

# **Energy & Climate Change**

15<sup>th</sup> National Conference and Global Forum on Science, Policy and the Environment

January 27-29, 2015

www.energyandclimatechange.org

### WELCOME

Human energy use accounts for three quarters of greenhouse gas emissions globally and an even higher share in the United States. Transitioning to new energy systems lies at the core of any response to climate change. We will need to reduce emissions from our current energy sources and practices, deploy new low carbon energy sources at scale, make our energy systems resilient to the effects of climate change, sustain prosperity in many countries, and lift many out of poverty around the world.

The 15<sup>th</sup> National Conference and Global Forum on Science, Policy and the Environment: *Energy and Climate Change* will develop and advance partnerships that focus on transitioning the world to a new "low carbon" and "climate resilient" energy system. It will emphasize putting ideas into action – moving forward on policy and practice.

You are leaders in science and engineering, policy and governance, businesses and civil society, and education. I invite you to network across traditional boundaries, collaborate, and advance technologies, policies, and practices to accelerate the needed transition.

This is a conference designed to challenge your thinking and spur your creativity. Take away new ideas, new relationships, and increased motivation to contribute your part to addressing one of the greatest challenges confronting mankind.

Peter Saundry Executive Director National Council for Science and the Environment

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# Committed To Ecological Restoration



The USDA Forest Service is working to restore all U.S. forests and grasslands to healthy, biologically rich, and productive environments that offer a sustainable supply of ecosystem values – and traditional and nontraditional forest products.

OREST SERV

White Mountain National Forest Photo by Lon Henderson, USDA Forest Service

# NASA Earth Science

One Planet Your Story Our Mission National Aeronautics and Space Administration



Providing New Perspectives of Earth's Environment

You're invited to join us at the NASA Booth, January 27-29, for daily Hyperwall presentations that will cover a diverse range of Earth science topics related to energy and climate change.

NASA Earth System Science conducts and sponsors research, collects new observations from space, develops technologies and extends science and technology education to learners of all ages. Working closely with our global partners, we enhance economic security and environmental stewardship, benefiting society in many tangible ways. NASA research seeks to answer fundamental science questions about the changes we see in climate, weather and natural hazards, and deliver sound science that helps decision-makers make informed decisions.

### NASA's Hyperwall Science Stories

Storytelling like never before!

NASA's hyperwall is a sophisticated visualization tool used to display large datasets.

svs.gsfc.nasa.gov/hw



# AGENDA

## Tuesday, January 27, 2015

- 7:30 a.m. Continental Breakfast, Exhibition and Scientific Poster Presentations open *Regency Ballroom Foyer* adjacent to the Plenary Hall and the Regency Ballroom where Plenary sessions are occurring
- 8:45 a.m. Opening: **Governor Bill Richardson**, former Governor of New Mexico, Secretary of Energy and U.S. Ambassador to the United Nations
- 9:00 a.m. Keynote Address: Gina McCarthy, Administrator, Environmental Protection Agency
- 9:30 a.m. Plenary 1: The Big Challenges

Moderator: Richard Harris, Science Correspondent, National Public Radio

- **Dymphna van der Lans**, CEO, Clinton Climate Initiative, The Clinton Foundation
- Veerabhadran Ramanathan, Distinguished Professor, University of California, San Diego; UNESCO Professor of Climate and Policy, TERI University, India
- Mohinder Gulati, Chief Operating Officer, Sustainable Energy for All

#### 10:30 a.m. Plenary 2: Decarbonizing the Energy Supply

Moderator: Chris Joyce, Science Correspondent, National Public Radio

- Dan Arvizu, Director, National Renewable Energy Laboratory
- Julio Friedmann, Deputy Assistant Secretary for Clean Coal, U.S. Department of Energy
- Mark Jacobson, Director, Atmosphere/Energy Program, Stanford University
- Cheryl Roberto, Associate Vice President for Clean Energy, Environmental Defense Fund
- Ellen Williams, Director, Advanced Research Project Agency-Energy

#### 11:30 a.m. Plenary 3: Smart Energy Use: Transforming our Relationship to Energy

Moderator: Elizabeth Shogren, Science Journalist, National Public Radio

- Nihar Patel, Vice President of North American Business Strategy, Toyota Motor Sales, USA, Inc.
- Kateri Callahan, President, Alliance to Save Energy
- Kathleen Hogan, Deputy Assistant Secretary for Energy Efficiency, U.S. Department of Energy
- Richard Caperton, Director of National Policy & Partnerships, OPower
- 12:30 p.m. Lunch on your own: Assorted items can be purchased in the Regency Ballroom Foyer

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	1. Preparing for COP 21	Conference Theater	22
	2. US-China Nongovernmental Climate Change Partnerships That Work	Kennedy	22
	3. Natural Gas: How Much Better Than Coal?	Roosevelt	22

	4. The Future of Bio: Beyond Ethanol	Regency C	23
	5. EPA's Clean Power Plan Part I: Status and Strategy	Potomac 5/6	23
	6. Integrating Clean Energy Across Scales: Buildings-to-Nations	Prince William	24
	7. Green Buildings	Lincoln	24
	8. Coastal Energy Resiliency	Regency D	24
	9. UN's Sustainable Energy for All Initiative: Focus on Energy Efficiency	Tidewater 2	25
	10. Financing Low Carbon Energy through Green Revolving Funds	Jefferson	25
	<ol> <li>Facilitating Understanding: Challenges and Opportunities for Climate Change Education in a Range of Sectors</li> </ol>	Regency F	26
	12. Low and Net-Zero Carbon Campuses	Washington B	26
3:45 p.m.	Symposia B	Room	Page
	<ol> <li>Engaging US and Chinese Businesses, Media and Publics in a Meaningful Dialogue on Climate Change</li> </ol>	Kennedy	27
	14. Carbon Capture and Storage: The Future of Coal	Roosevelt	27
	15. Geothermal Energy	Tidewater 2	28
	16. EPA's Clean Power Plan Part II: Opportunities and Obstacles	Potomac 5/6	28
	17. Smart Grid, Microgrids and Information Technology	Washington B	29
	18. Wood: The Real Green Building Material	Lincoln	29
	<ol> <li>From Transactions to Transformation: Large Corporate Energy Users Driving Change in the Electricity Sector</li> </ol>	Prince William	30
	20. Population and Energy Growth beyond 2030: Can Renewable Energy Meet the Demand?	Regency F	30
	21. Carbon Markets: Lessons from Around the World	Conference Theater	31
	22. Academic Investment and Divestment	Jefferson	31
	23. Facilitating Community Engagement	Regency C	32
	24. Climate-KIC, a Knowledge and Innovation Community	Regency D	32

5:30 p.m. Special Viewing: Extreme Realities – Room Regency E/F

# Wednesday, January 28, 2015

7:30 a.m.	Continental Breakfast, Exhibition and Scientific Poster Presentations open		
9:00 a.m.	Keynote Address: <b>Jennifer Granholm</b> , Distinguished Practitioner of Law and Public Policy, University of California, Berkeley; Former Governor of Michigan		
9:30 a.m.	Plenary 4: Finance and Markets		
	Moderator: Jeffrey Leonard, President and CEO, Global Environment Fu	nd	
	Naoko Ishii, CEO, Global Environment Facility		
	• Theodore Roosevelt IV, Chairman, Barclay's Clean Tech Initiative		
	• Adele Morris, Policy Director, Climate and Energy Economics Projection	t, The Brookings I	nstitution
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	25. Historic Contributions: The "Common But Differentiated Responsibility" (CBDR) Challenge	Tidewater 2	37
	26. Massive Scale Solar Energy: 1.5 Terrawatts by 2025	Jefferson	37
	27. Designing Landscapes to Deliver Energy, Economic Opportunities, and Climate Change Services	Potomac 4	38
	28. Nuclear Energy as a Non-Carbon Energy Option	Potomac 6	38
	29. Social Cost of Carbon	Fairfax	39
	30. Utilities in 2050: Which Possible Futures are Likely and Desirable?	Conference Theater	39
	31. Enabling Climate-Smart Energy Use with Real-Time Information	Potomac 2	40
	32. Local & Regional Energy Resiliency	Lincoln	40
	33. Electrifying Transportation	Prince William	41
	34. Public Sector Roles in Increasing Private Sector Finance for Clean Energy Access	Arlington	41
	35. The Water-Energy Nexus: Challenges and Opportunities	Washington A	41
	36. Carbon Pricing, Coalition Building, and International Action Towards COP 21	Roosevelt	42
	37. From Climate and Energy Literacy to Impact	Potomac 1	42
	<ol> <li>Innovative University – Community Partnerships: Collaboration for Climate Action</li> </ol>	Washington B	43
	39. "Reframing" Energy for the 21 <sup>st</sup> Century	Kennedy	43
12:15 p.m.	Lunch on your own: Assorted items can be purchased in the Regency Ballr Breakout workshop leaders will meet in "Chesapeake View" on the top flo	oom Foyer or of the hotel.	
2:00 p.m.	Workshops	Room	Page
-	1. Who is Responsible for Climate Change?	Jefferson	44

5:00 p.m.	2.	Fostering Effective U.SChina Nongovernmental Climate Change Partnerships	e Kennedy	44
	3.	Massive Scale Solar Energy: Identifying the Barriers	Washington B	45
	4.	Growing the Future "Bioeconomy": Breaking Through Bottleneck	ks Regency D	45
	5.	Harnessing the Hidden Efficiency: Using Voltage and Reactive Power Management as a Compliance Mechanism for the Clean Power Plan	Washington A	46
	6.	Reinventing Utilities: Planning for the Utilities that We Want and Need	Regency F	46
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	8.	Environmentally Sensitive Electricity: Developing a National Strategy for ESE Adoption	Potomac 6	47
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	10.	The Water-Energy Nexus: Collaboration for Increased Impact	Potomac 3	48
	11.	The Water-Energy-Climate Nexus: New Strategies	Potomac 4	48
	12.	Carbon Pricing, Coalition Building, and International Action Towards COP 21	Arlington	49
	13.	Advancing Community Action	Regency C	49
	14.	Higher Education, Energy, and Climate	Conference Theater	50
	15.	Climate Knowledge and Innovation Communities	Potomac 1	50
	16.	Campuses as Living Laboratories	Lincoln	51
	17.	Earth Observations Informing Energy Management Decision Making: Connecting Data Providers to Stakeholders	Fairfax	51
	18.	World Energy: Creating Pathways to a Low-Carbon World with Computer Simulation-Based Role Playing Games	Roosevelt	52
	19.	Integrated Science: Economy, Energy and Environment	Tidewater 2	52
	20.	Decisions Need Information, Information Needs Data, and Data Needs a System: Putting it Together	Tidewater 1	53
	40.	Additional Symposium: Nuclear Energy: Technologies for 2025 and 2050, Advancing Nuclear Energy Options	Prince William	53
5:30 pm	"Cli	mate Change, Our Personal Challenge" Photography Presentation	by Gary Braasch	
5:45 pm	Life U.S. <b>Step</b>	time Achievement Award: Introduction: <b>Jim Reaves,</b> Deputy Chie Forest Service <b>bhen Hubbell,</b> Distinguished Professor, University of California, L	of of Research and Deve os Angeles	lopment,
6:05 pm	Johr	n H. Chafee Memorial Lecture: Amory Lovins, Chief Scientist, Ro	cky Mountain Institute	
7:00 pm	Rece Boo	eption k signing: Ripudaman Malhotra – A <i>Cubic Mile of Oil</i>		

# Thursday, January 29, 2015

Keynote Address: Franklin Orr, Under Secretary of Science and Energy, U.S. Department of Energy

Continental Breakfast, Exhibition and Scientific Poster Presentations open

- 9:30 am Plenary 5: Sustainable Energy for All Moderator: Juliet Eilperin, White House Correspondent, The Washington Post Jacob Scherr, Senior Advisor, International Program, Natural Resources Defense Council Ryan Hobert, Senior Director, Energy and Climate, United Nations Foundation • Glenn A. Jones, Professor of Marine Sciences, Texas A&M University at Galveston 10:30 am Plenary 6: The Road to Paris Moderator: Suzanne Goldenberg, U.S. Environmental Correspondent, The Guardian Robert Orr, Dean, School of Public Policy, University of Maryland; Special Advisor, Secretary-General on Climate Change, United Nations Nigel Purvis, CEO, Climate Advisers • Mindy Lubber, President, Ceres • Alden Meyer, Director of Strategy and Policy, Union of Concerned Scientists • 11:30 am Keynote Address: Gérard Araud, Ambassador of France to the United States 12:00 pm Keynote Address: John Holdren, Director, Office of Science and Technology Policy, The White House Buffet Lunch in the Regency Ballroom 12:20 pm 2:00 pm Exhibition and Scientific Poster Presentations close
- 2:15 pm Adjourn

7:30 am

9:00 am

# **Keynote Biographies**

**Gov. William "Bill" Richardson** completed his second term as Governor of New Mexico in January 2011. He was elected Governor in 2002 and served for 15 years in northern New Mexico representing the 3rd Congressional District. Richardson served in 1997 as the U.S. Ambassador to the United Nations, and in 1998 he was unanimously confirmed by the U.S. Senate as Secretary of the U.S. Department of Energy. While a congressman, Richardson served as a special envoy on many sensitive international missions. Richardson has been nominated several times for the Nobel Peace Prize.

**Gina McCarthy** is the Administrator of the U.S. Environmental Protection Agency, confirmed in 2013. Appointed by President Obama in 2009 as Assistant Administrator for EPA's Office of Air and Radiation, she has been a leading advocate for common-sense strategies to protect public health and the environment. Previously, McCarthy served as the Commissioner of the Connecticut Department of Environmental Protection. During her career, which spans over 30 years, she has worked at both the state and local levels on critical environmental issues and helped coordinate policies on economic growth, energy, transportation and the environment.

