

*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

## POLICY AND GLOBAL AFFAIRS

# Briefing for Sustainability Seminar Series

**June 8, 2016**



# PGA Units in the Sustainability Space

- Government-University-Industry Research Roundtable
- Board on Science, Technology and Economic Policy
- Science and Technology for Sustainability Program/Roundtable
- Resilient America Roundtable
- Development, Security, and Cooperation

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

# Government-University-Industry Research Roundtable (GUIRR)



SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

# STEP Board

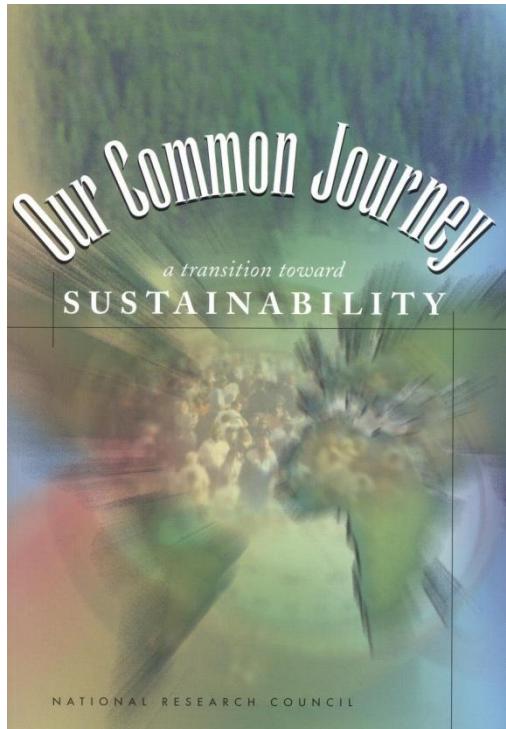
## Determinants of Market Adoption of Advanced Energy Efficiency & Clean Energy Technologies



SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

# *Our Common Journey: A Transition toward Sustainability* (Board on Sustainable Development, 1999)



**Described the goals of sustainability as:**

*“The primary goals of a transition to sustainability over the next two generations should be to meet the needs of a much larger but stabilizing human population, to sustain the life support systems of the planet, and to substantially reduce hunger and poverty.”*

## SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

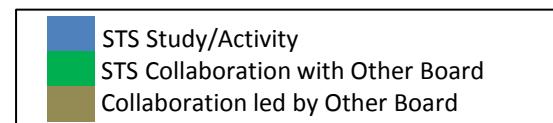
# Science and Technology for Sustainability: Mission

- Long-term goal: contribute to sustainable improvements in human well-being by creating and strengthening the strategic connections between scientific research, technological development, and decision-making.
- Examine issues at the intersection of the three sustainability pillars—**social, economic, and environmental**—and aims to strengthen science for decision-making related to sustainability.
- Concentrate on activities that
  - are crosscutting in nature;
  - require expertise from multiple disciplines;
  - are important in both the United States and internationally;
  - and engage multiple sectors, including academia, government, industry, and non-governmental organizations.
- Focus is on sustainability issues that have science and technology at their core, particularly those that would benefit substantially from more effective applications of science and technology.

## SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

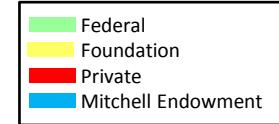
# Science and Technology for Sustainability Program Activities

