

2024 U.S. Department of Energy
Energy Storage Financing Summit: Virtual
October 9th & 10th, 2024 – Day 1

Current Study - Energy Storage Financing: *Operational Strategies & Impacts*

In Partnership With



U.S. DEPARTMENT OF
ENERGY



Hosts

KIRKLAND & ELLIS



Welcoming Remarks

Sam Kamyans – Partner, Tax Practice Group Kirkland & Ellis

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Sam Kamyans is a partner in the Tax Practice Group in the Washington, D.C., office of Kirkland & Ellis LLP. He is known as a “very talented” advisor in partnership taxation, uniquely in structuring tax-driven transactions to invest in, finance, or acquire carbon capture, hydrogen, clean fuels, solar, storage, and other energy transition projects. Sam has developed tax structures to implement market leading transactions relying upon section 45Q, 45Z, 45V, and 45/48 credits. He advises energy clients, including domestic and international private equity funds, and major sponsors to structure creative transactions to optimize each clients’ commercial and tax goals.

In addition, Sam brings a solutions-oriented approach to structure and implement mergers and acquisitions, divestitures, equity extractions, distressed asset restructurings, and public and private offerings.

In addition, Sam frequently publishes articles that clients rely upon to structure their deals, including a carbon capture financing guide, a guide to evaluating how to optimize credits for multi-credit projects, and practical publications on implementing IRS guidance.

Prior to joining Kirkland, Sam served at the Internal Revenue Service, where he assisted in issuing guidance on partnership taxation and energy-related matters. He has also served as tax counsel to Sempra Energy, a Fortune 500 energy company, and as a partner at a prominent U.S. energy-focused firm.

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Chairman's Remarks and Summit Overview

Richard Baxter - President Mustang Prairie Energy



Richard Baxter is President of Mustang Prairie Energy where he bridges the financial and technical sides of the energy storage industry for capital providers, project developers, and manufacturers. Richard has been active in the energy storage industry for 20 years, working across the industry, including at a storage OEM, investment bank, and as a strategy consultant.

Richard is the author of the U.S. DOE sponsored study series on Energy Storage Financing through Sandia National Laboratories. He is also the author of the Energy Storage Pricing Survey through (Sandia National Laboratories) series and supports the Technology Cost and Performance Assessment for the DOE's Grid Energy Storage Technology Cost and Performance Assessment. Previously, he supported the initial development and first three years of the Lazard Levelized Cost of Storage (LCOS) Survey.

He has served on the Board of Directors for the Energy Storage Association, the Charitable Foundation of the Energy Bar Association, and NovoCarbon. He was also the founder and Executive Director of the Advancing Contracting in Energy Storage (ACES) Working Group where he led the development of the ACES Energy Storage Best Practice Guide.

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Day 1: 2024 U.S. DOE Energy Storage Financing Summit: Virtual



Welcome	Sam Kamyans, Kirkland & Ellis	
Chairman	Richard Baxter, Mustang Prairie Energy	
Keynote	Imre Gyuk, U.S. Department of Energy, Office of Electricity	
Keynote	Xiaoping Wang, The World Bank Group	
Panel 1: LDES Market	Moderator Sam Saunders, Kirkland & Ellis	<ul style="list-style-type: none"> • Alex Campbell – LDES Council • Valerio DeAngelis – Sandia National Laboratories (ROVI) • Mike Firenze – MFI Energy • Will McNamara – Sandia National Laboratories (LDES Consortium) • Russ Weed – Flow Battery Industry Group
Keynote	Eric Hsieh, U.S. Department of Energy, Office of Electricity	
Panel 2: Modeling & Valuation	Moderator Ray Byrne, Sandia National Laboratories	<ul style="list-style-type: none"> • Patrick Balducci – Argonne National Laboratory • Miles Evans – Electric Power Research Institute • Tu Nguyen – Sandia National Laboratories • Dexin Wang – Pacific Northwest National Laboratory

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Day 2: 2024 U.S. DOE Energy Storage Financing Summit: Virtual