**Jennifer Granholm** is a Distinguished Practitioner of Law and Public Policy at UC Berkeley. She served as Michigan's 47th governor from 2003 to 2011 and as Michigan's Attorney General before that, from 1998-2002. During her tenure, she pioneered clean energy policies, working with business, labor, Republicans and Democrats, to create new economic opportunities in Michigan and make Michigan the hub of clean-energy development in North America. After leaving office, Granholm was an advisor to Pew Charitable Trusts' Clean Energy Program where she led a national campaign for clean energy policies. In addition, she hosted Current TV's political news analysis show "The War Room with Jennifer Granholm" and co-authored with her husband, Dan Mulhern, "A Governor's Story: The Fight for Jobs and America's Economic Future." She is co-chair of Priorities USA Action, a super PAC that is supporting Hillary Clinton for President in 2016.







**Franklin "Lynn" Orr** is the Under Secretary for Science and Energy at the U.S. Department of Energy. He is the principal advisor to the Secretary and Deputy Secretary on clean energy technologies and science and energy research initiatives. He also oversees the majority of DOE's National Laboratories. Dr. Orr was the founding director of the Precourt Institute for Energy at Stanford University from 2009 to 2013. He was the founding director of the Stanford Global Climate and Energy Project from 2002 to 2008, and he served as Dean of the School of Earth Sciences at Stanford from 1994 to 2002.

John Holdren is Assistant to the President for Science and Technology, Director of the White House Office of Science and Technology Policy, and Co-Chair of the President's Council of Advisors on Science and Technology (PCAST). Prior to joining the Obama administration, Dr. Holdren was the Director of the Program on Science, Technology, and Public Policy at Harvard University's Kennedy School of Government, as well as the Director of the Woods Hole Research Center.

**Gérard Araud**, 61, a career diplomat, was appointed Ambassador of France to the United States in September 2014. He previously held numerous positions within the Ministry of Foreign Affairs and International Development, notably including that of Director for Strategic Affairs, Security and Disarmament (2000-2003), Ambassador of France to Israel (2003-2006), Director General for Political Affairs and Security (2006-2009), and, most recently, Permanent Representative of France to the United Nations in New York (2009-2014). Over the course of his career, Mr. Araud has developed specialized knowledge in two key areas: the Middle East and strategic & security issues. He has written numerous journal articles, including one recently published in Commentaire, on the outbreak of World War One, and another in Esprit, on the search for a new world order.







# **Plenary Biographies**

### **Plenary 1: The Big Challenges**

*Richard Harris* has reported on a wide range of topics in science, medicine and the environment since he joined NPR in 1986. He has traveled to all seven continents for NPR, and he has covered stories such as the nuclear aftermath of the 2011 tsunami in Japan; the Earth Summit in Rio de Janeiro in 1992; and the United Nations climate negotiations in Kyoto (1997) and Copenhagen (2009). Harris was the first to report that the government vastly underestimated the volume of oil flowing into the Gulf of Mexico from the 2010 BP well blowout. Harris has been the recipient of many prestigious awards, including the 2013 AGU Presidential Citation for Science and Society, the 2009 National Academy of Sciences Communication Award, and the 1995 Peabody Award for investigative reporting.

*Mohinder Gulati* is the Chief Operating Officer of the Sustainable Energy for All Initiative (SE4ALL). Previously, Gulati worked with the World Bank on energy and sustainability issues as a Sustainable Development Sector Leader for South East Europe and Program Leader in the East Asia and Pacific region. In South Asia he led World Bank-funded power sector restructuring and reform program in several Indian states, enactment of new laws and regulation, creation of new regulatory institutions, and construction of power generation, transmission, and distribution projects.

*Veerabhadran Ramanathan* discovered the greenhouse effect of Cholorofluorocarbons in 1975. Along with R. Madden, he predicted in 1980 that global warming would be detected by 2000. In 1989, he led a NASA study that used satellite instruments to show that clouds had a large global cooling effect. Dr. Ramanathan now leads Project Surya, which mitigates black carbon and other climate warming emissions from solid biomass cooking in South Asia and Kenya and documents their effects on public health and environment. In 2014, Foreign Policy Journal included Ramanathan among the top 100 thought leaders of the world.

**Dymphna van der Lans** is the CEO of the Clinton Climate Initiative, where she oversees the Clinton Foundation's climate and energy programs. Prior to CCI, Dymphna served as the senior director for public policy programs at the German Marshall Fund of the United States. Before GMF, Dymphna was the director of global renewables, infrastructure, and energy efficiency at a specialist investment banking firm in London. She also worked as BP Alternative Energy's director of distributed energy markets. The DOE selected Dymphna as one of its inaugural ambassadors of its Clean Energy Education and Empowerment (C3E) initiative, which aims to advance professional women's leadership in clean energy.









### Plenary 2: Decarbonizing the Energy Supply

*Chris Joyce* is a correspondent on the science desk at NPR. His stories can be heard on all of NPR's news programs. For several years, Joyce was an editor and correspondent for NPR's *Radio Expeditions*, a documentary program on natural history and disappearing cultures. Joyce has written two non-fiction books on scientific topics for the popular market: *Witnesses from the Grave: The Stories Bones Tell* (with co-author Eric Stover); and *Earthly Goods: Medicine-Hunting in the Rainforest*. Joyce won the 2001 American Association for the Advancement of Science Excellence in Journalism Award.

*Dan Arvizu* became the eighth Director of the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) on January 15, 2005. Prior to joining NREL, Dr. Arvizu was the chief technology officer with CH2M HILL Companies, Ltd. In 2011, Dr. Arvizu was appointed by President Obama to a second six-year term on the National Science Board, the governing board of the National Science Foundation and the national science policy advisory body to the President and the Congress. He is presently serving as Chairman.

*Julio Friedmann* is the Deputy Assistant Secretary for Clean Coal, Office of Fossil Energy at the Department of Energy. After five years as a senior research assistant at Exxon and ExxonMobil, Dr. Friedman worked at the University of Maryland. Dr. Friedmann has led technical work on large Carbon Capture and Sequestration (CCS) projects in Europe, Africa, North America, and China. He was the program leader for the California Energy Systems for the 21st Century and was codirector for the U.S.-China Clean Energy Research Center on Clean Coal and CCS.

*Mark Jacobson* is Director of the Atmosphere/Energy Program and Professor of Civil and Environmental Engineering at Stanford University. He is also a Senior Fellow of the Woods Institute for the Environment and of the Precourt Institute for Energy. He has published two textbooks h and 140 peer-reviewed journal articles. He received the 2005 American Meteorological Society Henry G. Houghton Award and the 2013 American Geophysical Union Ascent Award for his work on black carbon climate impacts and the 2013 Global Green Policy Design Award for developing state and country energy plans.

*Cheryl Roberto* leads the national Environmental Defense Fund's (EDF) Clean Energy Program. Prior to joining EDF, Cheryl served as the Commissioner of the Public Utilities Commission of Ohio (PUCO) from 2008 to 2012. Cheryl currently serves on the Executive Group of the State and Local Energy Action network (SEEAction) and received the Inspiring Efficiency Leadership Award from the Midwest Energy Efficiency Alliance in January 2013. Cheryl was the head of the City of Columbus, Ohio Department of Public Utilities.

*Ellen Williams* is the Director of the Advanced Research Projects Agency–Energy (ARPA-E). Prior to joining ARPA-E, Dr. Williams served as the Senior Advisor to the Secretary of Energy and the Chief Scientist for BP. She is currently on a leave of absence from the University of Maryland where she has served as a Distinguished University Professor in the Department of Physics and the Institute for Physical Science and Technology since 2000. Dr. Williams founded the University of Maryland Materials Research Science and Engineering Center and served as its Director from 1996 through 2009.













### Plenary 3: Smart Energy Use: Transforming our Relationship to Energy

*Elizabeth Shogren* was until last year an NPR News Science Desk correspondent focused on covering environment and energy issues and news. Since she came to NPR in 2005, Shogren's reporting has covered everything from the damage caused by the BP oil spill on the ecology of the Gulf Coast, to the persistence of industrial toxic air pollution as seen by the legacy of Tonawanda Coke near Buffalo, to the impact of climate change on American icons like grizzly bears. Prior to NPR, Shogren spent 14 years as a reporter on a variety of beats at *The Los Angeles Times*. Shogren also covered foreign reporting assignments, including the Kosovo crisis in 1999, the Bosnian war in 1996, and Russian elections in 1993 and 1996. Before joining the Washington bureau, Shogren was based in Moscow where she covered the breakup of the Soviet Union and the rise of democracy in Russia.

**Richard Caperton** is Opower's Director of National Policy and Partnerships. In his role, Caperton leads the company's engagement with all branches of the federal government, including Congress, the Environmental Protection Agency, Department of Energy, and Federal Energy Regulatory Commission. Prior to joining Opower, Mr. Caperton was the Managing Director for Energy at the Center for American Progress, where he worked on energy tax and finance and electric utility issues. He has also worked in government relations at the National Rural Electric Cooperative Association and served as a policy fellow at the Alliance for Climate Protection. Mr. Caperton has testified in front of the U.S. House of Representatives and is regularly quoted in the press on these issues.

*Kathleen Hogan* is the Deputy Assistant Secretary for Energy Efficiency in the Office of Energy Efficiency and Renewable Energy (EERE), where she helps to implement and achieve national energy efficiency goals, including those laid out in the President's Climate Action Plan. Before this position, she served for more than 10 years as the Division Director at the U.S. Environmental Protection Agency. She was responsible for the development and operation of EPA's clean energy programs focused on removing market barriers for energy efficiency and renewable energy. She has been recognized for her work with a Presidential Rank Award, induction into the Energy Efficiency Hall of Fame of the U.S. Energy Association, and for being a contributor to the Nobel Peace Prize awarded to the Intergovernmental Panel on Climate Change.

*Nihar Patel* is vice president of North American business strategy for Toyota Motor Sales (TMS), U.S.A., Inc. In this position, he is responsible for developing North American business strategy, ensuring future volume growth strategy, engaging future technologies to maintain Toyota's technology brand leadership, and developing exports to markets outside of NAFTA. Prior to joining Toyota, Patel was managing director for Abdul Latif Jameel, the sole distributor of Toyota vehicles in Saudi Arabia. He was also the director of business and marketing strategy for Ford's Asia Pacific Region and deputy general manager of marketing for Mazda Motor Corporation.

*Kateri Callahan* brings more than 25 years of experience in policy advocacy, fundraising, coalition building and organizational management to her position as the president of the Alliance to Save Energy. The Alliance to Save Energy is a premier non-government organization headquartered in Washington, D.C. The Alliance has worked for more than three decades to advance energy efficiency worldwide to achieve a healthier economy, a cleaner environment and greater energy security. Prior to joining the Alliance, Callahan served for 11 years as the president/executive director of the Electric Drive Transportation Association.









### **Plenary 4: Finance and Markets**

*Jeffrey Leonard* is the President and Co-Founder of Global Environment Fund (GEF). With extensive experience in economic and environmental policy, and in alternative investments, Dr. Leonard serves as the Chairman of the investment committee of GEF funds. He is the author of five books and numerous technical articles relating to global economic and environmental issues. Dr. Leonard chairs the boards of The Washington Monthly and CityYear (Washington, DC), and is a board member of the NCSE, Emerging Markets Private Equity Association (EMPEA) and the New America Foundation. Dr. Leonard is a graduate of Princeton (Ph.D.), London School of Economics (M.S. Econ) and Harvard College (B.A., magna cum laude).

*Naoko Ishii* is the CEO and Chair of the Global Environment Facility (GEF), the world's leading international institution dedicated to investing in the stewardship and health of the global environment. Previously, Dr. Ishii served in the Japanese Government as Deputy Vice Minister of Finance. She has worked at the International Monetary Fund and Harvard University's Institute for International Development and was World Bank Country Director for Sri Lanka from 2006 to 2010. Her writings have been awarded the Suntory Prize and Okita Memorial Prize for International Development Research.

*Theodore Roosevelt IV* is a Managing Director in Investment Banking at Barclays, based in New York. Currently, he serves as Chairman of the firm's Clean Tech Initiative. Mr. Roosevelt joined Barclays Capital when it acquired the North American assets of Lehman Brothers in September 2008. He started work with Lehman in 1972. In February 2007, he was appointed Chairman of Lehman Brothers' Council on Climate Change. Mr. Roosevelt is Board Chair of the Center for Climate and Energy Solutions (C2ES), Secretary of The Climate Reality Project, a member of the Governing Council of the Wilderness Society, and a Trustee for the American Museum of Natural History.

Adele Morris is a Senior Fellow and Policy Director for Climate and Energy Economics at the Brookings Institution. Her expertise and interests include the economics of policies related to climate change, energy, natural resources, and public finance. She joined the Brookings Institution in 2008 from the Joint Economic Committee (JEC) of the U.S. Congress, where she spent a year as a Senior Economist covering energy and climate issues. Before the JEC, Adele served nine years with the U.S. Treasury Department as its chief natural resource economist, working on climate, energy, agriculture, and radio spectrum issues. Prior to joining the Treasury, she served as the senior economist for environmental affairs at the President's Council of Economic Advisers during the development of the Kyoto Protocol.





### Plenary 5: Sustainable Energy for All

*Juliet Eilperin* is a White House correspondent for *The Washington Post*, covering subjects ranging from climate change to campaign finance and health care. She has worked at the *Post* since 1998, when she joined as the House of Representatives reporter and covered the impeachment of Bill Clinton, lobbying, legislation, and five national congressional campaigns. Between April 2004 and March 2013, Ms. Eilperin covered the environment for the national desk, reporting on science, policy and politics in areas including climate change, oceans, and air quality. In the wake of the 2010 BP oil spill, she wrote several investigative stories about lax federal oversight of offshore oil drilling. Ms. Eilperin served as the youngest-ever McGraw Professor of Journalism at Princeton University in the spring of 2005. In 2011 she won the Peter Benchley Ocean Award for Excellence in Media.

