



**2022 MIT Energy Initiative Annual Research Conference  
September 13-14, 2022**

**Navigating the energy transition: Tackling energy security, materials availability, and other concerns to reach decarbonization goals**

MITEI's Annual Research Conference seeks to frame the key technology, policy, and economic drivers that are shaping today's energy system and its future. This year's conference looks at the race to decarbonize and the impact of energy security concerns and materials availability on the energy transition.

**Tuesday, September 13**

*All times are listed in Eastern time.*

MIT Media Lab, 6<sup>th</sup> floor | 75 Amherst St., Cambridge, MA

**7:30-8:15 am**      **Breakfast and registration**

**8:15-8:30 am**      **Welcome and opening remarks**

**Robert C. Armstrong**, Director, MIT Energy Initiative and Chevron Professor of Chemical Engineering, MIT

**8:30-10:00 am**      **The world facing multiple crises and what it means for the energy transition**

This session examines the variety of crises—including energy security, a lingering pandemic, disrupted supply chains, and inflation—facing the world that may slow our response to climate change.

**8:30 am**      **Keynote presentation** by **Ernest J. Moniz**, Cecil and Ida Green Professor of Physics and Engineering Systems emeritus, MIT; Thirteenth United States Secretary of Energy

**9:00 am**      **Panel discussion**  
Moderator: **Robert Stoner**, Deputy Director for Science and Technology, MIT Energy Initiative

Speakers:

**M. Taylor Fravel**, Arthur and Ruth Sloan Professor of Political Science, MIT Department of Political Science; Director, MIT Security Studies Program

**Yasheng Huang**, Epoch Foundation Professor of International Management, MIT Sloan School of Management

**Meghan O'Sullivan**, Jeane Kirkpatrick Professor of International Affairs, Harvard University's Kennedy School and Partner, Macro Advisory Partners

**John E. Parsons**, Deputy Director for Research, MIT Center for Energy and Environmental Policy Research



**10:00 am**

**Break**

**10:30 am-12:00 pm**

**What is the role of CCUS in getting to net zero by 2050?**

Moderator: [Bradford Hager](#), Cecil and Ida Green Professor of Earth Sciences, MIT Department of Earth, Atmospheric and Planetary Sciences

**Conversation** with [Charles Harvey](#), Professor, MIT Department of Civil and Environmental Engineering  
and [Howard Herzog](#), Senior Research Scientist, MIT Energy Initiative

**Panel discussion**

Speakers:

[David Keith](#), Gordon McKay Professor of Applied Physics, Harvard John A. Paulson School of Engineering and Applied Sciences, and Professor of Public Policy, Harvard Kennedy School

[Timothy Krysiak](#), Managing Director, Equinor Ventures Americas

[Jennifer Morris](#), Principal Research Scientist, MIT Energy Initiative and MIT Joint Program on the Science and Policy of Global Change

[Yogesh Surendranath](#), Associate Professor, MIT Department of Chemistry

[Kripa K. Varanasi](#), Professor, MIT Department of Mechanical Engineering

**12:00-1:30 pm**

**Networking lunch and viewing of student posters**

**1:30-2:45 pm**

**The future of power markets in a low marginal cost world**

The session will explore the economic, technological, and policy drivers of declining marginal costs of generation, the inherent characteristics of different generation resources, and the role of market and policy design in improving economic efficiency and creating incentives for long-term investments.

Moderator: [Christopher Knittel](#), Deputy Director for Policy, MIT Energy Initiative; George P. Shultz Professor of Energy Economics, MIT Sloan School of Management; Director, MIT Center for Energy and Environmental Policy Research

Speakers:

[Anuradha Annaswamy](#), Founder and Director, Active-Adaptive Control Laboratory, MIT; Senior Research Scientist, MIT Department of Mechanical Engineering

[Paul Joskow](#), Elizabeth and James Killian Professor of Economics and Management, MIT Department of Economics; President emeritus, Alfred P. Sloan Foundation



**Tim Schittekatte**, Postdoctoral Associate, MIT Sloan School of Management  
**Louis Vézina**, Head of Market Intelligence and Expertise, Hydro Québec

**2:45-3:00 pm**

**Break**

**3:00-4:15 pm**

**The challenge of scaling new energy startups**

Long lead times and capital intensity have long been understood to be inherent challenges for energy startups. How are the best companies navigating the challenge of taking their technology from the lab to the market?

Moderator: **Fiona Murray**, William Porter (1967) Professor of Entrepreneurship, MIT Sloan School of Management; Associate Dean of Innovation and Inclusion, MIT

Speakers:

**Aura Cuellar**, Vice President Energy Transition, Shell

**Joy Dunn**, Vice President of Operations, Commonwealth Fusion Systems

**Michael Kearney**, Partner, The Engine

**Hooisweng Ow**, Technology Principal, Eni Next LLC

**Libby Wayman**, Partner, Breakthrough Energy Ventures

**4:15-5:15 pm**

**Startup showcase**

This panel will look at energy startups, seeing how the best companies are navigating the challenge of taking their technology from the lab to the market. We will feature companies at various stages of development and discuss the value of partners throughout each part of the process.