## Food Security and Sustainability



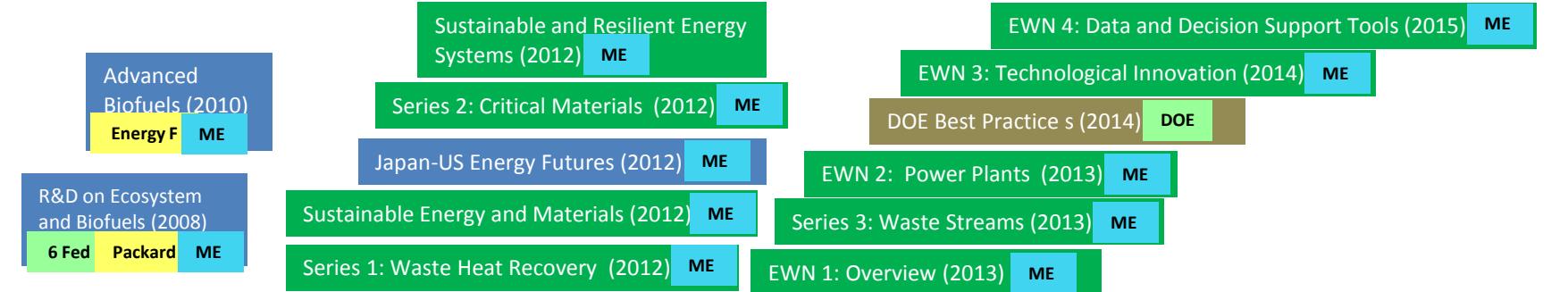
Data Needs for LCA (2012) ME

Critical Role of Animal Science Research (2015) USDA Gates 6 Privates



A Sustainability Challenge: Food Security for All (2012) Gates, Syngenta USDA ME

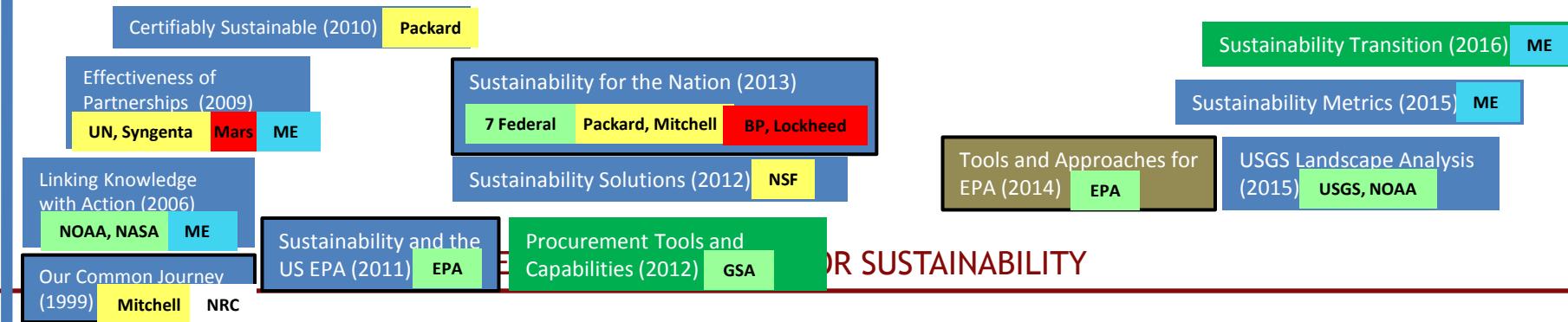
## Energy Sustainability



## Urban Sustainability



## Nationally-Focused



1996

2011

SCIENCE 2012 • ENGINEERING 2013 MEDICINE 2014

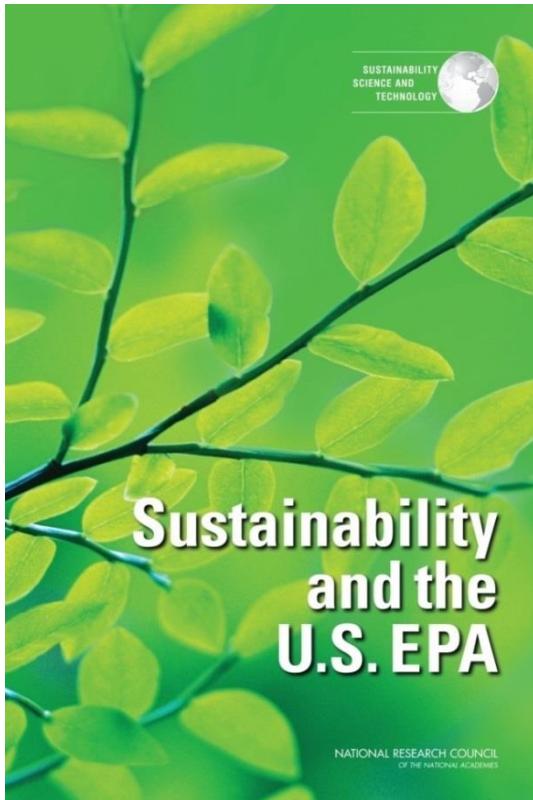
2015

2016

THE NATIONAL ACADEMIES

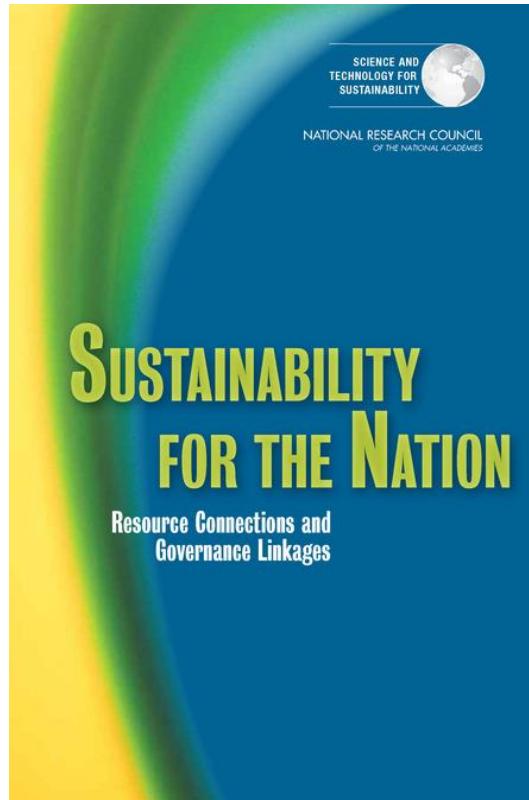
FOR SUSTAINABILITY

# Key Studies



2011

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY



2013

# I. Roundtable on S&T for Sustainability

- **Goal:** to mobilize, encourage, and use scientific knowledge and technology to help achieve sustainability goals and to support the implementation of sustainability practices.
- **Three principles**
  - Focus on strategic needs and opportunities for science and technology to contribute to transition toward sustainability
  - Focus on issues for which progress requires cooperation among multiple sectors
  - Focus on activities where scientific knowledge and technology can help to advance practices that contribute directly to sustainability goals
- **Next meeting:** June 2016