**S. Jacob Scherr** is a Senior Advisor to the Natural Resources Defense Council (NRDC) in Washington, DC. During his four-decade- long career with NRDC, Mr. Scherr has addressed the range of pressing global environmental challenges. He initiated NRDC's work on climate change in the late 1980s and has actively participated in all the major climate change and environmental summits since 1992. At Rio+20, he launched the Cloud of Commitments Initiative to advocate for a new global architecture for "commitments to action" on climate change and the broader challenge of sustainable development. Mr. Scherr is also serving as an Adjunct Faculty member at the School of International Service at American University. He is on the boards of the Center for Global Development and the Herbert Scoville, Jr. Peace Fellowship.

**Ryan Hobert** is the Senior Director for Energy and Climate Change at the United Nations Foundation, an organization created in 1998 by entrepreneur and philanthropist Ted Turner to connect people, ideas and resources with the UN. Ryan works on a variety of climate and energy initiatives – including the UN Secretary-General's Sustainable Energy for All initiative, the UN Foundation's Energy Access Practitioner Network, and Friends of Sustainable Energy for All – an effort to elevate energy issues on the New York diplomatic community's agenda. Before joining the UN Foundation in 2004, Ryan worked at the United Nations Environment Program's Energy Branch in Paris. Ryan holds a B.A. in Political Science from Wheaton College, in Illinois; and a Masters in International Affairs from the Institute of Political Studies (Sciences Po) in Paris.

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### Plenary 6: The Road to Paris

*Suzanne Goldenberg* is an award-winning journalist for The Guardian and has been the newspaper's US Correspondent since 2002. She has been the US-based environment correspondent for the Guardian since 2009. She also covered the last days of Saddam Hussein's rule and the US invasion of Iraq in 2003, war in Lebanon in 2006, the Palestinian uprising from 2000-2002, the Taliban takeover of Afghanistan in 1996, and the wars in Chechnya, Georgia, and Nagorno Karabakh in the former Soviet Union in the early 1990s. Goldenberg won the Bayeux prize for war reporting for her coverage of Iraq.

*Mindy Lubber* is the president of Ceres and a founding board member of the organization. She also directs Ceres' <u>Investor Network on Climate Risk (INCR)</u>, a group of 100 institutional investors managing nearly \$10 trillion in assets focused on the business risks and opportunities of climate change. Mindy regularly speaks about corporate and investor sustainability issues to high-level leaders. Mindy was honored by the United Nations and the Foundation for Social Change as one of the "<u>World's Top Leaders of Change</u>". She is a recipient of the Skoll Award for Social Entrepreneurship and was named one of "The 100 Most Influential People in Corporate Governance".

**Robert Orr** is Dean of the School of Public Policy, University of Maryland, and is the Special Advisor to the United Nations Secretary-General, on Climate Change. He was Assistant Secretary-General for Strategic Planning in the Executive Office of the United Nations Secretary-General from 2004 to 2014, and was the principal advisor to the Secretary-General on many issues including climate change. Prior to joining the United Nation, Dr. Orr was as the Executive Director of the Belfer Center for Science and International Affairs at the Kennedy School of Government at Harvard University; Director of the Council on Foreign Relations and held senior posts in the Government of the United States.

*Nigel Purvis* is the founder, President and CEO of Climate Advisers, a consultancy specializing in U.S. climate change policy, international climate change cooperation, global carbon markets, and climate-related forest conservation. Mr. Purvis directed U.S. environmental diplomacy in the Clinton and Bush administrations, most recently as Deputy Assistant Secretary of State for Oceans, Environment, and Science. In that capacity he oversaw U.S. foreign policy relating to climate change, biodiversity conservation, forests, toxic substances, ozone depletion and environmental aspects of international trade, and served as the deputy chief U.S. climate negotiator. Mr. Purvis currently holds climate change and international affairs research appointments at Resources for the Future, the German Marshall Fund of the United States and The Brookings Institution. He also serves as the Executive Director of the bipartisan Commission on Climate and Tropical Forests.

Alden Meyer is director of strategy and policy for the Union of Concerned Scientists (UCS). He is the principal advocate for UCS on national and international policy responses to the threat of global climate change. In addition, Mr. Meyer works extensively on renewable energy and electricity policy. Mr. Meyer has more than 30 years of experience in energy and environmental policy at both the state and national levels. He has testified before Congress on global warming and energy issues and has authored numerous articles on climate change, energy policy, and electric utility and nuclear power issues for both environmental and general interest publications.











# John H. Chafee Lecture and Lifetime Achievement Awards

### **Lifetime Achievement Award**



**Dr. Jimmy Reaves** career spans 32 years in the Forest Service. As the current Deputy Chief for Research and Development, he provides national leadership for basic and applied natural resources research and is a member of the Forest Service Executive Leadership Team. Dr. Reaves also served as the Associate Deputy Chief for Forest Service, Research and Development; Director of Forest Management Sciences; Director of the Southern Research Station; Assistant Station Director for Planning and Application in the Southern Station; National Forest Service Research and Development Budget Coordinator; and Research and Development where he served as a Research

Plant Pathologist. He had additional leadership and executive training from the Federal Executive Institute in Charlottesville, VA; U.S. Global Forestry Forum, Oaxaca, Mexico; The John F. Kennedy School of Government, Harvard University in Cambridge, MA, Washington, D.C., the Strozzi Institute, Petaluma, CA; and Leadership for Collective Intelligence, Dialogos Inc., Cambridge, MA. Dr. Reaves is a member of the Society of American Foresters.

#### Stephen Hubbell

Dr. Hubbell is a Distinguished Professor of Ecology and Evolutionary Biology at the University of California, Los Angeles. Previously, he held positions at the University of Georgia, Princeton University, the University of Michigan and University of Iowa, and at the Smithsonian Tropical Research Institute.

Dr. Hubbell is the co-founder and Founding Chair of the National Council for Science and the Environment. Through NCSE, he has strengthened the connections between science and decision-making in many areas; and between scientists of all types, with policy makers, managers,



conservationists, business leaders, and others around the world. This conference is part of Steve's legacy.

He has published four books and more than 200 scientific papers on tropical plant ecology, theoretical ecology, plant-animal interactions and animal behavior. His unified neutral theory of biodiversity and biogeography explains the diversity and relative abundance of species in ecological communities.

In 2014, Dr. Hubbell became the first American in more than four decades to receive the Scientific Achievement Award of the International Union of Forest Research Organizations who praised Hubbell as a "visionary scientist who has made unparalleled contributions to understanding the biological diversity and ecology of tropical forests." He is an international leader in advancing our scientific understanding of complex tropical systems, which is essential for their conservation and management.

Dr. Hubbell was awarded a Guggenheim Fellowship in 1984 and was a Pew Scholar in Conservation and the Environment from 1990-1992 (which he used to support NCSE).

### 15<sup>th</sup> Annual John H. Chafee Memorial Lecture



Amory B. Lovins, an American consultant experimental physicist and 1993 MacArthur Fellow, has been active at the nexus of energy, resources, economy, environment, development, and security in more than 50 countries for over 40 years, including 14 years based in England. He is widely considered among the world's leading authorities on energy—especially its efficient use and sustainable supply—and a fertile innovator in integrative design and in superefficient buildings, factories, and vehicles.

During 1979–2002, Mr. Lovins worked as a team with L. Hunter Lovins and they shared numerous awards. He has received numerous awards individually, including the 1993 Nissan Prize for inventing superefficient ultralight-hybrid

cars, the 2007 *Time International*'s Hero of the Environment award In 2009 *Time* named him among the world's 100 most influential people, and *Foreign Policy*, one of the 100 top global thinkers.

In 1982, the Lovinses cofounded Rocky Mountain Institute (<u>www.rmi.org</u>), an independent, entrepreneurial, nonprofit think-and-do tank. RMI's ~80 staff drive the efficient and restorative use of resources to help make the world thriving, verdant, and secure, for all, forever. Ms. Lovins left RMI in 2002; Mr. Lovins is now its Chief Scientist and Chairman Emeritus. The Institute's ~\$12-million annual revenue comes both from programmatic enterprise, chiefly private-sector consultancy, and from grants and donations. RMI's balance sheet comes largely from Mr. Lovins's having cofounded, led, spun off, and in 1999 sold (to the *Financial Times* group) E source, the premier source of information on advanced electric efficiency (<u>www.esource.com</u>).

Mr. Lovins has briefed 23 heads of state, given expert testimony in eight countries and 20+ states, delivered thousands of lectures, and published 31 books and over 480 papers, as well as poetry, landscape photography, music (he was a pianist and composer), and an electronics patent.



Senator John H. Chafee (1922 – 1999) was born in Providence, Rhode Island. He earned degrees from Yale University and Harvard Law School. Upon the United States' entry into World War II, Chafee left Yale to enlist in the Marine Corps, and then served in the original invasion forces at Guadalcanal. In 1951 he was recalled to active duty and commanded a rifle company in Korea.

After six years in the Rhode Island House of Representatives, Chafee was elected Governor by a 398 vote margin in 1962. He was re-elected in 1964 and 1966—both times by the largest margins in the state's history. In January 1969 he was appointed Secretary of the Navy and served in that post for three and a half years. He was elected to the United States Senate in 1976. As Chairman of

the Environment and Public Works Committee, the Senator was a leading voice in crafting the Clean Air Act of 1990. He led successful efforts to enact oil spill prevention and response legislation and a bill to strengthen the Safe Drinking Water Act. Senator Chafee was a long-time advocate for wetlands conservation and open space preservation and was the recipient of every major environmental award.

John Chafee was a Republican, a committed conservationist, and a political leader who worked across party lines to advance environmental protection.

# **SYMPOSIA & BREAKOUT WORKSHOPS**

**Symposia** are 90 minute mini-plenary sessions comprised of coordinated presentations by a diverse panel of experts who offer insightful perspectives on the topic of the session, followed by moderated discussion among the speakers and a brief question-and-answer period and open discussion with all session attendees. On Tuesday, January 27, two sets of concurrent symposia will provide focused discussion on critical cross-cutting topics. Symposia A will occur from 2:00 p.m. to 3:30 p.m. and Symposia B from 3:45 p.m. to 5:15 p.m. Another set of concurrent symposia, Symposia C, will occur on Wednesday, January 28 from 10:30 a.m. – 12:00 p.m.

**Breakout workshops** will take place Wednesday, January 28 from 2:00 p.m. to 5:00 p.m. The workshops are the core of the conference and are intended to be an opportunity for participants to generate science-based outcomes within the topic area. Using the information gleaned from the symposia the day before, the goal of the session is to generate additional action through development of improved strategies, tools, and partnerships. The session and follow-up after the conference should develop action plans with commitments to work together for implementation. These sessions are organized by leading individuals from partnering organizations working at the forefront of climate situations.

Most workshops are connected to symposia. We strongly encourage participants to attend the workshop connected with one of the symposia they attended on Tuesday or Wednesday morning.

# SESSIONS BY TRACK

Tracks	Symposia A	Symposia B	Symposia C	Workshop
1: COP 21	S1. Preparing for COP 21		S25. Historic Contributions: The CBDR Challenge	W1. Who is Responsible for Climate Change?
2: U.SChina Partnerships	S2. U.SChina Partnerships	S13. Engaging U.S. and Chinese Businesses, Media and Publics		W2. U.SChina Partnerships
3: Energy Sources	S3. Natural Gas S4. The Future of Bio: Beyond Ethanol	S14. CCS: The Future of Coal S15. Geothermal Energy	<ul><li>S26. Scaling Solar Energy</li><li>S27. Designing Landscapes as an</li><li>Energy Option</li><li>S28. Nuclear Energy as a Non- Carbon Energy Option</li></ul>	<ul><li>W3. Advancing Solar Energy</li><li>W4. Growing the Future Bioeconomy</li><li>S40. Advancing Nuclear Energy Options</li></ul>
4: Reinventing Utilities	S5. EPA's Clean Power Plan I S6. Integrating Clean Energy across Scales	S16. EPA's Clean Power Plan II S17. Smart Grids, Microgrids and Information Technology	S29. Social Cost of Carbon S30. Utilities in 2050	W5. Harnessing the Hidden Efficiency W6. Reinventing Utilities
5: Smart Energy Use	S7. Green Buildings	<ul><li>S18. Wood: The Real Green</li><li>Building Material</li><li>S19. From Transactions to</li><li>Transformation</li></ul>	S31. Enabling Climate-Smart Energy Use with Real-Time Information	W7. Environmental Dashboard W8. Environmentally Sensitive Electricity
6: Climate-Resilient Energy	S8. Coastal Energy Resiliency		S32. Local & Regional Energy Resiliency	
7: Low Carbon Transportation			S33. Electrifying Transportation	W9. Strategies to Advance Low Carbon Transportation
8: Energy for All	S9. Sustainable Energy for All	S20. Population and Energy Growth beyond 2030	S34. Public Sector Roles	
9: Energy-Water Nexus			S35. Water-Energy Nexus: Challenges and Opportunities	W10. The Water-Energy Nexus: Collaboration for Increased Impact W11. The Water-Energy-Climate Nexus: New Strategies
10: Finance, Pricing, and Markets	S10. Financing Low Carbon Energy	S21. Carbon Markets: Lessons from Around the World S22. Academic Investment and Divestment	S36. Carbon Pricing, Coalition Building, & International Action	W12. Carbon Pricing, Coalition Building, and International Action Towards COP 21
11: Communities	S11. Facilitating Community Understanding	S23. Facilitating Community Engagement	S37. From Climate and Energy Literacy to Impact	W13. Advancing Community Action
12: Higher Education	S12. Low and Net-Zero Carbon Campuses	S24. Climate Knowledge and Innovation Community	S38. Innovative University- Community Partnerships	<ul><li>W14. Higher Education, Energy and Climate</li><li>W15. Climate Knowledge and Innovation</li><li>Communities</li><li>W16. Campuses as Living Laboratories</li></ul>
13: Advancing Science and Technology for Decisions and Solutions			S39. "Reframing" Energy for the 21 <sup>st</sup> Century	<ul> <li>W17. Earth Observations Informing Energy Management Decision Making</li> <li>W18. World Energy</li> <li>W19. Integrated Science</li> <li>W20. Decisions, Information, Data and Systems: Putting it all Together</li> </ul>

## SESSION DESCRIPTIONS

### SYMPOSIUM A: JANUARY 27, 2015 2:00 - 3:30 PM

#### **S1. Preparing for COP 21**

#### (*Conference Theater*)

This symposium will engage speakers closely observing the preparations for the 21<sup>st</sup> Conference of the Parties to the United Nations Framework Convention on Climate Change in Paris (COP 21) in a discussion about what kind of agreement might be achieved. Key negotiators from several nations have begun to make public statements about a flexible agreement with an emphasis on "practices" and "processes" rather than "end points" with mandatory updates every five to ten years. Such an agreement will have "rules" and be structured to achieve the goal of limiting warming to 2°C, and will focus on transparency and reporting methodology. In March, 2015 nations will submit mitigation commitments called "intended nationally determined contributions." This symposium will provide insights into the status, of the COP 21 process and into the challenges to and opportunities for a meaningful agreement. Moderator: Jacob Scherr, Senior Advisor, International Program, Natural Resources **Defense Council** 

Speakers:

**Keya Chatterjee**, Executive Director, U.S. Climate Action Network **Alden Meyer**, Director of Strategy and Policy, Union of Concerned Scientists

**Lutz Weischer,** Team Leader, International Climate Policy, Germanwatch

**Matthieu Wemaere**, Lawyer and Faculty, Centre for International Studies, Research, and Community, Aix-en-Provence Institute

#### S2. U.S.-China Nongovernmental Climate Change Partnerships That Work

#### (Kennedy)

The symposium will bring together select NGOs, Think Tanks and others from both

countries to provide a range of views from those already been established in the international climate talks such as the UNFCCC or who have experience leading community-based programs and are beginning to participate in these talks. All must have a demonstrated interest in furthering U.S.-China bilateral cooperation. They will be engaged in a discussion on how to advance climate change diplomacy and educate their respective publics.