Welcome	Sam Kamyans, Kirkland & Ellis	
Chairman	Richard Baxter, Mustang Prairie Energy	
Keynote	Mike Gravely, California Energy Commission	
Keynote	Tom Ferguson, Massachusetts DOER	
Panel 3: Markets & Policy	<p>Moderator</p> <p>Paul Wight, Kirkland & Ellis</p>	<ul style="list-style-type: none"> • Jan Ahlen, NRUCFC • Todd Olinsky-Paul, Clean Energy States Alliance • Justin Rangooni, Energy Storage Canada • Allison Weis, Wood Makenzie • Paul Zumma, American Public Power Association
Keynote	Kaitlin Johnson, Federal Energy Regulatory Commission (FERC)	
Panel 4: Capital Providers	<p>Moderator</p> <p>Rob Eberhardt, Kirkland & Ellis</p>	<ul style="list-style-type: none"> • Craig Irwin, Roth Capital • Kate Howling, DOE Loan Programs Office • John O'Brien, Independent • Richard Riley, New Energy Risk • Patricia Vorhees, The Alta Group
Panel 5: Operational Strategies & Impacts	<p>Moderator</p> <p>Sharaf Islam, Kirkland & Ellis</p>	<ul style="list-style-type: none"> • Jason Abiecunas, FlexGen • Ryan Franks, Twaice • Robert Harris, BreitGRID • Mohammed Muthalib, DNV • Shawn Shaw, Camelot Energy

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U.S. DOE – Office of Electricity’s Energy Storage Division



Energy Storage Division Goals

- DOE Clearinghouse for Grid Energy Storage Development & Commercialization
- Drive Long Duration Energy Storage (LDES) Efforts
- Improve Reliability, Modeling & Analytics, and Validating Performance for Commercialization

Key Programs

Energy Storage Technology RD&D

Rapid Operational Validation Initiative (ROVI)

Strategic Efforts

Storage Innovations (SI) 2030

Long Duration Storage Shot Tech Assessments

Storage Innovations (SI) Liftoff

Energy Storage Safety Strategic Plan

OE Energy Storage Facilities

Grid Storage Launchpad

Cross Cutting DOE Collaborations

Energy Storage Grand Challenge

Long Duration Storage Shot

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<https://www.energy.gov/oe/energy-storage>

Sandia National Laboratories: Energy Storage

Programs

DOE Energy Storage Systems Annual Peer Review

- Aug 5-7, 2024
- <https://doepeerreview.sandia.gov/>

Electrical Energy Storage Applications and Technologies (EESAT)

- January 20th-21st, 2025
- <https://cmte.ieee.org/pes-eesat/call-for-papers/>

Energy Storage Systems Safety & Reliability Forum

- May 14-16, 2024
- <https://pnnl.cventevents.com/event/18b24511-29ad-4de6-b63a-31dc926d2e69/summary>

Power Electronics & Energy Conversion Workshop

- July 30 -31st, 2024
- <https://energy.sandia.gov/programs/electric-grid/power-electronics-and-controls/2024-power-electronics-energy-conversion-workshop/>

Energy Storage Webinars for Regulators

- <https://www.sandia.gov/ess/conference-archive>

Resources

DOE Global Energy Storage Database

- <https://gesdb.sandia.gov/>

U.S. DOE Energy Storage Handbook

- <https://www.sandia.gov/ess/publications/doe-oe-resources/eshb>

Energy Storage Pricing Survey

- <https://energy.sandia.gov/programs/energy-storage/publications/laboratory-publications/>

Energy Storage Financing Studies

- <https://energy.sandia.gov/programs/energy-storage/publications/laboratory-publications/>

Energy Storage Safety Collaborative

- <https://www.sandia.gov/energystoragesafety/>

Quest

- <https://www.sandia.gov/ess/tools-resources/quest>

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Energy Storage Financing Study Series

