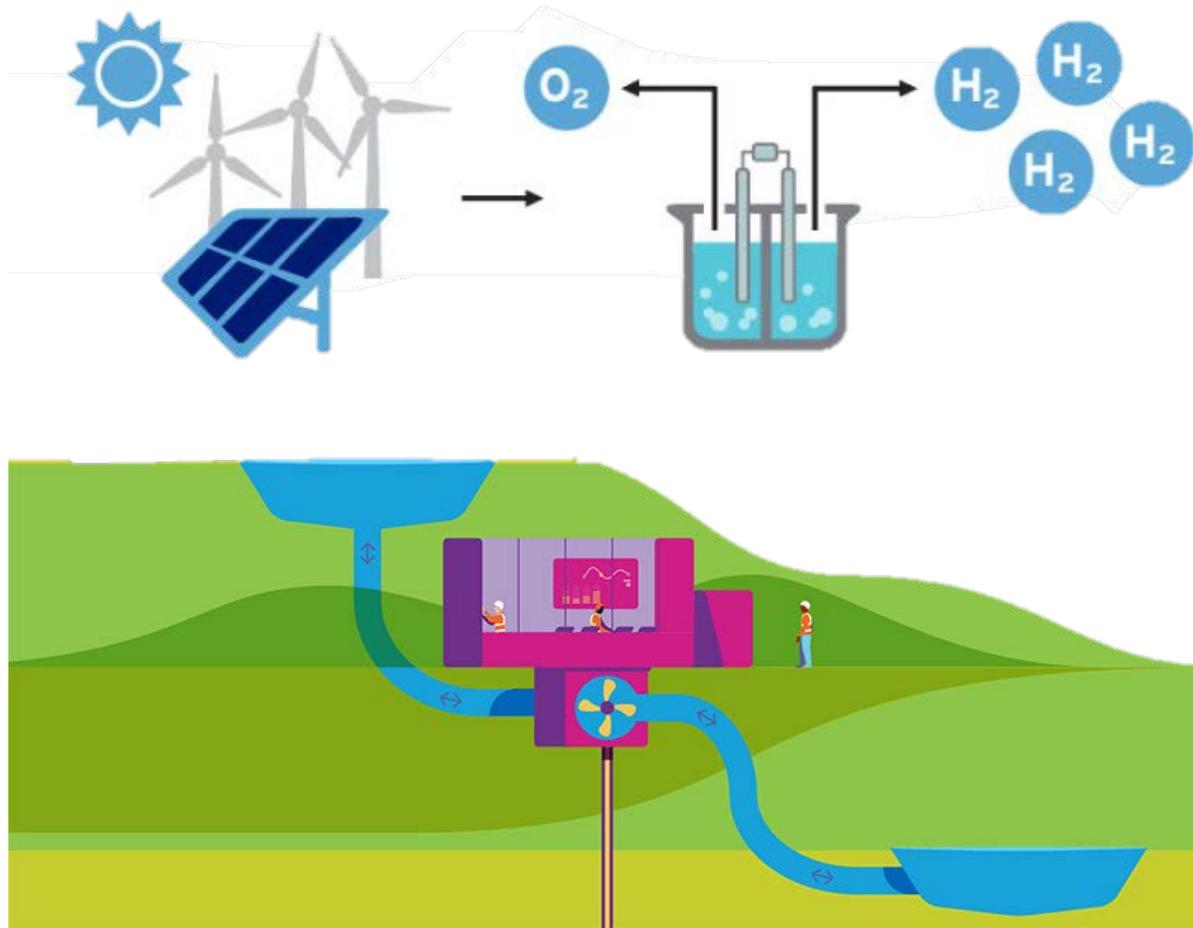
What storage will do in the future

- Energy storage is projected to provide daily arbitrage of solar resources



Source: Adapted from Massachusetts Department of Energy Resources, Mass Clean Energy Center, "State of Charge: A Comprehensive Study of Energy Storage in Massachusetts" (2017) <https://www.mass.gov/files/2017-07/state-of-charge-report.pdf>

CESA supports competition, and many technologies want to serve CA Storage needs



Recommendations

- Plan for the essentialness of energy storage
 - Continue building our tool-kit – ensure that we are ready
 - Grow/mature industry sectors that will be important, e.g. long-duration
 - Unleash and properly value storage: RPS rules, hybrids, MUAs, resiliency, fast flexibility, etc.
- Plan ahead to manage scale of increases and allow useful competition

Thank you!

- Alex Morris, amorris@storagealliance.org