<u>Moderator:</u> Daniel H. Garrett, Associate, Asia Institute

#### <u>Speakers:</u>

**LU Chuanying,** Research Fellow, Shanghai Institutes for International Studies

**Yu Hongyuan**, Professor and Director of Institute for Comparative Politics and Public Policy, Shanghai Institutes for International Studies

**Wang Mou**, Associate Professor of Institute for Urban and Environmental Studies, Chinese Academy of Social Science

**Tom Peterson**, President, Center for Climate Strategies

**Lei Xie,** Lecturer in Politics, University of Exeter, Penryn Campus

# **S3.** Natural Gas: How Much Better Than Coal? (*Roosevelt*)

When burned, natural gas emits half as much carbon dioxide per unit of energy as coal. Thus, many consider natural gas to be cleaner source of energy. However, methane is emitted via leaks and vents during the production, transmission, storage, and distribution of natural gas, thereby counteracting some of the climate benefit of natural gas over coal. This is important because methane has a much greater global warming impact than carbon dioxide does, especially on "shorter" time scales of decades up to a century or more. In order to determine whether coal or natural gas has a smaller global warming impact, we must know how much methane is emitted in the production, transmission, storage, and distribution of natural gas. This session will explore this key question. <u>Moderator:</u> Alexander "Sandy" MacDonald, Chief Science Advisor, NOAA Office of Oceanic and Atmospheric Research <u>Discussants:</u>

**Fiji George**, Director, Strategic Solutions, Development Solutions Division, Southwestern Energy

**Tony Ingraffea**, Dwight C. Baum Professorship in Engineering, Cornell University

**Gabrielle Petron**, Research Scientist, NOAA/University of Colorado

#### S4. The Future of Bio: Beyond Ethanol

(Regency C) - Past policies to reduce dependence on petroleum through biomass feedstocks have largely resulted in the production of just one fuel, ethanol, which is a relatively low-value commodity that can only replace a fraction of the gasoline market. Focus is now shifting to replacing crude oil used for many purposes with diverse, non-food biomass resources. From "drop-in" fuels to chemicals and polymers that fit into our existing infrastructure, the biorefining industry has great potential to reduce fossil fuel consumption but is still in its infancy. Major challenges lie ahead in economically collecting, transporting and converting these feedstocks into the products that help drive our economy. This session will highlight progress already made and envisage the future bioeconomy.

<u>Moderator:</u> Andrew Held, Senior Director, Deployment and Engineering, Virent, Inc. <u>Discussants:</u>

Brent Erickson, Executive Vice President, Biotechnology Industry Organization World Nieh, National Program Lead, Forest Products, U.S. Forest Service Carla Santos, Global Energy Fellow at the Institute for Energy and the Environment, Vermont Law School

#### **S5. EPA's Clean Power Plan I: Status and Strategy** (*Potomac 5/6*)

Our country is taking the most significant step in U.S. history toward reducing the pollution that causes climate change. The U.S. Environmental Protection Agency's landmark Clean Power Plan will place the first-ever limits on carbon dioxide emissions from power plants, giving states the incentive to shift to cleaner energy sources and the freedom to design their own paths to compliance. The solutions we need to achieve significant reductions of carbon pollution from our nation's largest source are at hand, and they would result in more energy security, economic growth, and protection from the harmful impacts of climate change. During this symposium, speakers will discuss the importance of the carbon pollution standards at this moment in the power sector, key design features of the standards (including the legal framework), and available state compliance options that can support the deployment of low-carbon technologies, while ensuring reliable power supplies and keeping electricity affordable. Organizers: Cheryl Roberto, Associate Vice President for Clean Energy, Environmental Defense Fund; Mica Odom, Director, U.S. Climate and Energy Communications, **Environmental Defense Fund** Moderator: Vicki Arroyo, Executive Director,

Georgetown Climate Center, Georgetown Univ. Discussants:

**Phil Assmus,** Senior Staff Associate, National Association of Clean Air Agencies

**Dallas Burtraw,** Senior Fellow, Resources for the Future

**Tomas Carbonell**, Attorney, Environmental Defense Fund

**Reid Harvey**, Director, Clean Air Markets Division, U.S Environmental Protection Agency

# **S6. Integrating Clean Energy across Scales: Buildings-to-Nations**

(Prince William)

This symposium will discuss issues related to the integration of clean energy technologies (specifically wind and solar) into the grid. The impact of consumer owned/leased rooftop solar and micro wind generation on local utilities falls at one end of the scale. At the other end of the scale is national policy related to large renewable installations and ever increasing renewable penetration rates. The symposium will also discuss the efficacies of policies and incentives at local levels (e.g., net metering visà-vis feed in tariff) and at national levels (incentive grants, etc.). The symposium will also enumerate the technical challenges associated with renewable integration (e.g., storage, load management, etc.) and identify promising approaches to address these. Moderator: Paul Flikkema, Professor of Electrical Engineering and Computer Science, Northern Arizona University Discussants:

Todd Foley, Vice President for Policy and Government Affairs, American Council On Renewable Energy (ACORE) Elisa Graffy, Professor of Practice, Consortium for Science, Policy & Outcomes, Arizona State University Bryan Hannegan, Associate Laboratory Director for Energy Systems Integration

Director for Energy Systems Integration, National Renewable Energy Laboratory **Jacob Smith**, Policy Advisor for Energy and Environment, Senator Bernie Sanders

#### **S7. Green Buildings** (Lincoln)

The session will focus on the vital role that energy-efficient buildings play in addressing the need to drastically reduce greenhouse gas emissions. We will give examples of the latest green buildings and provide the audience with information on current research and design tools for transitioning to a new generation of buildings. We will also answer questions from the audience. <u>Moderator</u>: Chuck Kutscher, Director, Center for Buildings and Thermal Systems, National Renewable Energy Laboratory

<u>Discussants:</u>

**Bob Dixon**, Head of Industry Affairs – Americas Region, Building Performance & Sustainability, Siemens Infrastructure & Cities **Hunter Fanney**, Chief and Supervisory Mechanical Engineer, Energy and Environment Division, National Institute of Standards and Technology

**Victor Olgyay**, Principal Architect, Buildings, Rocky Mountain Institute

#### **S8. Coastal Energy Resiliency** (*Regency D*)

Coastal energy infrastructure is currently threatened by sea level rise, encroachment, increased storm intensity and frequency, and other hazards. Coastal communities are beginning to plan for adaptation to these hazards. In the lower 48 states, around 300 energy facilities are less than four feet above local high tide, placing them at risk to sea level rise and increased inundation events from coastal storms. NOAA, other federal agencies, and non-governmental partners such as the Nature Conservancy are working to advance coastal resilience solutions that do not involve simply hardening or installing "gray" infrastructure, but rather use "green" infrastructure as well as recognizing and utilizing the natural capital rooted in coastal ecosystems. This symposium will increase understanding for the energy industry of activities, actors, technologies, and natural capital as well as advance partnerships between private sector, state and local government, NGOs, and federal agencies. Organizers: Leah Fisher and Kim Penn, Climate Change Policy Coordinator, NOAA Moderator Joseph Casola, Program Director,

<u>Moderator</u> Joseph Casola, Program Director Center for Climate and Energy Solutions

#### Discussants:

Holly Bamford, Acting Assistant Secretary, Conservation and Management, NOAA Seth Blitch, Louisiana Director of Coastal and Marine Conservation, The Nature Conservancy Jeff Williams, Director for Climate Consulting, Entergy Corporation

# **S9.** UN's Sustainable Energy for All (SE4All) Initiative: Focus on Energy Efficiency (*Tidewater 2*)

Sustainable Energy for All (SE4All), an initiative led by the UN Secretary-General and the President of the World Bank, has as one of its three objectives for 2030 a doubling of the global rate of improvement in energy efficiency. The SE4ALL Global Energy Efficiency Accelerator Platform is driving energy efficiency action and commitments by national and sub-national leaders at the country, city, state, region, and sector levels. Targeted energy efficiency measures have the potential to reduce global energy-related emissions by 1.5Gt in 2020 and generate US\$250-325 billion worth of savings per year. These measures include efficiency gains in buildings, transport, lighting, appliances, district energy and industry. SE4All supports specific, sector-based energy efficiency accelerators and include, for example, buildings, lighting, appliances, district energy systems, industry, and transportation. This session will explore the role that energy efficiency needs to play in a sustainable energy future. It will address the sector-specific opportunities that exist, and the approaches being used to scale up proven technologies and practices. Organizers: Hilary French, Program Officer for Climate Change and Resource Efficiency, and Daiva Kacenauskaite, Team Assistant, UN Environment Programme (UNEP) Regional Office for North America (RONA); Mark Radka, Chief, Energy Branch, UNEP Moderator: Patricia Beneke, Director and Regional Representative, UNEP RONA Discussants:

Christine Egen, Executive Director, Collaborative Labeling and Appliance Standards Program
Mark Hopkins, Senior Director, International Energy Efficiency, UN Foundation
Mark Radka, UN Environment Programme
Dave Turk, Deputy Assistant Secretary for International Climate Change Policy, U.S. Department of Energy

# S10. Financing Low Carbon Energy through Green Revolving Funds

#### (Jefferson)

Nearly 50 campuses have signed onto the Billion Dollar Green Challenge (including Harvard, Dartmouth. Penn and Princeton) and received support on this self-investing strategy to improve their campus. This symposium will share first-hand accounts and case studies of working to invest millions of dollars in building energy efficiency and renewable energy projects through self-managed green revolving funds. Princeton University, for example, has a \$45 million energy master plan, including a \$5 million dollar revolving energy efficiency fund. The master plan is expected to reduce the annual energy budget by one third and achieve \$8.5 million in annual savings. The session will provide insights into the decision making processes, communication, and tracking performance. Participants will be engaged in conversations about starting a fund with minimal investment, communicating the benefits, getting buy-in from reluctant participants, and prioritizing capital projects. Moderator Mark Orlowski, President, Sustainable Endowments Institute

#### Discussants:

Jeremy King, Sustainability Coordinator, Denison University Shana Weber, Sustainability Director, Princeton University

### S11. Facilitating Understanding: Challenges and Opportunities for Climate Change Education in a Range of Sectors

(Regency F)

Climate change education is a critical component of many research, resource management, and organizational planning documents. Education encompasses formal, informal, and university settings, policymakers, and resource managers. This session will review policies, programs, and efforts to engage audiences across professional communities and the public in learning about the causes, impacts, and necessary responses to climate change. Speakers will identify synergies and barriers in common, and provide recommendations for broadening and sustaining our collective impact. Participants will discuss how policies can enable or constrain efforts to educate the public on climate science.

Enablers: Next Generation Science Standards; MD Environmental literacy standards; and, federal agencies supporting climate change education programs.

Constrainers: reforms that compete with Next Generation Science Standards implementation; certification requirements; and, ties to traditional science disciplines.

<u>Moderator:</u> Patricia Harcourt (Maryland Project Manager) and Jen Merrill (Delaware Project Manager), Maryland-Delaware Climate Education, Assessment, and Research <u>Discussants:</u> Don Boesch, President, University of Maryland

Center for Environmental Science Nancy Brickhouse, Deputy Provost, University of Delaware Mica Estrada, Assistant Professor, University of California, San Francisco Tonyea Mead, Education Associate, Science, Delaware Department of Education Frank Niepold, Education Coordinator, NOAA

Climate Program Office

#### **S12. Low and Net-Zero Carbon Campuses** (*Washington B*)

This symposium will explore the roles that colleges and universities have undertaken to address their energy use in the context of climate change. Issues will include impacts, the American College & University Presidents' Climate Commitment and some of its initial success stories, and innovative energy case studies, such as ground-source geothermal heating and cooling, wind energy, on-site solar energy, offsite commercial-scale grid-delivered solar, and how College of the Atlantic, after becoming the country's first carbon-neutral campus, facilitates student participation in hands-on energy projects. Outcomes will include:

- strategies to advance toward climate-neutral campuses based on a scaled understanding of campus as an operational system with points of intervention;
- strategies to advance student leadership; and
- a new blog to enable participants to share ideas and gain additional support.