Outreach to Financial Industry

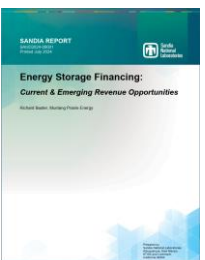
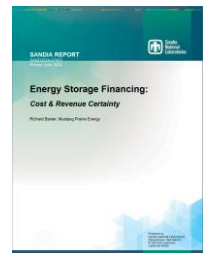
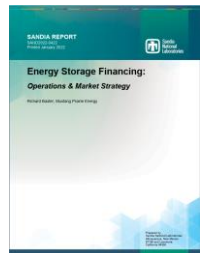
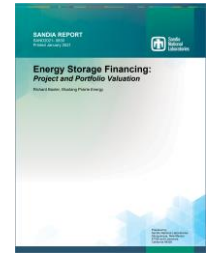
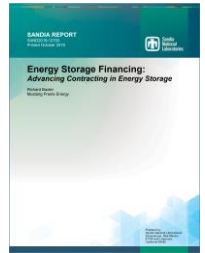
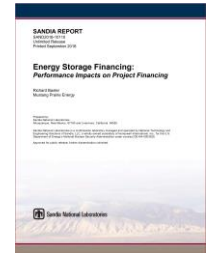
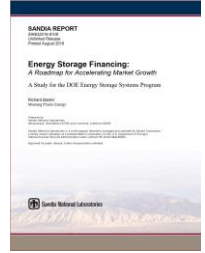
- Improve Project Development Risk Management
- Promote Technology and Project Risk Transparency
- Promote Wider Access to Low-Cost Capital
- Reduce Project & Transaction Costs

Study Components

- Summits: Current Market Insights
- Reports: Document Lessons Learned

Energy Storage Financing:

- A Roadmap for Accelerating Market Growth SAND2016-8109
- Performance Impacts on Project Financing SAND2018-10110
- Advancing Contracting in Energy Storage SAND2019-14896
- Project & Portfolio Valuation SAND2021-0830
- Operations & Strategy SAND2022-0422
- Cost & Revenue Certainty SAND2024-07453
- Current & Future Revenue Opportunities SAND2024-09001
- Deployment: Challenges & Opportunities SAND2024-xxxx
- Operational Strategies & Impacts SAND2025-In Progress



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U.S. DOE Energy Storage Financing Summits – Virtual

Virtual Financing Summits

Virtual 2023 U.S. DOE Energy Storage Financing Summit

250 Attendees, October 19-20th, 2023

<https://www.kirkland.com/events/kirkland-seminar/2023/01/2023-doe-energy-storage-financing-summit>

Virtual 2022 U.S. DOE Energy Storage Financing Summit

250 Attendees, October 19-20th, 2022

<https://www.kirkland.com/events/kirkland-seminar/2022/10/2022-us-doe-energy-storage-financing-summit>

U.S. DOE Energy Storage Financing For Social Equity Summit

340 Attendees, April 13th, 2022

<https://www.kirkland.com/events/kirkland-seminar/2022/04/us-doe-energy-storage-social-equity-summit>

Virtual 2022 U.S. DOE Energy Storage Financing Summit

400 Attendees, January 19 & 20th, 2022

<https://www.kirkland.com/events/kirkland-seminar/2022/01/2022-us-doe-energy-storage-financing-summit>

Virtual 2021 U.S. DOE Energy Storage Financing Summit

240 Attendees, September 28 & 29th, 2021

<https://www.kirkland.com/events/kirkland-seminar/2021/09/2021-us-doe-energy-storage-financing-summit>

Virtual 2021 U.S. DOE Energy Storage Financing Summit

300 Attendees, January 26 & 27th, 2021

<https://www.kirkland.com/events/kirkland-seminar/2021/01/2021-us-doe-energy-storage-financing-summit>

Virtual 2020 U.S. DOE Energy Storage Financing Summit

150 Attendees, September 22 & 23, 2020

<https://www.kirkland.com/events/kirkland-seminar/2020/09/2020-kirkland-doe-energy-storage-financing-summit>

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U.S. DOE Energy Storage Financing Summits – In Person

Financing Summits

- Outreach to the Financial Industry
- Allows DOE to engage directly with financial leaders in the storage industry
- Promotes financial industry networking with storage industry leaders
- Platform to promote DOE programs and resources

Valuation Workshops

- Valuation Modeling Advancements
- Compare Modeling Approaches
- Revenue Recognition / Value Stacking
- Results from Project Analysis

In-Person Event Dates

2024 – Jan 23 & 24	NY, NY	175 Attendees
2023 – Jan 26 th	NY, NY	150 Attendees
2020 – Jan 14 th	NY, NY	170 Attendees
2019 – Oct 22 nd	SF, CA	74 Attendees
2019 – Jan 23 rd	NY, NY	146 Attendees
2018 – Oct 6 th	SF, CA	104 Attendees
2018 – Jan 18 th	NY, NY	124 Attendees
2017 – June 7 th	D.C.	84 Attendees
2017 – Jan 11 th	NY, NY	68 Attendees
2014 – Dec 16 th	NY, NY	65 Attendees

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Energy Storage Financing: Operational Strategies & Impacts

Strategy Components

Regional Market

- System Scale
- Revenue/Value Creation

Operations

- O&M
- Charging Losses
- Replenishment
- Warranty
- Insurance

Battery Intelligence

Energy Management Software

Dispatch & Optimization

Impacts

Supported Project Lifetime

Capabilities (Throughput, C-Rate, etc.)