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

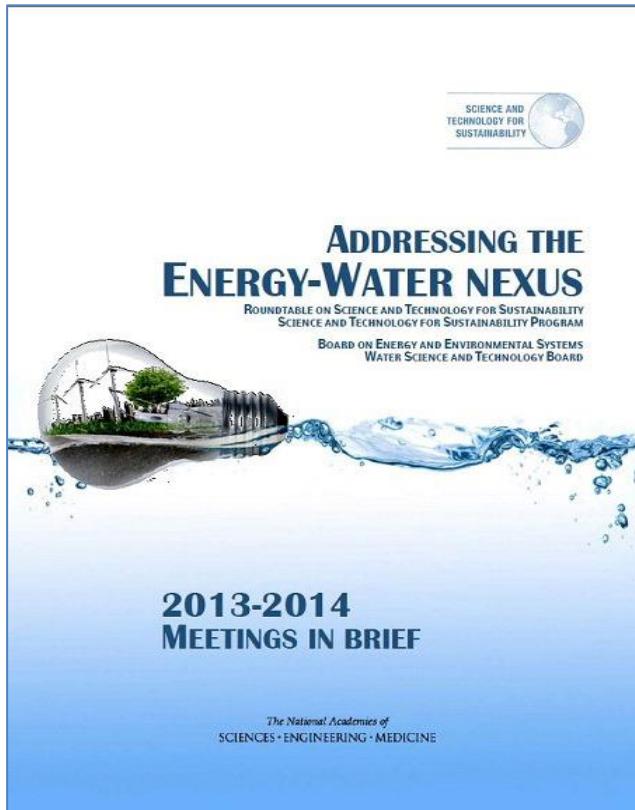
# Roundtable Members

- **David Dzombak (Co-Chair) (NAE)**, Carnegie Mellon University
- **Lynn Scarlett (Co-Chair)**, The Nature Conservancy
- **Ann Bartuska**, U.S. Department of Agriculture\*
- **Steve Bergman**, Shell International Exploration & Production Company
- **Paulo Ferrão**, University of Lisbon
- **Marilu Hastings**, Cynthia and George Mitchell Foundation
- **Lek Kadeli**, Environmental Protection Agency\*
- **Michael Kavanaugh (NAE)**, Geosyntec Consultants
- **Jack Kaye**, National Aeronautics and Space Administration\*
- **Mehmood Khan**, PepsiCo Inc.
- **Suzette Kimball**, U.S. Geological Survey\*
- **Steven E. Koonin (NAS)**, New York University
- **Franklin Orr (NAE)**, U.S. Department of Energy\*
- **Francis O' Sullivan**, Massachusetts Institute of Technology
- **Prabhu Pingali (NAS)**, Cornell University
- **Richard W. Spinrad**, National Oceanic and Atmospheric Administration\*
- **Michael Webber**, University of Texas at Austin

\*Denotes ex-officio members

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

# Meetings in Brief



- Science and Technology for Sustainability Program (STS)
- Board on Energy and Environmental Systems (BEES)
- Water Science and Technology Board (WSTB)

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

# Transition toward Sustainability after 15 Years: Where Do We Stand in Advancing the Scientific Foundation?

- **January 2016:** Convene an expert workshop of leading scientists in collaboration with the Board on Atmospheric Science and Climate (DELS/BASC)
- **Goals:** to discuss progress in sustainability science during the last 15 years, potential opportunities for advancing the research and use of scientific knowledge to support a transition toward sustainability, and challenges specifically related to establishing metrics and observations to support sustainability research and practice.

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

### III. Network for Emerging Leaders in Sustainability



- Launched in 2008, NELS is a series of seminars for early career professionals in the Academy and from agencies and organizations in the Washington area committed to careers promoting sustainability.
- Held on semiannual basis and tied to ongoing initiatives.
- December 1, 2015: Focus on Urban Sustainability. Speaker: Amanda Pitre-Hayes, City of Vancouver
- April 14, 2016,: Focus on Ocean Sustainability and the National Ocean Policy featuring Elizabeth Kerttula, Director of the National Ocean Council

SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

# IV. Sustainability across the Academies

## New Projects

### [Roundtable on Unconventional Hydrocarbon Development](#)

The Academies are launching a new roundtable that will examine issues related to the development of U.S. stores of unconventional hydrocarbon resources such as shale oil and gas. The Roundtable will serve as a neutral forum where representatives from government, industry, academia, and non-governmental and international organizations can meet on an ongoing basis to gather, critically examine, and communicate facts and data regarding the scientific, engineering, human and environmental health and safety, regulatory, economic, and societal aspects of unconventional hydrocarbon development downstream.

### [Assessment of Solid State Lighting, Phase 2](#)

The Academies will carry out a study and provide advanced solid state lighting (SSL). The report will study, [Assessment of Advanced Solid State Lighting](#), will focus on overarching tasks including commercial to current technology, and the challenges related manufacturing of SSLs.