<u>Moderator</u> James Eflin, Chair of the Department of Natural Resources and Environmental Management, Ball State University

#### Discussants:

Anna Demeo, Director of Energy Education and Management, College of the Atlantic Robert Francis, Vice President for Facilities, Drexel University Julian Keniry, Senior Director of Campus and Community Leadership and Campus Ecology, National Wildlife Federation James Lowe, Associate Vice President of Facilities, Planning, and Management, Ball State University

Chris O'Brien, Director, Office of Sustainability, American University

#### SYMPOSIUM B: JANUARY 27, 2015 3:45 – 5:15 PM

### S13. Engaging U.S. and Chinese Businesses, Media and Publics in a Meaningful Dialogue on Climate Change

(Kennedy)

The symposium brings together select NGOs, Think Tanks, government, and others from both nations to provide a range of views about how China and the U.S. can collaborate to advance cooperation and collaboration on energy and climate change issues, including steps to advance international climate talks. The goal is to identify ways to engage all stakeholders, particularly business, media and the general public, in climate change issues. All speakers bring successful examples of U.S.-China bilateral cooperation. They will engage with participants in a discussion on how to advance climate change diplomacy and educate their respective publics.

<u>Moderator</u>: Jennifer Turner, Director of the China Environment Forum, Wilson Center Discussants:

**BAI Jie**, Visiting Fellow, Freeman Chair, China Studies, Center for Strategic and International Studies

Jiang Lin, Senior Vice President of China Strategy and Analysis, Energy Foundation **Duanyong Wang**, Director of the Center for China's Overseas Interests Studies, Shanghai International Studies University, China **Ka-Ho YU**, Researcher, Chongyang Institute for Financial Studies, Renmin University of China

# **S14.** Carbon Capture and Storage - The Future of Coal (*Roosevelt*)

Coal provides 29% of the world's energy supply today. All mainstream projections of future energy supply indicate coal will continue to be a major source of world energy for decades to come. While coal is a major source of emissions for greenhouse gases (GHGs), there has been, and continues to be, considerable progress in reducing the level of emissions from coal, in terms of how coal is burned and how carbon emissions can be captured and stored. This symposium brings together five international experts to discuss the future of coal from different perspectives. Participants will engage speakers in a dialogue to understand the possible futures of coal in the context of a global effort to reduce GHGs.

<u>Moderator:</u> Brian Anderson, Associate Professor of Chemical Engineering, West Virginia University

Discussants:

**Robert Finley**, Director of the Advanced Technology Initiative, Illinois State Geological Survey

Sarah Forbes, Senior Associate, World Resources Institute

Julio Friedmann, Deputy Assistant Secretary for Clean Coal, U.S. Department of Energy James Wood, Director, U.S.-China Clean Energy Research Center, West Virginia University **S15. Geothermal Energy** (*Tidewater 2*)

Naturally occurring heat generated by the Earth is used to generate electricity. Geothermal energy can be found in shallow ground to several miles below the surface and is a clean and sustainable source for electrical generation. Unlike solar, wind, or tidal forces, geothermal energy is always "on" and has the ability to continuously produce electricity. Today geothermal power plants in 24 countries, including the United States, generate electricity using the earth's natural energy to heat water for electrical generation. The United States is the world's leader in electricity generated using geothermal energy. According to the U.S. Department of Energy, in 2013, U.S. geothermal power plants produced about 17 billion kilowatt hours (kWh) which is 0.4% of total U.S. electricity generation. During this symposium, speakers representing the federal government, industry, and academia will discuss the current state of geothermal energy production in the United States and their visions for the future. Organizer: Paul Young, Deputy Associate Director for Minerals and Energy, USGS Moderator Brenda Pierce, Program

Coordinator for the Energy Resources Program, USGS

#### Discussants:

**Chris Bromley**, Geophysicist, GNS Science, New Zealand **Karl Gawell**, Executive Director, Geothermal

Energy Association

**Jonathan Glen,** Research Geophysicist, USGS **Douglas Hollett**, Geothermal Technologies Office, U.S. Department of Energy

# **S16. EPA's Clean Power Plan II: Opportunities and Obstacles**

#### (*Potomac 5/6*)

The new Clean Power Plan will provide regulatory certainty to power companies that are making medium- and long-term investment decisions now that have enormous environmental and economic implications for our future. Strong standards will also help lock in the carbon reductions we have already achieved, ensure we stay on the path to a cleaner energy economy, and help address the significant negative public health and environmental effects of generating energy from dirtier fuel sources-adverse impacts that Americans are paying for as pollution damages their health, security, and welfare. This symposium will focus on the opportunities created by the Clean Power Plan and address key challenges such as designing state plans (market-based or portfolio), ensuring effective coordination with utility regulators, and facilitating consistent regulatory approaches across the country.

<u>Organizers:</u> Cheryl Roberto, Associate Vice President for Clean Energy, Environmental Defense Fund; Mica Odom, Director, U.S. Climate and Energy Communications, Environmental Defense Fund

<u>Moderator</u>: Benjamin Longstreth, Senior Attorney, Natural Resources Defense Council <u>Discussants:</u>

**Bryan Garcia**, President and CEO, Clean Energy Finance and Investment Authority, CT **Jonas Monast**, Director of the Climate & Energy Program, Duke University's Nicholas Institute for Environmental Policy Solutions **Tom Peterson**, President, Center for Climate Strategies

**Noelle Selin**, Professor of Engineering Systems and Atmospheric Chemistry, Massachusetts Institute of Technology

#### **S17. Smart Grid, Microgrids and Information Technology** (*Washington B*)

This session will explore the preferred future configuration of the energy system while suggesting the best evolutionary pathways to integrate the concepts of Smart Grid, Microgrid, and information technology into new architectures that solve the combined problems of redefining utilities, third parties, and end users as well as generation, transmission, distribution, and conversion. It challenges the participants to stretch their system thinking to include energy (including fuels), power, water, air, and economic networks as part of a complete solution. Speakers and participants will bring to this session their maps, models, diagrams, syntactic descriptions, and formative ideas of the challenges and solutions for the next generation energy architectures. It is critical at this point in history that all of these paradigms be brought to the table and addressed. Redefining these architectures and value propositions is key to society's expectation that we make these changes, not just to avoid a looming crisis, but to unleash the next great innovation opportunity: an opportunity that promises to deliver greater value to broader segments of the global community than did the data network revolution of the past three decades.

<u>Moderator</u>: **Bruce Beihoff**, Technical Director of Industry Relations, Midwest Energy Research Consortium

Discussants:

Murali Baggu, Manager, Distributed Power Systems Section, Power Systems Engineering Center, National Renewable Energy Laboratory Chris Greer, Director of Cyber Physical Systems and Smart Grid Program Office, National Institute of Standards and Technology Doug Houseman, Vice President of Innovation and Technology, Enernex Corporation Tom Jahns, Grainger Professor of Power Electronics and Electrical Machines, University of Wisconsin-Madison

#### **S18. Wood: The Real Green Building Material** (*Lincoln*)

The sustainable use of wood helps to restore working lands, mitigate climate change, and revitalize communities as well as support jobs and local economies. It is the only truly renewable building material, and using wood products help reduce our environmental impact. Choosing sustainably harvested wood in building construction also incorporates social, economic and environmental factors and helps to keep our family forests thriving. Although it doesn't eliminate the need for energy efficiency and other CO<sub>2</sub> reduction strategies, the use of wood fights climate change and, compared to other materials, requires less energy to extract, process, transport, construct and maintain over time. This session will bring together subject matter specialists to discuss the challenges and opportunities associated with using wood and wood products in green building systems and describe ways to bridge social, economic, and environmental interests to achieve restorative growth and resilience.

<u>Organizer and Moderator:</u> Carl F. Lucero, Director of Landscape Restoration & Ecosystem Services Research, U.S. Forest Service <u>Discussants:</u>

Kenneth Bland, Vice President of Codes and Regulations, American Wood Council William "Bill" Hohenstein, Director, Global Climate Change Program Office, USDA Ed James, Deputy Director of Engineering, Technology & Geospatial Services, U.S. Forest Service

**Mike Ritter**, Assistant Director, Forest Products Lab, U.S. Forest Service

### S19. From Transactions to Transformation – Large Corporate Energy Users Driving Change in the

**Electricity Sector** (*Prince William*) Utilities are responsible for 40% of CO<sub>2</sub> emissions in the U.S. The U.S. corporate sector is responsible for 62% of total U.S. greenhouse gas (GHG) emissions. With 60% of the Fortune 100 and nearly half the Fortune 500 having set climate or renewable energy goals to reduce emissions and costs, corporate end-users are increasingly demanding renewable energy. In most instances they have to go around their utility to get it. But this approach is complicated, time consuming, and misses opportunities for companies and utilities to collaborate. This symposium will explore new NGO and corporate collaborations to simplify renewable energy transactions, transform the electricity system to meet large customer needs, and create win-win solutions for utilities and corporate customers. The session will address questions such as: How are company demands and targets for clean energy driving more renewables to be sourced and added to the grid? What is the business case for companies to buy renewable energy and how is this shifting the energy mix? How are the 19 signatories of the "Corporate Renewable Energy Buyers' Principles opening up new opportunities with utilities to procure more cost-effective renewable energy? Moderator: Todd Foley, Vice President for Policy and Government Affairs, American Council On Renewable Energy (ACORE) Discussants:

Priya Barua, Associate, Climate and Energy
Program, World Resources Institute
Lily Donge, Principal at the Business
Renewables Center, Rocky Mountain Institute
Marty Spitzer, Director of U.S. Climate and
Renewable Energy Policy, World Wildlife Fund
Bill Weihl, Sustainability Director, Facebook

#### **S20.** Population and Energy Growth beyond 2030: Can Renewable Energy Meet the Demand? (*Regency F*)

This session is designed to bring population growth and the mid-century peaks in fossil fuel energy production into a more prominent position within the climate debate. This session will bring together experts in demography, nonrenewable energy reserves and their extraction, sustainable energy and the non-energy resources needed to build the required infrastructure, and policymakers to discuss the political framework(s) necessary to establish and implement programs with sufficient lead times. The session will also focus on the needs and limitations to achieving a smooth transition to a sustainable energy world in both the developed and least developed countries of the world and the implications for global and regional population growth/decline. Traditionally, the groups brought together within this session have not worked together to address these issues. Moderators: Glenn A. Jones, Professor of Marine Sciences, Texas A&M University at Galveston

#### Discussants:

**Sudeshna G. Banerjee**, Senior Economist, World Bank

James W. Murray, Professor of Chemical Oceanography, University of Washington Kevin J Warner, PhD Candidate, Texas A&M University at Galveston

### S21. Carbon Markets: Lessons from

**Around the World** (*Conference Theater*) This symposium will explore the rapidly expanding carbon markets of world, including the Regional Greenhouse Gas Initiative operating in nine northeastern states and the European Union's Emissions Trading System (EU-ETS) operating in 31 countries (the 28 EU members plus three others). The session will explore the challenges and opportunities that these and other markets have encountered and learned from. It will also look to the future and share insights and ideas about the role of carbon markets at COP 21 and beyond.

<u>Moderator:</u> Wil Burns, Co-Director, Forum for Climate Geoengineering Assessment, American University; President, Association for Environmental Studies and Sciences (AESS) <u>Discussants:</u>

**Emilie Alberola**, Research Unit Manager for Carbon and Energies Markets, CDC Climat, France

Juscelino Colares, Associate Director of the Frederick K. Cox International Law Center, Case Western Reserve University School of Law David Driesen, University Professor at the College of Law, Syracuse University Jeremy Firestone, Professor, College of Earth, Ocean, and Environment, University of Delaware

### S22. Academic Investment and

#### **Divestment** (Jefferson)

College and university endowment investment practices have the potential to have an outsized impact on conversations regarding financing climate solutions. They are able to both deploy resources to climate change solutions and away from climate change drivers. An investment and divestment debate is occurring on campuses all across the United States. A brief panel discussion with senior administrators and investment industry experts will set the stage for a broader discussion with audience members. Participants will play an active role in shaping and co-creating, and will be invited to join and remain engaged with a nascent initiative: the Intentional Endowments Network. The Network seeks to accelerate the integration of sustainability principles into the investment process of college and university endowments, and other mission-driven, non-profit organizations.

<u>Moderators:</u> Tony Cortese and Georges Dyer, Coordinator, Intentional Endowments Network <u>Discussants:</u>

Stephen Mulkey, President, Unity College Jenna Nicholas, CEO, Phoenix Global Impact and Project Manager, Divest-Invest Philanthropy Leslie Samuelrich, President, Green Century Capital Management Marcie Smith, Executive Director, Responsible Endowments Coalition

### **S23.** Facilitating Community Engagement

### (Regency C)

To facilitate public engagement on climate change, we must reach audiences not traditionally part of the conversation and provide people with skills to discuss and evaluate environmental issues from diverse perspectives. This session will present efforts to help individuals and communities learn about climate change and deliberate options for addressing this issue. The National Environmental Education Foundation will share its work with the Hispanic Communications Network to reach Spanish speakers with weather, climate and environmental information through radio and television. The North American Association for Environmental Education will share its work with the Kettering Foundation to engage communities in civic deliberations about climate change through the Environmental Issues Forums.

<u>Organizers:</u> Sara Espinoza, Managing Director of Research and Best Practices, National Environmental Education Foundation and Bora Simmons, Director, North American Association for Environmental Education <u>Moderator:</u> Bora Simmons, National Project for Excellence in Environmental Education <u>Discussants:</u>

Michele Archie, Senior Consultant, Harbinger Consulting Group

**Judy Braus**, Executive Director, North American Association for Environmental Education

Sara Espinoza, Managing Director of Research and Best Practices, National Environmental Education Foundation Alison Rodden, Vice President, Hispanic

**Communications Network** 

# **S24.** Climate-KIC, a Knowledge and Innovation Community (*Regency D*)

This symposium will examine the role of climate innovation education in helping transform and prepare society for changes already well underway. Speakers will discuss initiatives including the "Eco-civilization" proposed by China, the Climate Education and Literacy Initiative being led by the White House, and the work of Climate-KIC, a Knowledge and Innovation Community (KIC) created by the European Institute of Innovation and Technology. The panel will examine questions such as: What are the emerging best practices of innovation education? What barriers prevent infusion of innovation into curricula, and how can such obstacles be overcome?

