

# WI PSC/DOE ENERGY STORAGE WEBINAR SERIES: Evolution of Batteries – New Approaches Other Than Li-ion

**June 23, 2021 10:00 AM - 12:45 PM (CT)**

**Agenda & Speaker Biographies**

**Presented by Public Service Commission of Wisconsin,  
U.S. DOE Office of Electricity Energy Storage Program,  
and Sandia National Labs**

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Meeting will be open ½ hour early so you can test your connections

Energy storage is the key to unleashing the power of renewables, relieving generation, transmission, and distribution demands, and hastening the energy transition to a decarbonized future. Public Service Commission of Wisconsin Commissioners and Staff are invited to participate in a series of energy storage webinars presented in collaboration with US DOE Office of Electricity Energy Storage Program and Sandia National Laboratories. Experts from the national labs, regional agencies and other organizations and institutions will provide content, with time for discussion and questions.

## **June 23, 2021 – Evolution of Batteries – New Approaches Other Than Li-ion**

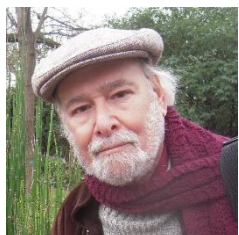
10:00 - 10:10	Introductory Comments Dr. Imre Gyuk, Director, DOE Office of Electricity Energy Storage (ES) Program
10:10 - 10:30	Thermal Energy Storage Dr. Cliff Ho, Sandia National Laboratories (SNL)
10:30 - 10:50	Hydrogen Energy Storage Dr. Simon Evans, Carbon Brief
10:50 - 11:00	Q&A
11:00 - 11:20	Gravity Energy Storage Russ Weed, Advanced Rail Energy Storage (ARES) North America
11:20 - 11:40	Compressed Air Energy Storage Dr. Stephen Bauer, Sandia National Laboratories (SNL)
11:40 - 11:50	Q&A
11:50 - 12:10	Side by Side Comparison of Li-ion & Flow Batteries Dr. Reed Wittman, Sandia National Laboratories (SNL)
12:10 - 12:30	Li-ion Recycling Wilson Ma, Li-Cycle
12:30 - 12:45	Q&A



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## Speaker Biographies



After taking a B.S. from Fordham University, Dr. Imre 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 two decades 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 numerous storage projects for grid resilience. His work has led to 12 R&D 100 awards, two EPA Green Chemistry Challenge Awards, and Lifetime Achievement Awards from ESA and NAATBatt. He is internationally recognized as a leader in the energy storage field.



Dr. Cliff Ho is a Fellow of the American Society of Mechanical Engineers and Senior Scientist at Sandia National Laboratories, where he has worked since 1993 on problems involving solar energy, water safety and sustainability, heat- and mass-transfer processes in porous media, and microchemical sensor systems for environmental monitoring. Dr. Ho has authored over 300 scientific papers, holds 15 patents, and is author and co-editor of two books. He received an Outstanding Professor Award at the University of New Mexico in 1997, and he received the national Asian American Engineer of the Year Award in 2010. Dr. Ho received an R&D 100 Award in 2013 for his development of the Solar Glare Hazard Analysis Tool, and an R&D 100 Award in 2016 for the development of the Falling Particle Receiver for Concentrating Solar Energy. In 2008, he won Discover magazine's "The Future of Energy in Two-Minutes-or Less" video contest.



Dr. Simon Evans is the deputy editor and policy editor at Carbon Brief. Simon covers climate and energy policy. He holds a PhD in biochemistry from Bristol University and previously studied chemistry at Oxford University. He worked for environment journal The ENDS Report for six years, covering topics including climate science and air pollution.

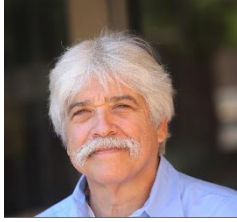


Russ is a seasoned business and project developer, marketing and sales leader, and legal manager, with 30 years of experience in the energy storage, renewables, and electronics industries. He has a track record of success at GE, Labtec, leading law firms when an attorney in private practice, and flow battery company UET (UniEnergy Technologies). In 2018, Russ established the consultancy CleanTech Strategies LLC. The firm's clients include engineering, procurement, and construction firm Potelco, part of Quanta Services (NYSE: PWR), which has built the megawatt-scale Horn Rapids Solar, Storage, and Training project in conjunction with utility Energy Northwest and owner Tucci Energy Services; the energy storage program at Sandia National Laboratories; engineering and manufacturing company Hotstart with 78 years of experience providing thermal management systems for engines, equipment, and now energy storage; power market conference company Infocast to design and host two two-day energy storage conferences focused on Storage Business Models and Economics and Increasing Storage Safety and Performance; and ARES, including its 50MW/12.5MWh project in Nevada providing regulation services into the CAISO market. Russ is now the Chief Development Officer for ARES. His foci are the 50MW ARES project in Nevada, the development and negotiation of further ARES projects, development of strategic partnerships for ARES, and the go-to-market strategy of the company.



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Dr Stephen Bauer is a Distinguished Member of the Technical Staff at Sandia National Laboratories; he received a PhD in geology from Texas A&M University in 1983. He is a geomechanicist by training, has been at Sandia for more than 35 years and studies how rocks respond to pressures, heat and fluids over extended time periods. He has led field and laboratory efforts to evaluate mechanical, thermal and hydrologic responses of many materials including a wide range of rocks, silicon carbide, foams, domal salt, concretes, cements, ceramics, metals, epoxies, and crushed salt. Dr. Bauer has worked on underground storage aspects of nuclear waste, petroleum products, natural gas, hydrogen and air. The studies have been supported by the Department of Energy and private sector projects.



Reed earned his BSE in Material Science Engineering at Arizona State University in 2013. He then went on to complete a PhD in Energy Science and Engineering through the Bredesen Center, an interdisciplinary degree program centered on all aspects of energy, at the University Tennessee and Oak Ridge National Lab. His PhD dissertation focused on using materials and electrochemical methods to understand the fundamental processes at the Zinc (Zn) electrode of alkaline Zn batteries. After joining Sandia National Lab in 2019, he shifted focus to understanding fundamental aspects of safety and reliability of Lithium (Li)-ion and aqueous batteries. His current work includes materials and electrochemical characterization of Li-ion battery degradation mechanisms during long-term cycling, and fundamental origins of gas evolution in aqueous flow batteries.



As Vice President, Corporate Development at Li-Cycle, Wilson Ma spearheads the company's efforts to scale the recovery of lithium-ion resources globally, while also leading the strategic planning and corporate partnerships and acquisition planning and driving the growth and international development of the company's Spoke & Hub network. Wilson has over 10 years of experience driving growth and business transformation in the industrials, banking, and technology industries. Prior to joining Li-Cycle a year ago, Wilson was Director, Growth and Business Transformation at Emerson Electric Company where he built a highly proficient team and embedded a broad base of capabilities to grow the business in Canada. Before that, he served as Program Manager at Advanced Micro Devices. Born and raised in Toronto, Canada, Wilson enjoys outdoor activities like hiking, biking, and camping. He is a graduate of the University of Toronto's Mechanical Engineering and MBA programs.



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