Applications Supported

Off-Take Contracts

Merchant Tail Operating Position

Market Segments

Wholesale

Utility

Behind the Meter

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2024 U.S. DOE Energy Storage Financing Summit: Virtual – DOE Keynote

Imre Gyuk – Chief Scientist, Energy Storage, Office of Electricity U.S. Department of Energy



After taking a B.S. from Fordham University, Dr. Gyuk did graduate work at Brown University on Superconductivity. Having received a Ph.D. in Theoretical Particle Physics from Purdue University he became a Research Associate at Syracuse. As an Assistant Professor he taught Physics, Civil Engineering, and Environmental Architecture at the University of Wisconsin. Dr. Gyuk became an Associate Professor in the Department of Physics at Kuwait University where he became interested in issues of sustainability.

Dr. Gyuk joined the Department of Energy to manage the Thermal and Physical Storage program. For the past 12 years he has directed the Electrical Energy Storage research program in the Office of Electricity developing a wide portfolio of storage technologies for a broad spectrum of applications. He supervised the \$185M ARRA stimulus funding for Grid Scale Energy Storage Demonstrations and is now partnering with the States on storage projects for grid resilience.

His work has led to 9 R&D 100 awards and a Lifetime Achievement Award. He is internationally recognized as a leader in the energy storage field.

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2024 U.S. DOE Energy Storage Financing Summit: Virtual – Keynote

Dr. Xiaoping Wang – Lead Energy Specialist, Energy Storage Program

The World Bank



Dr. Xiaoping Wang is Lead Energy Specialist and leads the energy storage program at the World Bank. Previously she was program leader for infrastructure in Ethiopia, Sudan and South Sudan and oversaw a portfolio of approximately \$5 billion supporting transport, energy and digital development to enable growth and create jobs.

Having had stints in the Chinese government, UNDP and the World Bank and field assignments in East Asia, South Asia, and Africa, Xiaoping has extensive experience in connecting development financiers and recipient countries for common objectives and for results. Xiaoping has helped better the life of millions of people in Latin America, Asia, Eastern Europe and Africa with improved access to infrastructure. She holds a PhD degree in energy and environment policy from Princeton University and a Masters degree in environmental economics from Yale University.

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2024 U.S. DOE Energy Storage Financing Summit: Virtual

Panel 1 – LDES Market

Moderator: **Sam Saunders**, Kirkland & Ellis

- **Alex Campbell** – LDES Council
- **Valerio DeAngelis** – Sandia National Laboratories (ROVI)
- **Mike Firenze** – MFI Energy
- **Will McNamara** – Sandia National Laboratories (LDES Consortium)
- **Russ Weed** – Cleantech Strategies

- **Lessons Learned from Other Markets**
- **Supporting LDES Contract Development**
- **State Program Development**
- **Comparative Economic Metrics**

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MFI Energy



CleanTech Strategies 

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2024 U.S. Department of Energy Energy Storage Financing Summit: Virtual

---- Break ---

October 9th & 10th, 2024 – Day 1

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2024 U.S. DOE Energy Storage Financing Summit: Virtual – DOE Keynote

Eric Hsieh, Office of Electricity, Deputy Assistant Secretary for Energy Storage U.S. Department of Energy



Eric Hsieh is the Deputy Assistant Secretary for Energy Storage in the U.S. Department of Energy's (DOE) Office of Electricity (OE), where he leads efforts to accelerate the next generation of energy storage technologies that deliver reliability, resilience, economic, and efficiency benefits. Mr. Hsieh also co-chairs the crosscutting [Energy Storage Grand Challenge](#), which coordinates departmental priorities such as the Long-Duration Storage Energy Earthshot. He is an energy policy, financial, and engineering thought leader with nearly 20 years of experience in improving energy delivery through innovation. Prior to his current role, Mr. Hsieh was the Director of Grid Components and Systems within OE.

