

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Roundtable on Science and Technology for Sustainability
June 12-13, 2017

Keck Center of the National Academies of
Sciences, Engineering, and Medicine
500 Fifth Street NW
Washington, DC

Workshop Objective: To examine the sustainability implications of material demands and manufacturing processes associated with technologies for solar photovoltaic energy and concentrated solar power, wind energy, and energy storage systems across various sectors.

Monday, June 12, 2017 (Keck 100)

Workshop on Sustainable Materials and Manufacturing for Renewable Energy Technology Development to 2030

- 8:00 am Registration, continental breakfast available outside conference room
- 8:45 am **Welcome**
David Dzombak (NAE), Carnegie Mellon University, STS Roundtable Co-Chair
Lynn Scarlett, The Nature Conservancy, STS Roundtable Co-Chair
Richard Bissell, The National Academies of Sciences, Engineering, and Medicine
- 9:05 am **Workshop Overview and Objectives**
Michael Kavanaugh (NAE), Geosyntec Consultants
Suzette Kimball, U.S. Geological Survey
- 9:15 am **Keynote Remarks**
Claus Daniel, Oak Ridge National Laboratory

Session I: Renewable Energy Technologies – Material and Manufacturing

- 9:50 am Introduction
Michael Kavanaugh (NAE), Geosyntec Consultants
- 9:55 am **Solar Energy Technology Advancement – Materials and Manufacturing Implications**
Charles Gay (NAE), U.S. Department of Energy
- 10:25 am **Wind Energy Technology Advancement – Materials and Manufacturing Implications**
Yongxin Huang, Siemens Gamesa Renewable Energy
- 10:55 am Break

- 11:10 am **Energy Mass Storage Technology Advancement – Materials and Manufacturing Implications**
Jay Whitacre, Carnegie Mellon University
- 11:40 am **Moderated Discussion: Sustainable Manufacturing Challenges for Solar, Wind, and Energy Storage Technologies**
All participants, with Michael Kavanaugh (NAE), Moderator
- 12:10 pm LUNCH

Session II: Acquisition, Use, Recovery and Reuse of Metals in Renewable Energy Technologies

- 1:10 pm Introduction
Suzette Kimball, U.S. Geological Survey
- 1:15 pm **Supply and Demand of Minor Metals for U.S. Solar PV and Wind Power: Scenarios and Perspectives**
Nedal Nassar, U.S. Geological Survey
- 1:45 pm **Current and Future Demand For and Reuse of Rare Earth Elements, and Related Sustainability Issues**
Elisa Alonso, Oak Ridge National Laboratory
- 2:15 pm **Social Dimensions of Meeting Demand for Metals for Use in Renewable Energy Technologies**
John Thompson, Cornell University
- 2:45 pm **Moderated Discussion: Sustainability Challenges and Social Dimensions of Meeting Copper and REE Demand for Renewable Energy Technologies**
All participants, with Suzette Kimball, Moderator
- 3:15 pm Break

Session III: Research Needs for Sustainable Materials and Manufacturing for Renewable Energy Technologies

- 3:30 pm **The Path Forward: Advancing the Sustainable Materials and Manufacturing for Renewable Energy Technologies and Next Steps**
Each facilitator is asked to provide 10 minute remarks focused on their perspective on the issue and research needs identified during the day, followed by Q&A with audience.
 - Cyrus Wadia, Nike, Inc. (Industry Perspective)
 - Alexander King, The Ames Laboratory (National Perspective)
 - Roderick Eggert, Colorado School of Mines (Academic Perspective)
- 4:50 pm **Wrap Up**
David Dzombak (NAE)/Lynn Scarlett, STS Roundtable Co-Chairs
- 5:00 pm **Adjourn**
- 5:15 pm **Reception** (Ruth's Chris Steak House, 724 9th Street NW Washington, DC)

6:00 pm **Working Dinner** (Ruth's Chris Steak House, 724 9th Street NW Washington, DC)
Speaker: Joseph Kiesecker, The Nature Conservancy

Tuesday, June 13, 2017 (Keck 201)

8:15 am Breakfast available in conference room

8:45 am **Welcome and Feedback from Previous Day**
David Dzombak (NAE), Carnegie Mellon University, STS Roundtable Co-Chair
Lynn Scarlett, The Nature Conservancy, STS Roundtable Co-Chair

9:00 am **Develop Plan of Actions and Milestones for a Series of Workshops on Sustainable Manufacturing and Sustainable Mineral Extraction**
Moderator: Michael Kavanaugh (NAE), Geosyntec Consultants

Strategic Planning for Future Activities

9:30 am **Review of January 2017 Roundtable Session on Strategic Planning**
David Dzombak (NAE)/Lynn Scarlett, STS Roundtable Co-Chairs

9:35 am **United Nations Sustainable Development Goals**
Moderator: William Colglazier, American Association for the Advancement of Science

10:15 am **Ocean Sustainability**
Moderator: Donald Scavia, University of Michigan

10:45 am Break

11:00 am **Sustainable Food Systems**
Moderator: Prabhu Pingali (NAS), Cornell University

11:30 am **Possible Workshop Topics for the remainder of 2017**
All Members

Current Activities

12:00 pm **Housing, Health and Homelessness: Evaluating the Evidence** (Consensus report expected in 2017)
Michael Dorsey, The National Academies of Sciences, Engineering, and Medicine

12:10 pm **STS Program Updates**
Richard Bissell, The National Academies of Sciences, Engineering, and Medicine

12:15 pm **Wrap up**
David Dzombak (NAE)/Lynn Scarlett, STS Roundtable Co-Chairs

12:30 pm **Adjourn**