2023 Future Energy Systems Center Spring Workshop

The Royal Sonesta Boston | 40 Edwin H Land Blvd, Cambridge, MA 02142

Tuesday, May 16, 2023

All times listed in Eastern Daylight time.

8:00-8:45 am — **Breakfast and registration**
Parkview Room

Main program will take place in the Riverfront room.

8:45-9:00 am — **Welcome and opening remarks**
Randall Field, Executive Director, Future Energy Systems Center, MIT Energy Initiative
Robert Stoner, Deputy Director for Science and Technology, MIT Energy Initiative

9:00-10:00 am — **Future Energy Systems Center accomplishments**
Moderator: **Robert Stoner**, Deputy Director for Science and Technology, MIT Energy Initiative

Speakers:

- **Emre Gençer**, Principal Research Scientist, MIT Energy Initiative
- **Jing Li**, William Barton Rogers Career Development Professor of Energy Economics, MIT Sloan School of Management
- **Dharik Mallapragada**, Principal Research Scientist, MIT Energy Initiative
- **John Parsons**, Deputy Director for Research, MIT Center for Energy and Environmental Policy Research
- **Tim Schittekatte**, Research Scientist, MIT Energy Initiative
- **Guiyan Zang**, Research Scientist, MIT Energy Initiative

10:00-10:30 am — **Break**
Parkview Room

10:30-11:30 am **New Future Energy Systems Center project kickoffs**
Moderator: **Randall Field**, Executive Director, Future Energy Systems Center, MIT Energy Initiative

Project presentations:

- **Identification of the best steel decarbonization options for different region**
  Emre Gençer, Principal Research Scientist, MIT Energy Initiative
  Sydney Johnson, PhD Candidate, MIT Chemical Engineering Practice Program; Graduate Research Assistant, MIT Energy Initiative
- **What is the best hydrogen carrier for long-distance distribution and storage?**
  Guiyan Zang, Research Scientist, MIT Energy Initiative
- **The competitive landscape for distributed nuclear cogeneration**
  John Parsons, Deputy Director for Research, MIT Center for Energy and Environmental Policy Research
- **Chemistry and climate effects of potential hydrogen leakage**
  Susan Solomon, Martin Professor of Environmental Studies, MIT Department of Earth, Atmospheric, & Planetary Sciences
- **Flexibility and firm power in future zero-carbon power systems**
  Audun Botterud, Principal Research Scientist, MIT Laboratory for Information and Decision Systems
  Jessika Trancik, Professor, MIT Institute for Data, Systems, and Society
- **Optimization for the joint resiliency of power grid and e-transportation**
  Andy Sun, Iberdrola-Avangrid Professor in Electric Power Systems, MIT Sloan School of Management

11:30 am-12:15 pm **Breakout sessions with project teams**

12:15-1:15 pm **Lunch**
Parkview Room

MIT Energy Initiative

1:15-2:45 pm **Carbon accounting for green hydrogen**
Moderator: **Dharik Mallapragada**, Principal Research Scientist, MIT Energy Initiative

Speakers:

- **Tom Brown**, Professor for Digital Transformation in Energy Systems, Technical University of Berlin
- **Rick Clark**, Vice President of Strategy and Product Solutions, NextEra Energy Resources
- **Rachel Fakhry**, Director of Emerging Technologies, NRDC
- **Wilson Ricks**, Graduate Researcher, Department of Mechanical Engineering, Princeton University
- **Tim Schittekatte**, Research Scientist, MIT Energy Initiative

2:45-3:15 pm **Break**
Parkview Room

3:15-4:45 pm **Electricity retail rates to facilitate electrification**
Moderator: **Tim Schittekatte**, Research Scientist, MIT Energy Initiative

Speakers:

- **William W. Hogan**, Raymond Plank Research Professor of Global Energy Policy, John F. Kennedy School of Government; Research Director, Harvard Electricity Policy Group, Harvard University
- **Travis Kavulla**, Vice President for Regulatory Affairs, NRG
- **Achintya Madduri**, Senior Analyst, Retail Rates, Energy Division, California Public Utilities Commission
- **Sanem Sergici**, Principal, The Brattle Group

Concluding remarks: **Paul Joskow**, Elizabeth and James Killian Professor of Economics, MIT

4:45-5:15 pm **Ongoing projects highlights**

Speakers:

A. Analyzing the large-scale supply of low-carbon hydrogen in Germany
   Paul Sizaire, Graduate Research Assistant, MIT Energy Initiative
B. Pathways towards gigaton scale low-carbon H2 production
   Ed Graham, Postdoctoral Associate, MIT Energy Initiative
C. Development of a building retrofit adoption model
   Zachary Berzolla, PhD Candidate, Building Technology, MIT
D. System impacts of decarbonization pathways for space heating in cold climates
   Morgan Santoni-Colvin, Graduate Student, MIT Technology and Policy Program
E. Multi-vector energy systems analysis for low-carbon power and transportation
   Youssef Shaker, Graduate Research Assistant, MIT Energy Initiative
F. Impact of multi-dimensional uncertainty in long-term investment planning
   Philipp Andreas Gunkel, Graduate Student, MIT Department of Chemical Engineering; Visiting PhD Candidate, Technical University of Denmark

