



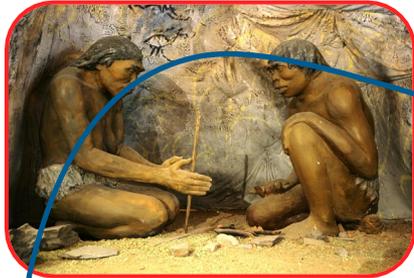
The Role of LDES from Multiple Perspectives Panel

Moderator: Zhiwen Ma (NREL)

*Panelists: Paul Denholm (NREL), Rachel Wilson (Form Energy),
Joe Stekli (Galvanize Climate Solutions), Caleb Dennis-Kiyasu (LADWP)*

Energy Storage and Sustainability

Human civilization has been built upon energy storage.



Learned to use fire

Industrial Revolution

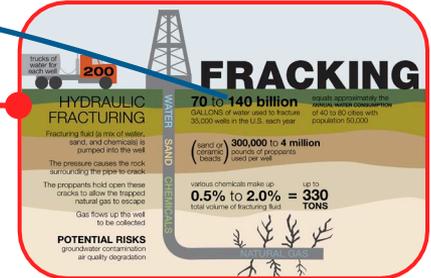


Steam Engine
Arguably the most important invention during the Industrial Revolution, he



Oil Exploration

Fracking Revolution



Energy storage by nature (fossil fuels) is not sustainable!



What's next?

Carbon-free clean energy for sustainability



Energy Storage Panelists



Rachel
Wilson



Joe Stekli



Caleb
Dennis-Kiyasu



Paul
Denholm



Zhiwen Ma
(moderator)



Galvanize
Climate
Solutions



Energy Storage for Grid Resilience and LA100 Study

Rachel Wilson

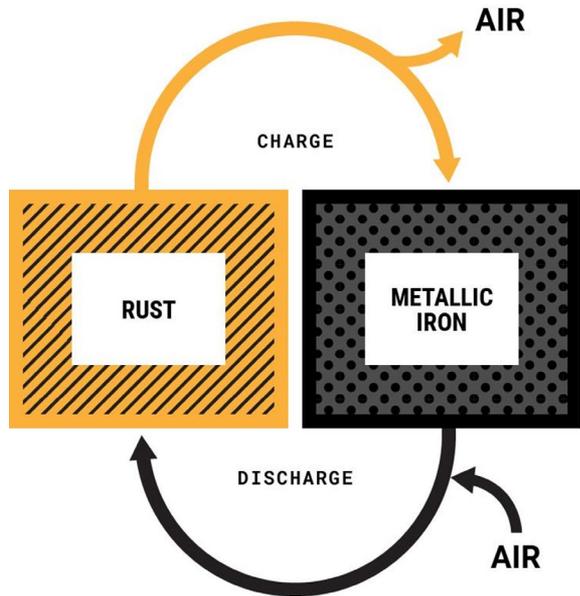
Form Energy



*Manager, Strategy and
Market Development*
rwilson@formenergy.com

Rachel Wilson is an internationally-recognized expert on electric system simulation modeling and utility resource planning best practices. She joined Form Energy in 2022 as the Manager of Strategy and Market Development. In her role at Form, Rachel uses data and analytics to support product strategy decisions, as well as regulatory and policy decisions, and to demonstrate the value of multi-day storage in both vertically integrated and deregulated electricity markets

BREAKTHROUGH LOW-COST, MULTI-DAY ENERGY STORAGE



Joe Stekli

Galvanize Climate Solutions



VP Science + Technology
Portfolio Services and Impact
joe.stekli@galvanizeclimate.com

Joe Stekli is the vice president for science and technology at Galvanize Climate Solutions, where he support each of Galvanize's investment strategies. Prior to Galvanize, he held a leadership role in the Low Carbon Resources Initiative at EPRI, led the CSP and T2M programs in the SunShot Initiative, was a T2M advisor in ARPA-E, helped to start the commercialization program in the DARPA Directors Office, and worked in the White House Office of Management and Budget. He started his career as a process engineer in the semiconductor industry. He holds a bachelors in Chemical Engineer and a MBA from Ohio State and is completing his Ph.D in Infrastructure and Environmental Systems at UNCC.

The investment opportunity **of** **our time.**

Galvanize is purpose-built to invest in and support the companies and teams positioned to lead the climate transition and deliver both climate impact and compelling returns.

Caleb Dennis-Kiyasu

Los Angeles Department of Water and Power (LADWP)



Caleb Dennis-Kiyasu is a Mechanical Engineer with the Los Angeles Department of Water and Power. He has worked with the LADWP for 15 years, spending a number of years in hydro generation support. He currently leads the team responsible for analyzing potential long duration energy storage projects for LADWP.

- Lead team on long duration energy storage analysis.
- 15 years at LADWP
- caleb.dennis-kiyasu@ladwp.com



The Los Angeles 100% Renewable Energy Study

LA100 Study

Released in March 2021, the groundbreaking Los Angeles 100% Renewable Energy Study (LA100) found that LA can achieve reliable, 100% renewable power as early as 2035.

[Read the Full Report](#)

<https://maps.nrel.gov/la100/la100-study/report>

Paul Denholm

National Renewable Energy Laboratory



- Principal Energy Analyst and Senior Research Fellow at NREL
- Paul.Denholm@nrel.gov

Paul Denholm is a Principal Energy Analyst and Senior Research Fellow at the National Renewable Energy Laboratory. His research focuses on examining the technical and economic impacts of large-scale deployment of renewable electricity generation, and the role of energy storage. He has co-authored over 150 articles related to renewable energy integration and is a Fellow of the IEEE. He holds a Ph.D. in energy analysis from the University of Wisconsin-Madison.

NREL's 100% Clean Electricity by 2035 Study

Multiple pathways to a net-zero grid in the U.S. by 2035

produce *significant benefits exceeding the costs*



Zhiwen Ma

National Renewable Energy Laboratory



- Senior Engineer at NREL
- Works on energy storage, hydrogen production, and concentrating solar power
- Zhiwen.Ma@nrel.gov

Technical background:

- Lead the NREL \$7 million electro-thermal energy storage demonstration project.
- Capability node lead in DOE Energy Material Network HydroGEN Advanced Water Splitting Material consortium.
- Lead topic editor of “Long-Duration and Long-Term Energy Storage for Renewable Integration” for Frontiers Energy Research.
- Principal Investigator of the NREL ARPA-E DAYS project, “Economic Long-Duration Electricity Storage by Using Low-Cost Thermal Energy Storage and High-Efficiency Power Cycle”.
- Principal Investigator of Pumped thermal energy storage and concentrating solar thermal power projects.
- 80 peer-reviewed publications and 15 awarded patents.

Discussion Points

- 1. LDES Technology Approach**
- 2. LDES Uses Cases**
- 3. LDES Customer Adoption**
- 4. Utility Resource Planning**
- 5. Economic/Environmental Impacts of LDES**
- 6. LDES Community Benefits**
- 7. Open Questions and Dialogue with Audiences**