Moderator: **Louis Carranza**, Associate Director, MIT Energy Initiative

Speakers:

**Carlos Araque**, Co-founder and CEO, Quaise

**Francesco Maria Benedetti**, Co-founder and CEO, Osmoses, Inc.

**Ross Bonner**, CTO, Transaera

**Jonte Boysen**, Head of Business Development, Verdox

**Tonio Buonassisi**, Co-founder and Scientific Advisor, Xinterra; Professor, MIT Department of Mechanical Engineering

**Shreya Dave**, Co-founder and CEO, Via Separations

**Marco Ferrara**, Co-founder and Senior Vice President, Software and Analytics, Form Energy

**Cameron Halliday**, Co-founder and CEO, Mantel

**Abigail Jablansky**, Business Development Lead, Amogy

**5:15 pm**

**Networking reception with startups**



**Wednesday, September 14**

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MIT Media Lab, 6<sup>th</sup> floor | 75 Amherst St., Cambridge, MA

**7:45-8:45 am**                      **Breakfast and registration**

**7:45-8:45 am**                      **Discussion with MITEI Education team: What should undergraduate education look like?**

The energy transition needs a range of different skill sets and knowledge bases. Based on these needs, what should undergraduate energy education look like? The MITEI Education Office wants to hear your ideas and recommendations. Please join us for breakfast and a conversation about how undergraduate energy education should evolve in the next five years.

**8:45 am**                                **Welcome day 2**

**Robert C. Armstrong**, Director, MIT Energy Initiative; Chevron Professor of Chemical Engineering

**8:45-10:00 am**                      **The future of energy storage**

This session explores the role that energy storage can play in fighting climate change and in the global adoption of clean energy grids.

Moderator: **Robert C. Armstrong**, Director, MIT Energy Initiative; Chevron Professor of Chemical Engineering

**Speakers:**

**Fikile Brushett**, Associate Professor, MIT Department of Chemical Engineering

**Dharik Mallapragada**, Principal Research Scientist, MIT Energy Initiative

**Elsa Olivetti**, Esther and Harold E. Edgerton Career Development Professor, MIT Department of Materials Science and Engineering; Co-Director, MIT Climate and Sustainability Consortium

**Richard Schmalensee**, Professor of Economics, Emeritus, MIT Department of Economics; Dean and Howard W. Johnson Professor of Management, Emeritus, MIT Sloan School of Management

**10:00-11:00 am**                      **Clean energy supply chain: Materials availability and security**

Historically, access to resources has been a key concern of the energy industry and a key driver of international diplomacy. Now, as countries scramble to secure clean energy supply chains, including access to materials, how will the world allocate these scarce resources and are there enough to get us to net zero?



Moderator: **Robert Jaffe**, Jane and Otto Morningstar Professor of Science, Post-Tenure, MIT Department of Physics

Speakers:

**Elsa Olivetti**, Esther and Harold E. Edgerton Associate Professor, MIT Department of Materials Science and Engineering; Co-Director, MIT Climate and Sustainability Consortium

**Arvind Sanger**, Founder and Managing Partner, Geosphere Capital

**Stuart Watson**, Chief Adviser, Office of the Chief Scientist, Development and Technology, Rio Tinto

**11:00 am**

**Poster session with students**

**12:00 pm**

**Luncheon**

**1:30-2:45 pm**

**MITEI General Seed Fund Project annual check-up**

Over the past 16 years, MITEI, with the support of our member companies and private donors, has made 205 seed fund awards totaling more than \$28 million. Proposals across the entire spectrum of energy and related climate research are welcome, including science, technology, and social sciences. Awards have funded principal investigators from 29 departments, all five schools, the College of Computing, and programs under the aegis of the Vice President of Research's Office. Submissions are encouraged from all disciplines. This session features projects from recent awardees.

Moderator: **Antje Danielson**, Director of Education, MIT Energy Initiative

Speakers:

**Chuchu Fan**, Wilson Assistant Professor of Aeronautics and Astronautics, MIT Department of Aeronautics and Astronautics, presenting on **Design automation of safe, robust, and resilient distributed power systems**

**Michael Howland**, Esther and Harold E. Edgerton Assistant Professor, MIT Department of Civil and Environmental Engineering, presenting on **Robust wind farm siting and design under climate change-driven wind resource uncertainty**

**Namrata Kala**, Assistant Professor, Applied Economics, MIT Sloan School of Management, presenting on **Socio-economic impacts of clean electrification: A randomized control design**

**Caitlin Mueller**, Associate Professor, MIT Department of Civil and Environmental Engineering and MIT Department of Architecture, presenting on



**Low-energy thermal comfort for buildings in the global south: Optimal design of integrated structural thermal systems**

**2:45-3:00 pm**

**Break**

**3:00-3:30 pm**

**Keynote discussion** with **Coordinating Minister for Maritime Affairs and Investment of the Republic of Indonesia Luhut Binsar Pandjaitan**,

and

**Robert C. Armstrong**, Director, MIT Energy Initiative; Chevron Professor of Chemical Engineering

**3:30-4:45 pm**

**Monitoring and mitigating non-CO2 greenhouse gases**

Carbon dioxide emissions as a contributor to climate change have been the primary concern of industry, academia, and the general public. However, other emissions contributing to global warming include methane, nitrous oxide, fluorinated gases, aerosols, and other pollutants. How should we measure the impact of these non-CO2 contributors and how can they be mitigated?

Moderator: **Jennifer Morris**, Principal Research Scientist, MIT Energy Initiative and MIT Joint Program on the Science and Policy of Global Change

Speakers:

**William H. Green**, Hoyt C. Hottel Professor in Chemical Engineering, Postdoctoral Officer, MIT

**Steven Hamburg**, Chief Scientist and Senior Vice President, Environmental Defense Fund

**Desiree Plata**, Associate Professor, MIT Department of Civil and Environmental Engineering

**Timothy Swager**, John D. MacArthur Professor of Chemistry, MIT Department of Chemistry

**4:45 pm**

**Reception for Society of Energy Fellows**

Samberg Conference Center (E52), 50 Memorial Drive, 7th floor, Salons T and West