

The background of the slide is a dark blue, space-themed image. It features a view of the Earth's horizon from space, with a glowing blue network of lines and dots overlaid on the planet's surface, suggesting a global energy or data network. The text is positioned on the left side of the image.

Frontiers in Energy Storage: Next Generation AI Workshop

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Frontiers in Energy Storage Workshop

Hosted at Lawrence Berkeley
National Laboratory on
April 16, 2024

(hybrid format, 59 in-person and
189 virtual attendees)

- **Agenda highlights:**

- Invited talks on national lab capabilities
- Invited talks from industry and consultants
- Panel discussion on markets and deployment
- “Lightning talks” on technical topics
- Breakout discussions and report-outs

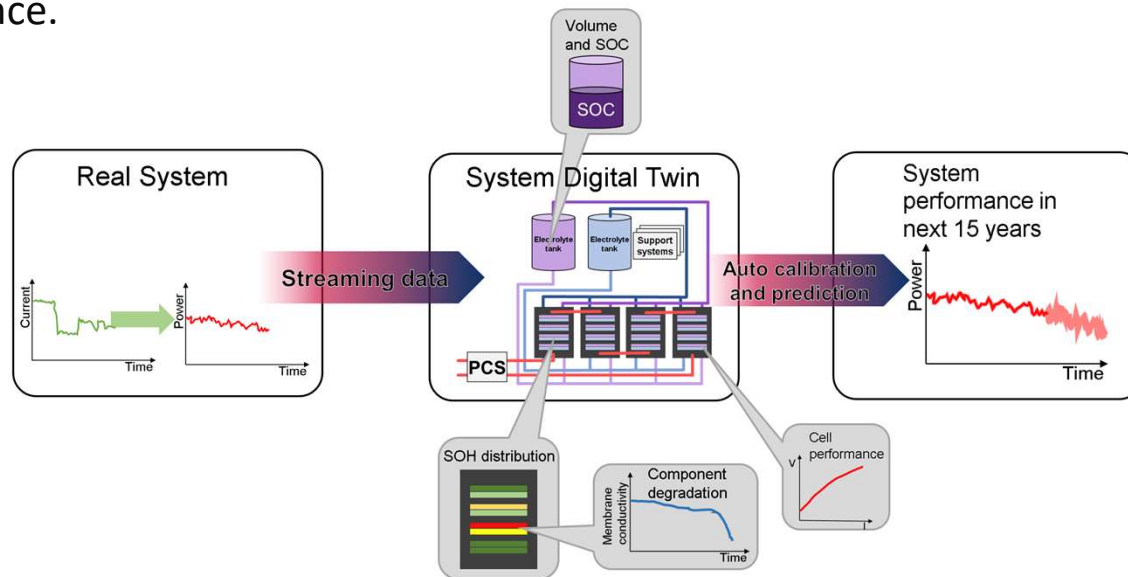


Future of Energy Storage – Key Questions

- How can AI accelerate the discovery of new energy storage materials?
- What role can AI play in managing and optimizing energy storage systems?
- How can AI influence policy and market decisions in energy storage?

AI for Storage Materials Development

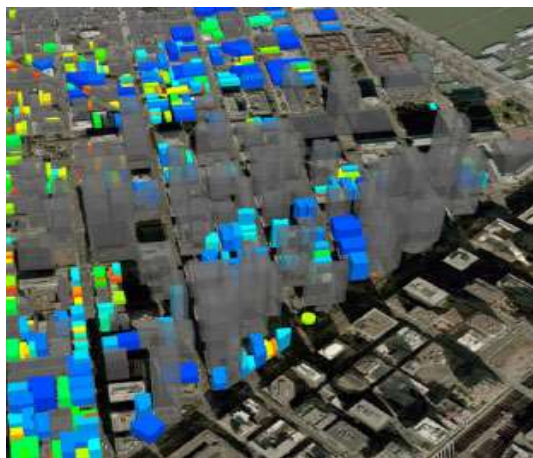
- **Challenge:** Finding and optimizing new materials for energy storage is slow and labor-intensive.
- **Solution:** AI models analyze vast datasets to predict the properties of new materials quickly and accurately.
- **Examples:** AI-accelerated design of new battery materials and rapid validation frameworks that can predict long-term performance.