5:15-6:15 pm **Reception and poster session**
Longfellow A, B, C foyer

Poster presenters:

1. Comparative assessment of low-carbon liquid energy carriers for long-haul trucking
   Jim Owens, PhD Candidate, MIT Department of Chemical Engineering
2. Decarbonization strategies for transportation via direct air capture of CO2
   Niamh Keogh, Postdoctoral Associate, MIT Department of Aeronautics and Astronautics
3. Ensuring a financially sustainable, just, and inclusive energy transition
   Peter Heller, Graduate Research Assistant, MIT Technology and Policy Program

4. Maximizing security and resilience to cyber-attacks in a power grid
   Vineet J. Nair, PhD Student, MIT Department of Mechanical Engineering
   Priyank Srivastava, Postdoctoral Associate, MIT Department of Mechanical Engineering
5. Modeling liquid air energy storage systems
   Shaylin Cetegen, PhD Student, MIT Department of Chemical Engineering
6. Opportunities for carbon dioxide capture in the urban ecosystem
   Alex Tavasoli, Postdoctoral Associate, MIT Department of Chemical Engineering
7. Electrochemical oxidative coupling of methane towards ethylene
   Filip Grajkowski, Graduate Student, Professor Bilge Yildiz Research Group, MIT
8. Electric transmission lines are not pipes: WECC & ERCOT case study
   Thomas Lee, PhD Student, MIT Institute for Data, Systems, and Society
9. Producing hydrogen from electricity: How modeling additionality drives the emissions impact of time matching requirements
   Michael Giovanniello, Graduate Student, MIT Technology and Policy Program
10. Medium-term impact of COVID-19 on urban mobility: Behavior, preference, and energy consumption
    Yunhan Zheng, PhD candidate, MIT Department of Civil and Environmental Engineering
11. Lower cost, CO2-free, H2 production from CH4 using liquid tin
    Michael Bichnevicius, PhD student, MIT Department of Mechanical Engineering
12. The future of work and urban mobility
    Nicholas Caros, PhD Candidate, Transportation, MIT
13. The role of contractors in building electrification
    Johnattan Ontiveros, Graduate Student, MIT Technology and Policy Program
14. Temporal transfer learning for human-compatible autonomy
    Jung Hoon Cho, PhD Student, MIT Department of Civil and Environmental Engineering and Laboratory for Information and Decision Systems

6:15-8:00 pm **Dinner**
Longfellow A, B, C

Wednesday, May 17, 2023
All times are listed in Eastern Daylight time.

8:00-9:00 am **Breakfast and registration**
Parkview Room

Main program will take place in the Riverfront room.

9:00-10:40 am **Futre Energy Systems Center Advisory Committee Meeting**

10:40-11:00 am **Break**
Parkview Room

11:00 am-12:30 pm **Is ammonia a viable energy carrier?**
Moderator: **Robert Stoner**, Deputy Director for Science and Technology, MIT Energy Initiative

Speakers:

- **Young Suk Jo**, Co-Founder and CTO, Amogy
- **Noelle Eckley Selin**, Professor MIT Institute for Data, Systems and Society and Department of Earth, Atmospheric and Planetary Sciences
- **Greg Wilson**, Vice President for Science and Advanced Technologies, JERA Americas
- **Guiyan Zang**, Research Scientist, MIT Energy Initiative

12:30-1:30 pm **Lunch**
Parkview Room

MIT Energy Initiative

1:30-3:00 pm **Scaling battery materials**
Moderator: **Fikile Brushett**, Associate Professor, MIT Department of Chemical Engineering

Speakers:

- **Junzheng Chen**, Director, Advanced R&D, 24M Technologies
- **Linda Gaines**, Transportation Systems Analyst, Argonne National Laboratory
- **Michael Machala**, Senior Energy Systems Analyst, Toyota Research Institute
- **Elsa Olivetti**, Esther and Harold E. Edgerton Career Development Professor, MIT Department of Materials Science and Engineering

3:00-3:30 pm **Break**
Parkview Room

3:30-5:00 pm **The new nuclear: Challenges and opportunities**
Moderator: **John Parsons**, Deputy Director for Research, MIT Center for Energy and Environmental Policy Research

Speakers:

- **Emilio Baglietto**, Associate Professor, MIT Department of Nuclear Science and Engineering
- **Gretchen Baier**, R&D Executive External Strategy Leader, The Dow Chemical Company
- **Atte Harjanne**, Member, Parliament of Finland

5:00 pm **Closing remarks**
Robert Stoner, Deputy Director for Science and Technology, MIT Energy Initiative