<u>Moderator:</u> Mark McCaffrey, Programs and Policy Director, National Center for Science Education

Discussants:

Lena Adamson, Department of Education, Stockholm University (via Skype) Ebrahim Mohamed, Director of Education, Climate-KIC

Juliette Nicole Rooney-Varga, Associate Professor of Environmental Biology and Director of the Climate Change Initiative, University of Massachusetts, Lowell

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Across the United States and the world, climate change is already affecting communities, livelihoods, and the environment. In response, many parts of the federal government are taking action to help Americans adapt to current and potential risks.

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- President Obama

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Session Proposals welcome

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#### SYMPOSIUM C: JANUARY 28, 2015 10:30 AM – 12:00 PM

#### S25. Historic Contributions: The "Common But Differentiated Responsibility" (CBRD)

#### **Challenge** (*Tidewater 2*)

This session will explore how international climate mitigation discussions leading up to COP 21 should be informed by historical climate contributions and responsibility. It will address key scientific, ethical and policy dimensions of questions of historical and future responsibility for global warming. It will focus on how we can improve and make better use of estimates of historical contributions to climate warming to inform societal responses to climate change. It will also address issues such as the relative merits of considering production- vs. consumption- vs. extraction-based emissions. Finally, we will discuss the important ethical and philosophical questions surrounding the question of responsibility.

<u>Moderators:</u> Peter Frumhoff, Director of Science and Policy, Union of Concerned Scientists; Steve Davis, Assistant Professor, University of California, Irvine, and Richard Heede, Co-Founder and Director, Climate Accountability Institute Discussants:

Sivan Kartha, Senior Scientist, Stockholm Environment Institute Carroll Muffett, President and CEO, Center for

International Environmental Law **Damon Matthews**, Research Chair of Climate Science and Sustainability, Concordia

University

# S26. Massive Scale Solar Energy: 1.5 TW by 2025 (*Jefferson*)

The dramatic cost reduction of solar PV systems over the last five years combined with an annual demand for new systems approaching 50 GW this year makes solar PV a potentially high impact tool for reducing global carbon emissions with minimal impact on consumer electricity costs. This symposium will focus on the barriers associated with substantially increasing PV deployments over the next ten years. Specifically we will explore how to increase PV's fraction of world electricity demand to 20% of world electricity production by 2025. The 2014 IEA World Energy Outlook forecast has PV growing to ~6% of total electricity capacity by 2025, so 20% represents a nearly 4x increase, moving PV to 1.6 TW in 10 years. The discussants will represent four points of view regarding massive solar PV growth, namely the science and technology barriers at the PV device level, availability of capital and other financial barriers to the industry, barriers associated with integrating large scale intermittent generators into the existing energy distribution system and barriers that the PV industry itself may face in growing at such a rapid rate.

<u>Moderator</u> **Jeff Ball**, Scholar-in-Residence, Stanford University's Steyer-Taylor Center for Energy Policy and Finance

#### Discussants:

**Tonio Buonassisi**, Associate Professor of Mechanical Engineering, Massachusetts Institute of Technology

**Bryan Hannegan**, Associate Laboratory Director for Energy Systems Integration, National Renewable Energy Laboratory **Tom Kimbis**, Vice President of Executive Affairs/General Counsel, Solar Energy Industry Association **Stefan Reichelstein**, Senior Fellow, Woods Institute for the Environment, Stanford University

#### **S27.** Designing Landscapes to Deliver Energy, Economic Opportunities, and Climate Change Services (*Potomac 4*)

Forest and other lands have always been used for energy production to meet human needs, either from below-ground or from vegetation use and management above ground, as well as producing other services and goods. This session will present how including risk considerations and designing management systems across landscapes can produce energy and other economic opportunities while providing ecosystem services and consider climate mitigation and resilience. Panelists will: (1) review the current and planned state of practice on landscape design principles under changing conditions to deal with risk management; (2) identify current thinking and practice on linking the energy economy and ecosystem services from landscapes internationally; (3) present a case study from the experience on fracking from the viewpoint of a U.S. State government; and (4) address wildlife considerations when designing wind energy projects. Discussion could include other examples, ideas for improvement, barriers, and needs such as institutional structures.

<u>Organizer:</u> Marilyn Buford, Silviculture Research National Program Leader, U.S. Forest Service

<u>Moderator/Organizer:</u> Linda S. Heath, Chief Scientist, National Inventory and Monitoring Applications Center, U. S. Forest Service <u>Discussants:</u>

Chizuru Aoki, Cluster Lead for Climate Change Mitigation, Global Environment Facility
Seth Cassell, Chief of the Resource Planning and Inventory Division, Bureau of Forestry, Department of Conservation and Natural Resources, State of Pennsylvania
Amy Daniels, Knowledge Management Lead for Global Climate Change, U.S. Agency for International Development
Todd Katzner, Research Wildlife Biologist, U.S. Geological Survey

# **S28.** Nuclear Energy as a Non-Carbon Energy Option (*Potomac 6*)

Should we be re-evaluating nuclear energy as the prime tool to stall climate change? Is it the 'greenest' energy source? How does it compare to other energy sources? Can 'new nuclear' be even 'greener'? Where should nuclear energy fit in our quest to meet business-as-usual energy needs plus the new demands of climate change mitigation, such as ocean acidification? Will the environmental community get on board? What will it take to generate government and multinational support? These are just some of the questions that will be touched upon. This symposium will examine the current state of the industry, both here and abroad, and provide a sneak peak at exciting new technologies coming down the road.

<u>Moderator:</u> **Bob Greene**, Thorium Energy Alliance of Silicon Valley

Discussants:

Seth Grae, President and CEO, Lightbridge Sal Golub, Associate Deputy Assistant Secretary for Nuclear Reactor Technologies, U.S. Department of Energy

**Ripudaman Malhotra**, Associate Director of the Chemical Science and Technology Laboratory, SRI International and Author of "A Cubic Mile of Oil: Realities and Options for Averting the Looming Global Energy Crisis" **Jasmina Vujic,** Professor of Nuclear Engineering, University of California, Berkeley

#### **S29. Social Cost of Carbon** (*Fairfax*)

When promulgating a major rule, Federal agencies must submit a benefit-cost analysis (BCA) to the Office of Management and Budget as part of the review process. The social cost of carbon (SCC) is essential to estimating the benefits component of a BCA of a climate mitigation policy. In early 2010, an Interagency Working Group produced the first set of uniform SCC estimates to be used by all agencies. The Administration revised these estimates upward in 2013. The SCC estimates have sparked controversy and criticism from many angles. This panel will discuss the various steps in calculating the SCC, the weaknesses and strengths of those calculations, and how they are used to inform climate policy. They will also discuss the limitations on applying BCA to climate change policy.

<u>Moderator</u>: Karl Hausker, Senior Fellow, World Resources Institute Discussants:

Francisco de la Chesnaye, Program Manager of the Energy and Environmental Analysis Group, Electric Power Research Institute (EPRI)
Laurie Johnson, Chief Economist, Natural Resources Defense Council
Benjamin Zycher, John G. Searle Chair and Resident Scholar, American Enterprise Institute

# S30. Utilities in 2050: Which Possible Futures are Likely and Desirable?

#### (Conference Theater)

The implications of the growth of decentralized, renewable generation for the U.S. power industry are likely to be profound. As an illuminating example, established centralized utilities in Germany are now facing severe economic hardship because they did not anticipate the negative impacts of highpenetration distributed PV solar on revenues during periods of peak demand. As distributed generation capacity grows in the U.S., policy should guide, rather than react to, the disruptive changes that distributed generation will bring. How should retail markets be structured to reflect the redistribution of market power to tomorrow's electricity prosumers? Can, and should, utilities maintain centralized economic control when generation is decentralized? What energy services can utilities provide as alternative revenue sources to buttress declining demand for energy as a simple commodity? Finally, how can the critical processes of civic engagement, state-level regulation, and state and federal legislative action be aligned with the deployment of renewable energy technology and capacity to build a more reliable, resilient, efficient, and sustainable retail-level energy grid?

<u>Moderators:</u> Ian Rinehart, Engagement Associate, OPower

Discussants:

**Richard Caperton**, Director of National Policy & Partnerships, OPower

**Karlynn Cory**, Renewable Financing and Policy Analyst, National Renewable Energy Laboratory

**Lorenzo Kristov**, Principal for Market and Infrastructure Policy, California Independent System Operator

**Amory Lovins**, Cofounder and Chief Scientist, Rocky Mountain Institute

# **S31. Enabling Climate-Smart Energy Use with Real-Time Information**

(Potomac 2)

Through most of history, our ancestors experienced intimate and continuous feedback from the natural world that informed and constrained individual and community decision making. The loss of this feedback may, in part, explain the environmental conundrums we now face: although technological advances now taking place in energy efficiency, renewable energy, and material science are necessary for achieving sustainability, they may not compensate for this loss of feedback. In recent years, developments in hardware, software and networking, informed by social psychology, are enabling the emergence of novel forms of feedback on resource consumption and environmental quality. Automated feedback technology increases efficiency by enabling instant response to information about energy availability and cost. Real-time feedback delivered to citizens at multiple scales provides a new mechanism for engaging, educating, motivating and empowering community decision making that is aligned with ecological constraints. This session will explore examples of how both automated and community-facing feedback are being leveraged to drive electricity and water conservation.

#### <u>Organizers/Moderators:</u> Daniel Rosenberg, Project Manager, Oberlin College; Carol Miller, Professor of Civil and Environmental Engineering, Wayne State University <u>Discussants:</u>

Allison Harris, Project Manager, EcoWorks John Petersen, Professor and Director of Environmental Studies, Oberlin College Constantine Samaras, Assistant Professor of Civil and Environmental Engineering, Carnegie Mellon University

# **S32. Local & Regional Energy Resiliency** (*Lincoln*)

The development of successful energy resiliency strategies is predicated on selecting the right alternatives. The alternatives that are right for your community depend on the delicate balance of choosing the appropriate technologies, partnerships between government and private sector, and making the long term cases for financial and environmental sustainability. This panel will address the challenges facing strategy implementation at the local, regional, and state levels. Panelists will discuss the potential benefits of developing energy resiliency strategies, address the challenges and barriers to creating an energy plan, and examine how energy resiliency relates to other key components of quality place-making and job creation.

<u>Moderator</u>: William Avera Wynne, III, AICP Planning Director, Tampa Bay Regional Planning Council <u>Discussants</u>:

Chris Castro, Orlando City Advisor, City Energy Project, City of Orlando Eliza Hotchkiss, Technical Project Lead, National Renewable Energy Laboratory James Murley, Executive Director, South Florida Regional Planning Council

#### S33. Electrifying Transportation

(Prince William)

This symposium will explore the rapid development in technology that supports the electrification of transportation, including batteries for different types of electric vehicles (hybrid, plug-in hybrid, full battery electric vehicles) and fuel cells. Participants will receive a clear understanding of where these technologies are and the opportunities and challenges for the future. Moderator: Eric Wachsman, Director, University of Maryland Energy Research Center Discussants: Ping Lu, Program Director, ARPA-E, Department of Energy Reuben Sarkar, Deputy Assistant Secretary for Transportation, Department of Energy Sunita Satyapal, Director, Fuel Cell Technologies Office, U.S. Department of Energy

### **S34.** Public Sector Roles in Increasing Private Sector Finance for Clean Energy

Access (Arlington)

Over one billion people globally lack access to electricity. Providing clean and affordable energy services to these populations will be a critical driver for poverty reduction, job creation, and improved health and social outcomes. Achieving universal energy access will require an unprecedented level of public and private sector investment, mostly directed towards distributed generation solutions such as mini-grids and off-grid systems. It will also involve a dramatic increase in new energy service providers, particularly small and medium enterprises (SMEs), to better reach rural and base-of-the-pyramid consumers that account for a majority of the unserved populations. This panel will discuss the importance of engaging governments, energy access SMEs, public organizations, and investors to identify key public sector roles in supporting the successful development and scale-up of energy access.

<u>Moderator</u>: Terri Walters, Senior Policy
Advisor, National Renewable Energy
Laboratory
<u>Discussants</u>:
Faheen Allibhoy, Principal Investment Officer,
International Finance Corporation (IFC)
Morgan Bazilian, Lead Energy Specialist,
World Bank
Ellen Morris, Founding Partner, Embark
Energy; President, Sustainable Energy
Solutions; Adjunct Professor, Columbia
University
Richenda Van Leeuwen, Executive Director
for Energy and Climate and Energy Access
Initiative, UN Foundation

### S35. The Water-Energy Nexus: Challenges and Opportunities

#### (Washington A)

The symposium will address the critical waterenergy nexus in the context of the large demands each places on the other, the impacts of climate change, population growth and movement, and the introduction of new technologies. Water demands from agriculture, energy, and other human uses compete for long-term sustainability of water resources and the ecosystems that sustain them. Sea-level rise, potential changes in precipitation, extreme events, uncertainties for water management, irreversible changes in supplies and ecosystems, engineered solutions, opportunities to increase water and energy efficiency and even generate energy from water infrastructure, will all be addressed. The example of south Florida as a model for complicated water resilience issues globally will be highlighted. In this session, our experts will reflect on the internationally significant issues of water and energy sustainability and resilience in the context of climate change mitigation goals, presenting issues, challenges and opportunities, and new strategies.