## Upcoming Meetings

### November

- [Propulsion and Energy Systems to Reduce Commercial Emissions](#)  
November 2, 2015, Webex
- [Kavli Frontiers of Science 27th Annual U.S. Symposium](#)  
November 5-7, 2015, Irvine, CA
- [Propulsion and Energy Systems to Reduce Commercial Emissions](#)  
November 10-11, 2015, Irvine, CA
- [Revisiting Brucellosis in the Greater Yellowstone Area](#)  
November 10-11, Washington, DC
- [Assessment of Solid State Lighting, Phase 2](#)  
November 11-12, 2015, Washington, DC
- [NASA Technology Roadmaps](#)  
November 12-13, 2015, Washington, DC
- [Assessing Approaches to Updating the Social Cost of Carbon](#)  
November 13-14, 2015, Washington, DC
- [Independent Scientific Review of Everglades Restoration](#)  
November 16-18, 2015, TBD
- [Unraveling Low Dose Toxicity: Case Studies of System Evidence](#)  
November 17-18, 2015, Washington, DC
- [EcoChains: Arctic Crisis Game Night: Koshland Science](#)  
November 18, 2015, Washington, DC
- [Extreme Weather Events and Climate Change Attribution](#)  
November 30-December 1, 2015, Washington, DC
- [Pathways to Urban Sustainability: Challenges and Opportunities](#)  
November 30-December 1, 2015, Washington, DC

## New Reports & Summaries



### [Measuring Progress Toward Sustainability: Indicators and Metrics for Climate Change and Infrastructure Vulnerability](#)

As a first event of the Roundtable on Science and Technology for Sustainability's 2015-2016 initiative, the June 2015 meeting hosted a session that provided an overview of the state of the science on sustainability indicators and metrics in the context of climate change and infrastructure vulnerability. The purpose of the session was to assess what indicators and metrics have been found to be the most useful for promoting sustainability as well as identify knowledge gaps related to developing indicators that integrate across the ecological, social, and economic sciences. This Meeting in Brief synthesizes the discussions held during the event.

### [Enhancing Participation in the U.S. Global Change Research Program](#)

The US Global Change Research Program (USGCRP) is a collection of 13 Federal entities charged by law to assist the United States and the world to understand, assess, predict, and respond to human-induced and natural processes of global change. The USGCRP has increasingly focused on research that can inform decisions to cope with current climate variability and change, to reduce the magnitude of future changes, and to prepare for changes projected over coming decades. This report provides a rationale for evaluating current program membership and capabilities and identifying potential new agencies and departments in the hopes that these changes will enable the program to more effectively inform the public and prepare for the future.

The image shows the header of an email newsletter. It features the text 'The National Academies of SCIENCES • ENGINEERING • MEDICINE' on the left and 'SUSTAINABILITY ACROSS THE ACADEMIES' on the right, both in white text on a dark background. Below this, there is a red banner with the text 'October 2015' on the left and 'VISIT OUR WEBSITE | SUBSCRIBE' on the right.

## Table of Contents

- [News](#)
- [New Reports & Summaries](#)
- [New Projects](#)
- [Science & Technology for Sustainability Projects](#)
- [Upcoming Meetings](#)
- [Sustainability Topics in the \*Proceedings of the National Academy of Sciences\*](#)
- [About the STS Program](#)

## News

### [STS Director Jerry Miller Speaks at Natural Resources Symposium](#)



On October 14, 2015, STS Director Jerry Miller delivered a [presentation](#) that discussed the ways in which resource scarcity influences and will continue to influence the natural resource practice arena for industrial companies and others at the Ad-Hoc Industry Natural Resource Management Group's 2015 Natural Resources Symposium held at Georgetown University.

- **Monthly e-newsletter. Over 2000 subscribers**

# Additional Information

- **GUIRR:** Susan Sauer Sloan
- **STS:** Jerry Miller
- **STEP:** Gail Cohen
- **DSC:** John Boright
- **RAR:** Lauren Alexander Augustine



SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY