

4TH ANNUAL
ENERGY STORAGE GRAND CHALLENGE
SUMMIT

**Manufacturing,
Supply Chain,
and Workforce**

DOE Chairs

Nyla Khan, DOE Office of Electricity

Changwon Suh, DOE Advanced Materials and Manufacturing Technologies Office

National Lab Co-Chairs

Samantha Reese, NREL

Rebecca Estrada, LBNL



TRACK FOCUS/OBJECTIVES

The Manufacturing, Supply Chain, and Workforce Track is a small federation of lab staff focused on:

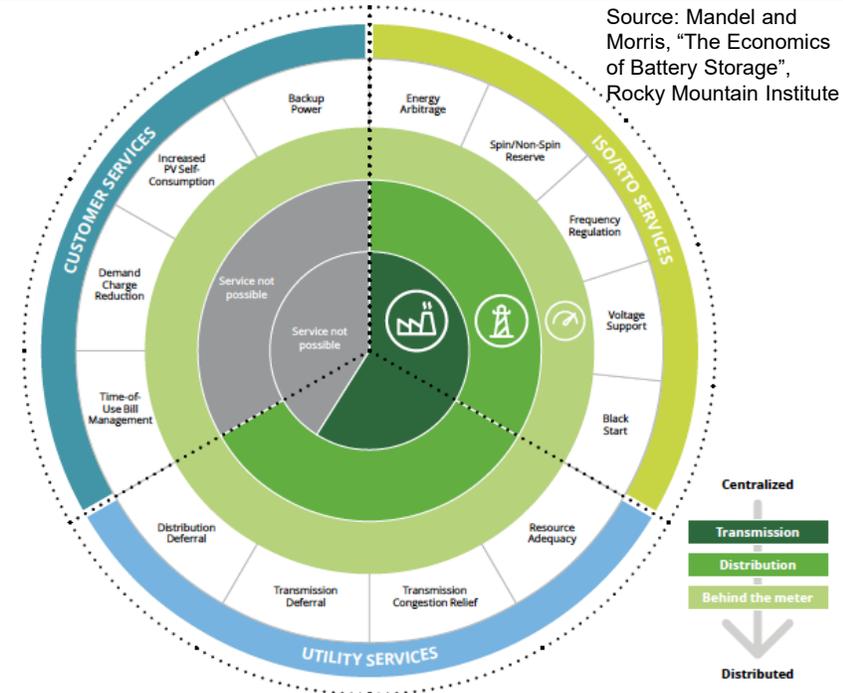
- Providing insights and informing DOE future efforts based on current needs
- Focuses on:
 - Supporting innovation and increasing production across the supply chain
 - Supporting utilization of energy storage in industrial decarbonization and resilience
 - Educates members of the workforce across spectrum
 - Researchers
 - Manufacturers
 - Operators
 - & More!
- Synergizing with other 3 ESGC tracks
- Sharing information & disseminating data, tools and analysis



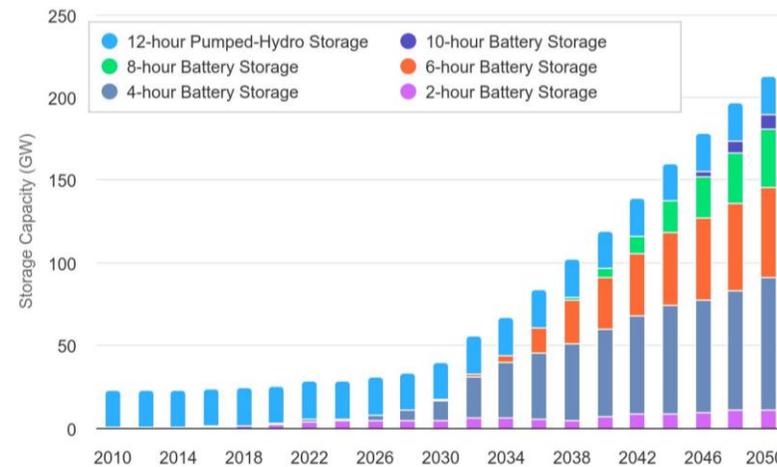
• Market Growth

- Tripled in 2023¹
- Anticipated 21% annual growth rate¹
 - 137GW->442GWh by 2030

• Value Streams²



Source: Mandel and Morris, "The Economics of Battery Storage", Rocky Mountain Institute



- <https://about.bnef.com/blog/global-energy-storage-market-records-biggest-jump-yet/>
- <https://www2.deloitte.com/us/en/pages/energy-and-resources/articles/global-energy-storage-renewable-energy-storage.html>
- Denholm, P., Cole, W. and Blair, N., 2023. Moving beyond 4-hour Li-ion batteries: Denholm, Paul, Wesley Cole, and Nate Blair. 2023. Moving Beyond 4-Hour Li-Ion Batteries: Challenges and Opportunities for Long(er)-Duration Energy Storage. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-85878. <https://www.nrel.gov/docs/fy23osti/85878.pdf>

Supply Chain: Expand Economic Models

- Develop economic models for other energy storage chemistries beyond lithium-ion
 - Techno-economic
 - Trade flow
 - Carbon accounting
- The models developed for lithium-ion have been successful in helping provide a roadmap for understand impact of innovation
- Recommendation for key to success
 - Need to ensure to a diversity of chemistries and manufacturing processes are modeled
 - Need to ensure assumptions and data are defensible
- Primary Challenge(s)
 - Data availability
 - Early technology readiness level means processes are not fully known

Manufacturing: Expand Pilot Plant Capabilities

- Develop more pilot plant capabilities
- Modify and build on existing capabilities that have been demonstrated for lithium-ion
 - Ensure diversity of process and chemistries are accessible
- Recommendation for key to success
 - Co-location of pilot demonstration plants with workforce development programs
- Primary Challenge(s)
 - \$\$\$\$
 - Resources

Workforce Development: Expansion/Development of Programming Grades 8-12

- Addresses workforce required in 1-3 years, 5 years, and 10 years
- Modify and build on existing programs demonstrating success
 - **Savannah River Site Apprenticeship Program:** High School and College program. Trained in specific disciplines needed on National Laboratory Site. Produces prospective employees in 1-3 years.
 - **NASA HUNCH Program:** mission is to empower and inspire students through a Project Based Learning program. Participate in the design and fabrication of real-world valued products for NASA. Produces prospective employees in 5-10 years.
 - **SAGE Program:** in conjunction with the Department of Energy National Laboratories, broadens gender diversity in STEM fostering creativity and innovation. Includes high school summer camp component. Produces prospective employees in 5-10 years.
- Recommendation for key to success
 - Co-location of demonstration programs with (manufacturing) pilot plants
- Primary Challenge(s)
 - Resources
 - Allowability
 - Sustainability

Actions

- Please attend ESGC Track Meeting @ 5pm to meet us!
- Reach out to Sam (Samantha.Reese@nrel.gov) or Rebecca (Restrada@lanl.gov) with questions, **suggestions**, or to participate!

THANK YOU

Samantha Reese- Samantha.Reese@nrel.gov

Rebecca Estrada- Reestrada@lanl.gov