<u>Moderator:</u> Maribeth Malloy, Director of Environmental Sustainability, Energy, Environment, Safety & Health, Lockheed Martin

#### Discussants:

Diana Bauer, Office Director of Energy Systems Analysis and Integration, U.S.
Department of Energy
Maria Donoso, Director, Global Water for Sustainability (GLOWS) Program
Richard Olson, Director of the Extreme Events Institute, Florida International University
Fred Sklar, Chief Scientist, Everglades
Division, South Florida Water Management
District

#### **S36.** Carbon Pricing, Coalition Building, and International Action towards COP 21 (*Roosevelt*)

As highlighted in the recent UN IPCC reports, at UNFCCC COP 20 in Lima, and by the World Bank and International Monetary Fund, putting a price on carbon is critical if we are to mitigate climate change. This session will bring together leaders and experts from across multiple sectors and disciplines to explore the opportunities and impacts of carbon pricing instruments and develop a working coalition to advance and implement these and other complementary solutions. This symposium will focus on knowledge-sharing and include: existing and evolving examples of carbon pricing policies and mechanisms; economic impact analyses; business, industry, and investment impacts and opportunities; international implementation, country context, and the impacts on sustainable development, financing, and poverty alleviation; cross-sector stakeholder engagement and participation; international efforts to build a coalition on carbon pricing action; and strategies for achieving a carbon pricing agreement at COP 21 in Paris.

<u>Organizers:</u> Joseph Robertson, Global Strategy Director, Citizens' Climate Lobby; John Hansen, Coalition Development Specialist, Citizens' Climate Lobby <u>Moderator:</u> Joseph Robertson, Citizens' Climate Lobby

#### Discussants:

Thomas Armstrong, Executive Director, U.S.
Global Change Research Program
Anne Kelly, Director of Public Policy and
BICEP, Ceres\*
Tom Kerr, Principal Climate Policy Officer at the IFC, World Bank Group
Scott Nystrom, Senior Economic Associate,
Regional Economic Models, Inc.

#### **S37. From Climate and Energy Literacy to Impact** (*Potomac 1*)

This symposium builds upon an ongoing discussion about how the many climate and energy literacy efforts underway can have significant and sustained impact through the development of: [1] a common agenda; [2] shared system of measures; [3] mutually reinforcing activities; [4] continuous communication; and, [5] a well-funded backbone support organization to coordinate the effort. Speakers will review the collective ideas for the activities of a backbone organization and continue with a discussion of what the structure of such an organization might be. This symposium will include the CLEAN Network and representatives of various projects funded through the NSF-Climate Change Education Program, NASA Innovations in Climate Education (NICE), and NOAA Environmental Literacy, or who have been otherwise engaged in the Tri-Agency Climate Change Education community, National Climate Assessment Network, and other organizations. Organizers: Tamara Ledley, Senior Scientist, TERC; Frank Niepold, Climate Education Coordinator, NOAA; and Mark McCaffrey, Programs and Policy Director, National Center for Science Education Moderator: Frank Niepold, NOAA Climate

Program Office

#### Discussants:

Emily Cloyd, Public Participation and Engagement Coordinator for the National Climate Assessment Network, USGCRP Tamara Ledley, Project Leader, TERC/CLEAN Network

**Michele Madia**, Director of Sustainability Financing and Policy, Second Nature

#### **S38. Innovative University-Community Partnerships: Collaboration for Climate Action** (*Washington B*)

This session will showcase examples of how universities have creatively partnered with both large and small communities to advance carbon reduction goals. Panelists include both university and community partners from New York State and Portland, OR. This session will explore key lessons learned within a series of discussions on 1) an overview of climate action planning activity within the Central New York Region, 2) experience with collaborative climate action planning with the City of Syracuse, 3) experience with GHG inventory, targeting and climate action planning with a small rural community in CNY; and 4) the process of developing and implementing collaborative research projects linking Portland State University to the Portland Bureau of Planning and Sustainability's Climate Action Plan. Moderator Jennifer Allen, Director of the Institute for Sustainable Solutions, Portland State University

#### Discussants:

Tim Carter, President, Second Nature Jackie Dingfelder, Policy Director for Mayor Charlie Hales, City of Portland Richard Smardon, Distinguished Service Professor, SUNY College of Environmental Sciences and Forestry

#### **S39. "Reframing" Energy for the 21<sup>st</sup> Century** (*Kennedy*)

At current levels of consumption the U.S. economy appears to be about 14% energyefficient. This means we waste 86% of all the energy now burned to maintain economic activity. That level of waste imposes a large array of costs that constrains the robustness of the economy. Indeed, the evidence suggests the long-term sustainability of the economy may not be possible without much higher levels of efficiency. This session will explore the implications of how an appropriate accounting of energy as work (rather than energy as commodities sold on the market) may impact the need for new research and development, different energy policies, and needed changes in the nation's educational curriculum.

<u>Moderator</u> John "Skip" Laitner, President-Elect, Association for Environmental Studies and Sciences (AESS)

#### Discussants:

**Carla Frisch**, Director of End-Use Analysis, Office of Energy Policy and Systems Analysis, U.S. Department of Energy

Michael Brody, Adjunct Professor, American University

**Abby Lindsay**, American University; Board, Association for Environmental Studies and Sciences (AESS)

### BREAKOUT WORKSHOPS: JANUARY 28, 2015 2:00 - 5:00 PM

#### W1. Who is Responsible for Climate

#### Change? (Jefferson)

This workshop will address key scientific, ethical and policy dimensions of responsibility for climate loss and damage, adaptation and mitigation, with the aim of developing strategies for how to better inform policy in the lead up to COP 21 in Paris as well as broader societal debate. Discussion points will include scientific challenges surrounding emissions and estimates and allowances for different climate targets, political challenges involving when historical responsibility should begin, and the merits of focusing on national vs. corporate vs. individual responsibility.

#### Moderators:

**Steve Davis**, Assistant Professor, University of California, Irvine

**Peter Frumhoff**, Director of Science and Policy, Union of Concerned Scientists **Richard Heede**, Co-Founder and Director,

Climate Accountability Institute

**Damon Matthews**, Research Chair, Climate Science and Sustainability, Concordia University

#### W2. Fostering Effective U.S.-China Nongovernmental Climate Change Partnerships (*Kennedy*)

The workshop will bring together representatives from both countries to further U.S.-China bilateral cooperation. They will be engaged in a discussion on how to advance climate change diplomacy and educate their respective publics. Possible outcomes include establishing a mechanism for a significant and sustainable U.S.-China Dialogue on Climate Change. Participants will identify gaps in understanding and implementation of existing climate collaboration and emerging needs for further cooperation in Paris and post-2015 Climate negotiations. Additional goals include:

• advancing mutual understanding on the issues that divide the two nations on moving

toward unequivocal commitments on mitigation and on now-unavoidable adaptation measures, including key issues associated with the "common but differentiated" principle; and

 identifying key issues where U.S. and Chinese non-governmental actors can collaborate on position papers of key issues such as advancing solar energy, carbon markets, applying the principle of "common but differentiated" responsibilities and other issues which might be presented at the 2015 Paris COP Climate Conference.

<u>Moderator</u> Haibing Ma, Senior Research Associate and China Program Manager, Worldwatch Institute

#### <u>Speakers:</u>

**Clay Stranger**, Manager, Reinventing Fire: China Initiative, Rocky Mountain Institute **Bei Tang**, Associate Professor, Shanghai International Studies University, China **Jian Zhang**, Fellow, Shanghai Institutes for

International Studies, China

**Songli Zhu**, Energy Research Institute, National Development and Reform Commission, China *Discussants:* 

Jianmin Chen, Director, Shanghai Key Laboratory of Atmospheric Particle Pollution and Prevention, Fudan University Song Gao, Assistant Professor, Nova Southeastern University

Ping Jiang, Associate Professor, Tyndall Centre for Climate Change Research, Fudan University
Kexi Pan, Vice Director, Fudan University
Energy Research Center, Fudan University
Zitai Zhang, Director of Environment, Resources and Energy Law Center, Fudan University

#### **W3. Massive Scale Solar Energy: Identifying the Barriers** (*Washington A*)

This workshop will explore how to grow global photovoltaic generation capacity to a scale that is large enough to substantially reduce global carbon emissions while maintaining wholesale electricity costs that are comparable to the lowest cost fossil fuel generation sources, currently combined cycle natural gas in the U.S. The workshop will focus on moving PV to 20% of world electrical generation capacity by 2025. According to IEA World Energy Outlook forecasts, this target equates to 1.6 TW of PV generation by 2025, which requires an annual deployment rate that is roughly 4x greater than current forecasts. The DOE SunShot goal for 2020 is for PV to achieve a levelized cost of energy (LCOE) that is 6 cents/kWhr. During this workshop we will discuss whether a more aggressive LCOE target is needed in order to achieve this much higher growth rate. The primary goal of the workshop is to identify the barriers that must be lowered to move PV to such a massive scale. Moving PV to the TW scale will require a coordinated effort between world governments, global PV industry players (both existing and new entrants), major utilities around the world along with their regulators and the global network of scientists and engineers working to advance the science and technology of every component of the PV system. Here in the U.S., the Department of Energy's SunShot Initiative is already actively coordinating these efforts domestically so this workshop will use the recent learnings of the SunShot program as a starting point.

<u>Moderator</u>: **Greg Wilson**, Director of the National Center for Photovoltaics, National Renewable Energy Laboratory *Discussants*:

**Raffi Garabedian**, Chief Technology Officer, First Solar

**David Rubin,** Director of Service Analysis, Pacific Gas & Electric **Lidija Sekaric**, Technology-to-Market Program Manager, Department of Energy

#### **W4. Growing the Future "Bioeconomy": Breaking through Bottlenecks** (*Regency D*)

Next generation technologies for the future bioeconomy involve the use of biomass such as energy grasses and co-products. The bioenergy value chain can be thought of as individual unit operations leading from renewable feedstocks to biofuels or chemicals. In order to allow for economical production, various bottlenecks in the bioenergy value chain need to be overcome.

These bottlenecks include the logistics of biomass collection and delivery, efficient and economical cell wall deconstruction, and advantageous policies. Currently, technologies are being developed for the efficient cell wall deconstruction of lignocellulose to 5 and 6 carbon sugars that can be used by various microorganisms to produce the products of choice. The logistics required to support a biomass refinery on a continuous basis are also being examined. Policies and regulations supporting the future bioeconomy need to be implemented in order to allow these renewablebased approaches an opportunity to be competitive with more traditional petrochemical-based approaches. Moderators: Hans Blaschek, Professor Emeritus, University of Illinois at Urbana-Champaign; Scott Williams, Research and Education Coordinator, Wisconsin Energy Institute; and Susan Jenkins, Managing Director, Energy Biosciences Institute at the University of California, Berkelev Discussants:

Hanna Breetz, Goldman School of Public
Policy, University of California, Berkeley
Bruce Dale, University Distinguished Professor, AgBioResearch, Michigan State University
Madhu Khanna, Professor, Energy Biosciences
Institute, Institute of Genomic Biology,
University of Illinois at Urbana-Champaign
Bill Provine, Director of Science & Technology
External Affairs, DuPont

#### W5. Harnessing the Hidden Efficiency – Using Voltage and Reactive Power Management as a Compliance Mechanism for the Clean Power Plan (Washington A)

Integrated Volt / VAR Control (IVVC) is a strategy that is increasingly being adopted in realizing a broad range of benefits across the electric grid including demand reduction, energy conservation, and an increase in system efficiency. IVVC makes it possible for electric customers and the grid to realize significant reductions in energy consumption without requiring changes to customer behavior. Despite its promise, increased deployment of IVVC and maximization of its associated benefits has been limited by a misalignment of policy objectives with existing business models and system of incentives. However, IVVC can be leveraged in developing a mechanism by which to comply with the requirements of the EPA's Clean Power Plan and reducing carbon emissions. This workshop will examine these ideas and facilitate a discussion on how energy savings and carbon reductions associated with IVVC may be quantified and captured to reflect their full value. The session will also investigate how IVVC may be used in a 'compliance market' setting to generate additional investments in a more efficient electric system.

<u>Organizers:</u> Cheryl Roberto, Associate Vice President for Clean Energy, Environmental Defense Fund; Mica Odom, Director, U.S. Climate and Energy Communications, Environmental Defense Fund

*Facilitator:* **Ronny Sandoval**, Senior Manager of Grid Modernization, Environmental Defense Fund

#### Discussants:

**Paul Alvarez**, President, Wired Group **Jay Oliver**, Director of Grid Automation, Duke Energy

Joe Paladino, Senior Advisor, U.S. Department of Energy

**Jeff Roark**, Principal Technical Leader, Electric Power Research Institute

#### **W6.** Reinventing Utilities: Planning for the Utilities that We Want and Need (*Regency F*)

This workshop will address the technical, market design and policy issues required to change the modern electrical power distribution system to efficiently and effectively integrate larger amounts of intermittent solar, wind, geothermal and biomass power, which requires changes in business models, infrastructure, public policy and systems-thinking designs. While recognizing the changes required, the energy industry sees no practical tested path for change. One solution is creating a "dynamic distribution system" – which is a place where all energy stakeholders can prosper while providing reliable, resilient, safe and clean power at competitive prices. Another part of the answer will come from "the energy value chain" of generation-transmission-distribution-retailconsumption with the new customer at both ends of the continuum by also becoming an energy generator. It will likely take some combination of new businesses opportunities to grow the market and create a new energy value proposition, new and innovation public policies allowing for creativity and experimentation in the market, along with continuous technology innovation. The states will likely be the incubators of innovation to create new electrical and thermal business solutions.

<u>Moderator:</u> Gary Radloff, Director of Midwest Energy Policy Analysis, Wisconsin Energy Institute at University of Wisconsin-Madison <u>Discussants:</u>

**Donna Attanasio**, Senior Advisor for Energy Law Programs, George Washington University **Bruce Beihoff**, Director, Technology Innovation, Midwest Energy Research Consortium

**Lorenzo Kristov**, Market and Infrastructure Policy, California Independent System Operator **Danny Waggoner**, Associate, Public Utility Commission Program, Advanced Energy Economy

#### W7. Environmental Dashboard: Combining Displays of Real-Time Resource Use with Community Voices to Celebrate & Empower Stewardship

(Potomac 5)

"Environmental Dashboard" (EnvironmentalDashboard.org) employs monitoring and display technology to provide three levels of feedback:

1) "Building Dashboard," deployed in over 1,000 buildings in the U.S. and Canada, which dynamically displays water and electricity consumption in individual buildings;

2) "Citywide Dashboard," which dynamically animates whole community resource flows and environmental quality; and

3) "Community Voices," which combines images and text to celebrate thoughts and actions that advance pro-environmental identity and action.