As Director of Grid Components and Systems, Mr. Hsieh led strategy development and execution for grid hardware innovations including power conversion, energy storage, and robotics. He has more than 10 years of federal service, having also been the Director of the Office of Finance and Incentive Analysis, where he applied geospatial and computational techniques to modernize utility industry analysis. Over the course of his professional career, Mr. Hsieh has held executive positions with several industry-leading firms and government associations.

Mr. Hsieh holds a master's in public policy from the University of California at Berkeley, as well as a Bachelor of Science in Computer Science and Engineering (with a concentration in AI) from the Massachusetts Institute of Technology.

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2024 U.S. DOE Energy Storage Financing Summit: Virtual

Panel 2 – Modeling & Valuation

Moderator: **Ray Byrne**, Sandia National Laboratories

- **Patrick Balducci** – Argonne National Laboratory
- **Miles Evans** – Electric Power Research Institute
- **Tu Nguyen** – Sandia National Laboratories
- **Dexin Wang** – Pacific Northwest National Laboratory

- **LDES Opportunity & Value**
- **Energy Storage Project Valuation**
- **Energy Storage Modeling Capabilities**
- **Utility T&D Planning & State Policy**



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Acknowledgements

The author would like to acknowledge the support and guidance of Eric Hsieh, Deputy Assistant Secretary, Office of Electricity Energy Storage Division, Dr. Imre Gyuk, Chief Scientist, Energy Storage, Department of Energy's Office of Electricity, and Dr. Ray Byrne, Manager, Electric Power System Research Program of Sandia National Laboratories.

Eric Hsieh, DOE – Office of Electricity

- Deputy Assistant Secretary, Office of Electricity Energy Storage Division



Dr. Imre Gyuk, DOE – Office of Electricity

- Chief Scientist, Energy Storage, Office of Electricity



Dr. Ray Byrne – Sandia National Laboratories

- Manager, Electric Power System Research



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Energy Storage Pricing Survey Series

Energy Storage Pricing Survey Overview

Provides

- Realistic Expectation for System Price
- Standardized Reference Benchmark Price
- Range of System Costs Based on Range of Power / Energy Ratings

Technologies Covered

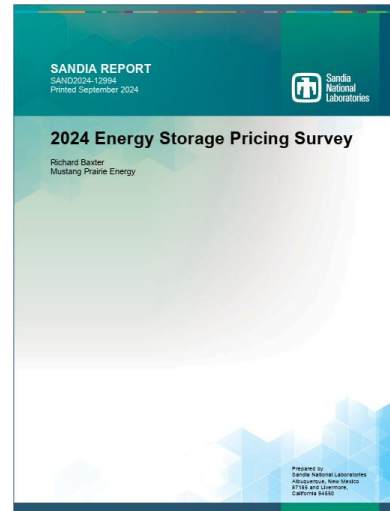
- 16 Technology Families Currently Covered
- 14 Emerging Technology Families Introduced
- Grid Applications of 2 Hours to 10 Hours
- UPS Technologies Not Covered

Data Acquisition

- Primary – OEM & Customers
- Secondary – Market Reports
- Weighting of Data Allows to Promote Market Accuracy
- Survey Options
- U.S. Based Deployment

Anonymity

- Component and System Price Quotes
- Specific OEM Price Quote Remains Confidential



Key Takeaways

Lithium

- Slowing Average Cost Decline in Near Term (Lithium)
- Greatest Decline in Larger Systems
- Supply chain Issues Remain

Non-Lithium

- Project Development / EPC Costs Lacking Experience
- Exposure to Commodity Prices

Energy Storage Pricing Survey (ESPS)

Available at <https://www.sandia.gov/ess-ssl/>

- | | |
|-------------|----------------|
| • 2018 ESPS | SAND2019-14896 |
| • 2019 ESPS | SAND2021-0831 |
| • 2020 ESPS | SAND2021-14700 |
| • 2021 ESPS | SAND2024-08994 |
| • 2022 ESPS | SAND2024-08996 |
| • 2024 ESPS | SAND2024-12994 |

Thank you

Tomorrow

**US Department of Energy
Energy Storage Financing Summit
Day 2**

October 10th, 2024 12:00PM – 4:30PM (ET)

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