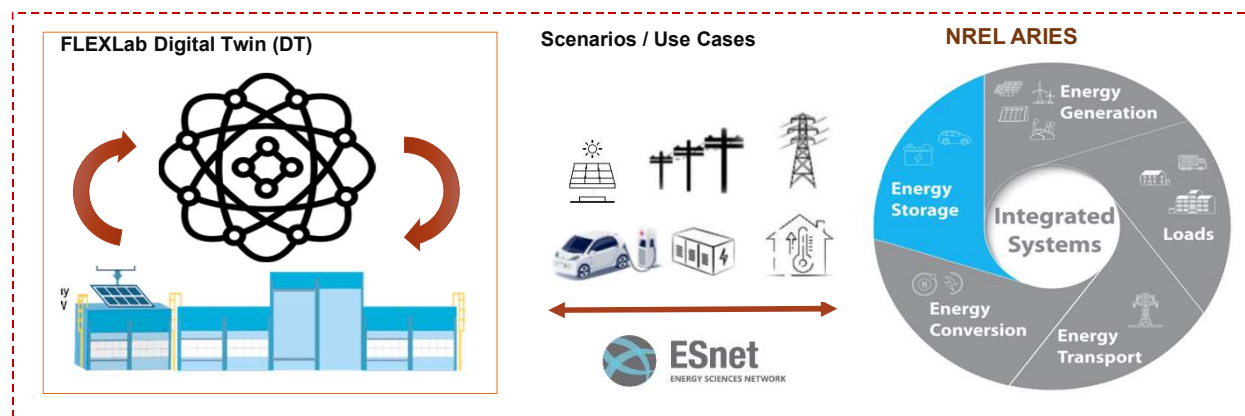
ROVI modeling of redox flow batteries

AI for Grid Operations

- **Challenge:** Managing complex energy systems with many distributed resources (like solar panels and electric vehicles).
- **Solution:** AI-driven models improve the efficiency and lifespan of storage assets through predictive maintenance and operational optimization.
- **Example:** Digital twins simulate and optimize real-time grid operations.



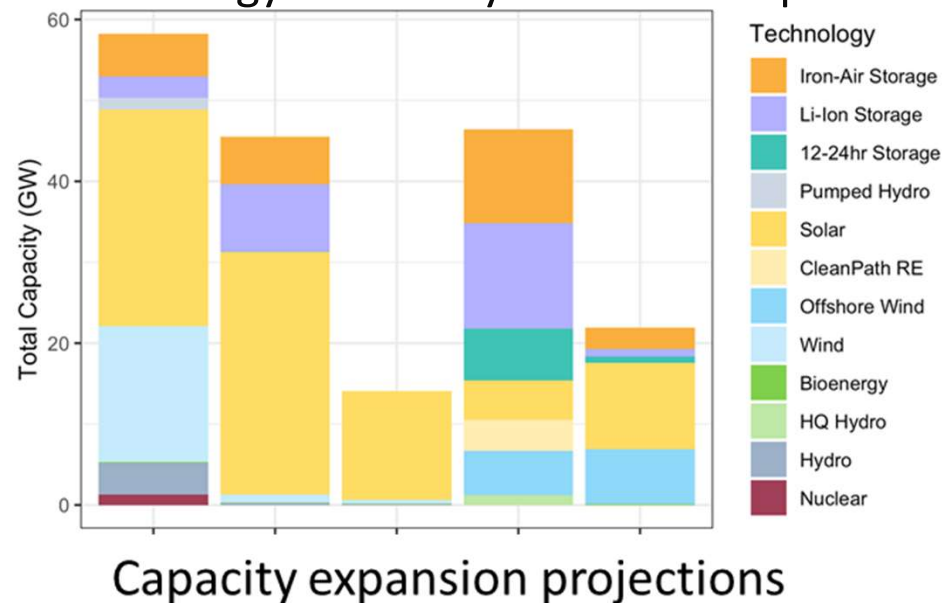
Urban digital twins



Digital twins for building and integrated energy systems

AI for Policy and Valuation

- **Challenge:** Making informed decisions in a complex and rapidly changing market.
- **Solution:** AI provides insights into market trends, informs regulatory strategies, and helps evaluate the economic viability of new technologies.
- **Example:** AI models forecast energy market dynamics and optimize investment strategies.



Workshop Findings

- **Data** is foundation for all AI/ML models
 - Enhance data availability, ensure interoperability, and establish secure data-sharing protocols.
- **Collaboration** between sectors is necessary for innovation
 - Foster partnerships between academia, industry, and government to share knowledge and resources.
- **Trust** in AI systems must be established before implementation
 - Develop explainable AI tools, ensure transparency in decision-making, and address security concerns.
- **Education** of all stakeholders is necessary for adoption
 - Educate the public, policymakers, and industry stakeholders about AI's potential and limitations in energy storage.