A pilot implementation of all three components in the City of Oberlin incorporates real-time data from drinking water, wastewater, watershed and municipal electricity systems with digital displays installed in public spaces throughout the community. This session will provide an overview of Environmental Dashboard and explore how technology can be used to engage a community and broaden perspectives on sustainability. Integration of the technology within public school curricula to promote "systems thinking" and community engagement will also be considered. Audience members will be engaged in a discussion of how this approach might be adopted in other communities. Moderator: John Petersen, Director of Environmental Studies, Oberlin College Discussants: Daniel Rosenberg, Project Director, Environmental Dashboard

Md Rumi Shammin, Associate Professor, Oberlin College Sharon Pearson, Oberlin City Council Member, Ohio

#### W8. Environmentally Sensitive Electricity (ESE): Developing a National Strategy for ESE Adoption (*Potomac* 6)

Reductions in greenhouse gas emissions and improvements to air quality can be made with simple changes in the way electricity is consumed. It is possible to arm users with information that allows informed choices regarding better times (and potentially, locations) for energy use. Environmentally Sensitive Electricity (ESE) technology provides location specific, real-time and forecasted marginal electricity emissions information. Participants in this workshop will be actively engaged in formulating a national strategy to bring an existing ESE technology to the mainstream. This new technology, termed LEEM (Locational Emissions Estimation Methodology), provides users with current emissions estimates from their real-time electricity consumption. After a short introduction to LEEM, participants will test applications, including Home Emissions Read Out (HERO), Polluting Emissions Pump Station Optimization (PEPSO), and SmartChange. Participants will then envision a national-scale adoption of ESE, explore the path and help develop a strategy to bring ESE to this scale. Moderator: Loch McCabe, President and CEO, Shepherd Advisors

Discussants:

Clare Butterfield, Program Director, Illinois Science and Energy Innovation Foundation Allison Harris, Project Manager, EcoWorks Lawrence D. Lemke, Associate Professor of Geology, Wayne State University Shawn McElmurry, Associate Professor of Civil and Environmental Engineering, Wayne State University

**Constantine Samaras**, Assistant Professor of Civil and Environmental Engineering, Carnegie Mellon University

#### **W9. Strategies to Advance Low Carbon Transportation** (*Potomac* 2)

Following Symposium 33, this breakout workshop will allow participants to discuss advancing low-carbon transportation, what infrastructure and policies are needed for this transition to occur, and make tangible suggestions on putting the infrastructure and policies in place

<u>Moderator:</u> Eric Wachsman, Director, University of Maryland Energy Research Center <u>Discussants:</u>

**Steve Leffin**, Director of Global Sustainability, UPS

**Morry Markowitz/Bud DeFlaviis**, Fuel Cell and Hydrogen Energy Association

**Richard Wahls**, Strategic Technical Advisor in the Advanced Air Vehicles Program Office, NASA

**Jill Sorensen**, Maryland Electric Vehicle and Executive Director, Baltimore Electric Vehicle Initiative

#### W10 & W11. The Water-Energy Nexus

The internationally significant issues of water and energy sustainability and resilience in the context of climate change mitigation goals will require new strategies to develop low-carbon solutions that maintain water resources and the ecosystems that sustain them. Although interactions between energy and water historically have been considered on a regional or technology-by-technology basis, there has been an increased call for taking a more integrated approach. These workshops will be in adjoining rooms.

#### W10. The Water-Energy Nexus: Collaboration for Increased Impact

#### (Potomac 3)

This workshop will explored work conducted by the U.S. Department of Energy, World Bank, and Stanford University's Water in the West program to frame the integrated challenge and opportunity space around the water-energy nexus. Workshop participants – wide-ranging

stakeholders in the water-energy space such as federal/state/tribal/local government agencies, private industry, NGOs, international organizations and foreign governments, academic institutions, utilities, and citizens will then have an opportunity to focus discussion on (a) procedures for identifying and prioritizing common action areas in the context of an integrated approach, (b) differences/similarities in stakeholder approaches, priorities, and mechanisms for action, and (c) a preliminary effort to flesh out the common action areas. The goal is to formulate an integrated and collaborative vision of the respective roles of these players for maximum impact at the regional, national, and global scale.

<u>Organizer:</u> Noel Bakhtian, Energy-Water Nexus Lead at Office of International Affairs, U.S. Department of Energy

<u>Moderator</u>: **Stella Thomas**, Founder and Managing Director, Global Water Fund Discussants:

Newsha Ajami, Director of Urban Water Policy, Water in the West, Stanford University Diana Bauer, Office Director, Energy Systems Analysis and Integration, U.S. Department of Energy

**Nicole Carter,** Specialist in Natural Resources Policy, Congressional Research Service **Anna Delgado Martin**, The World Bank Group

#### W11. The Water-Energy-Climate Nexus: New Strategies (*Potomac 4*)

This session will bring together representatives from the research, government, education and policy communities to illustrate new insights and developing strategies that meet these goals. We will discuss and identify action plans to integrate across sectors of society to focus regional solutions. Presentations and discussions will focus on integrating the following topics: 1) risk reduction and emergency management, 2) water supply, management and infrastructure, 3) energy and fuel, 4) natural ecosystem goods and services and 5) agriculture. Panelists will be presented with discussion topics from workshop participants after convening in breakout groups. A review and action plan will be developed and circulated to workshop participants for the production of a white paper and peer-reviewed journal article for publication. A network of participants will co-develop a working group to facilitate further actions.

#### <u>Moderator/Organizer:</u> Tiffany Troxler, Research Scientist, Florida International

University

<u>Organizer:</u> Evelyn Gaiser, Interim Dean of the School of Environment, Arts and Society, Florida International University Discussants:

**Dan Childers**, Senior Sustainability Scientist, Global Institute of Sustainability at Arizona State University

Maria Donoso, Director, Global Water for Sustainability (GLOWS) program Bruce Mowry, City Engineer, City of Miami

Beach

**Richard Olson**, Director of the Extreme Events Institute, Florida International University **Fred Sklar**, Chief Scientist, Everglades Division, South Florida Water Management District

#### W12. Carbon Pricing, Coalition Building, and International Action towards COP 21 (Arlington)

This workshop is an action-oriented working session focusing on:

- achieving a strong and effective international framework for carbon pricing at COP 21;
- building domestic and international crosssectoral coalitions and dialogue around carbon pricing;
- strategies for engaging and influencing the international negotiation process;
- draft carbon pricing text recommendations for the COP 21 Paris Agreement;

- context and the importance of communicating a compelling case for carbon pricing; and
- carbon pricing across diverse country contexts.

Outcomes will include:

- an expanded international cross-sector coalition to price carbon with key intervention points, and a set of priorities and goals and "working groups";
- clear understanding of effective, humanscale carbon pricing principles with a list of knowledge gaps, sector coverage gaps, and research challenges and a matrix of carbon pricing considerations and mechanisms; and,
- a draft carbon pricing text recommendations for the COP 21 Paris Agreement.

This workshop is designed as a facilitated action-oriented working session. Speakers from S36 will be engaged in the group actions and dialogues as participants and collaborators. *Facilitators:* Joseph Robertson, Global Strategy Director, Citizens' Climate Lobby; John Hansen, Coalition Development Specialist, Citizens' Climate Lobby

# **W13.** Advancing Community Action (*Regency C*)

Participants will discuss and improve upon results-driven community strategies for sustainability action. We will draw upon the findings and recommendations from:

- Symposium 11 on engaging audiences across professional communities and the public in learning about developing necessary responses to climate change;
- Symposium 23 on reaching diverse audiences who are not traditionally part of the conversation through culturally and linguistically relevant weather, climate and environmental information through local media; and
- Symposium 37 on the need to structure a backbone organization that can coordinate

the efforts of the many climate and energy literacy efforts already underway.

Attendees will break into working groups that will discuss and explore how each of us can take the collective knowledge of best practices from the conference home to implement. We will collaboratively develop an action plan to carry out best practices for measurable sustainability progress in communities.

<u>Moderator:</u> Thomas Lee, Program Director, Enterprise Community Partners <u>Discussion Leaders:</u>

**Sara Espinoza**, Managing Director of Research and Best Practices, National Environmental Education Foundation

Tamara Ledley, Senior Scientist, TERC; Frank Niepold, Climate Education Coordinator, NOAA; and Mark McCaffrey, Programs and Policy Director, National Center for Science Education

Jennifer Merrill and Nancy Brickhouse, University of Delaware; Don Boesch and Patricia Harcourt, University of Maryland Center for Environmental Science Miriam Parson, Program Manager for Sustainability Programs, Student Conservation Association

### W14. Higher Education, Energy and

**Climate** (*Conference Theater*) This workshop invites participants to engage in dialogue around how higher education institutions can assess and address their own carbon footprints as well as how they can effectively develop external partnerships to address climate change. Facilitators deeply involved in climate action efforts will guide an interactive discussion open to diverse audiences, including: colleges or universities interested in new approaches to climate action on their own campus and/or with community partners; government agencies interested in strengthening their partnerships with higher education; elected leaders interested in progressive responses to a global problem; not-for-profit organizations

interested in advancing sustainable practices in colleges and universities; and private corporations interested in developing the technologies and expertise to advise and consult with academic institutions – all toward the committed goal of addressing climate change through energy sourcing, use, and management. Organizers: Jennifer Allen, Director of the Institute for Sustainable Solutions, Portland State University; Richard Smardon, Distinguished Service Professor, Department of Environmental Studies, SUNY - College of Environmental Sciences and Forestry; and James Eflin, Chair of the Department of Natural Resources and Environmental Management, Ball State University

#### Facilitators:

Jennifer Allen, Portland State University Meghan Chapple, Director of Sustainability and Senior Advisor on Sustainability Initiatives, George Washington University Jackie Dingfelder, Policy Director for Mayor Charlie Hales, City of Portland James Eflin, Ball State University Richard Smardon, Distinguished Service Professor, Department of Environmental Studies, SUNY College of Environmental Sciences and Forestry

#### W15. Climate Knowledge and Innovation Community Workshop (*Potomac 1*)

In this interactive workshop, participants embark on a short-course developed by the Climate Knowledge Innovation Community (KIC) called "The Journey," which brings together graduatelevel learners and experts who are immersed in an array of innovative initiatives relating to climate and energy, to share insights and experiences and learn-by-doing, developing a business or implementation plan that is then presented to the cohort group. "The Journey" will include a short simulation of the course guided by experts and cross-pollinated with other workshop participants, with a group or individual plan for implementing climate innovation into organizations being a primary outcome of the workshop.

<u>Moderators:</u> Ebrahim Mohamed, Director of Education, Climate-KIC and Mark McCaffrey, Programs and Policy Director, National Center for Science Education

#### Discussants:

**Jordi Curell**, Director, Directorate General of Education and Culture, European Commission (via Skype)

**Peter Oleson**, Chairman, European Institute of Innovation and Technology (via Skype) **Mary Ritter**, OBE, Former CEO and Advisor, Climate-KIC (via Skype)

### W16. Campuses as Living Laboratories

#### (Lincoln)

As colleges and universities struggle with the challenges of rising utility costs, student retention and placement rates, and reduced operating budgets, strategies which hold promise in positively impacting all three areas are actively sought out. This session will explore how leveraging campus facilities for education reduces utility expenditures, increases student retention rates through engagement, and encourages the attainment of 21st century workforce skills. Attendees will learn the common elements of successful living laboratory implementation and then apply these in developing a plan for their own campuses.

<u>Organizer and Moderator:</u> Brian Lovell, Co-Founder, The Association of Controls Professionals and Co-Principal Investigator, National Science Foundation BEST Center

#### W17. Earth Observations Informing Energy Management Decision Making: Connecting Data Providers to Stakeholders (*Fairfax*)

This workshop seeks to enhance the dialog between Earth science data producers who develop value added products and those who create the decision support systems that use these measurements for renewable and other energy applications. There is a need to understand the requirements of those who make the policy and management decisions that enable the development of new energy production facilities as well as to understand their impacts in a changing climate. Desired outcomes from this session include: (1) improved understanding of the Earth observation needs of energy decision makers and stakeholders; (2) guidance to the Earth Science Information Partners (ESIP) Energy & Climate Working Group for its input to the 2<sup>nd</sup> USGEO Earth Observation Assessment; and (3) guidance to data providers on how to increase the utility of their measurements and ways to improve the production of value-added products. Organizers and Moderators: Richard Eckman, Program Manager, Earth Science Division, NASA Headquarters and Ana Pinheiro Privette, Founder and Principal, Climate Data Solutions, LLC Discussants: Marc Imhoff, Deputy Director, Joint Global Change Research Institute, University of

Maryland Greg Leng, Director, *RETScreen Clean Energy Project Analysis*, Natural Resources Canada Scott Sklar, President, The Stella Group Paul Stackhouse, Senior Researcher, NASA Langley Research Center Erica Zell, Senior Research Scientist, Battelle

### W18. World Energy: Creating Pathways to a Low-Carbon World with Computer **Simulation-Based Role-Playing Games**

(Roosevelt)

What would you do if you could design and implement a set of policies to create a lowcarbon global economy? This is your chance to find out! Join us for an interactive session of the World Energy game, where you will take on the role of leaders from key economic and energy sectors and negotiate a climate and energy deal. The exercise is framed by rigorous analysis through the interactive, state-of-the-art climate and energy policy decision support simulation, EnROADS. No prior experience is necessary but come ready to make decisions that will affect generations to come.

Organizers and Moderators: Juliette Nicole Rooney-Varga, Associate Professor of Environmental Biology and Director of the Climate Change Initiative, University of Massachusetts, Lowell and Ellie Johnston, Program Associate, Climate Interactive

#### W19. Integrated Science: Economy, **Energy and Environment** (*Tidewater 2*)

This session will focus on the nexus of issues that drive energy production, delivery, and use with environmental progress, the economy of a nation, region, or state. The session will address technology impacts, trends, and barriers to change; the moral imperative for change and the implications; and the challenge of balancing and optimizing these competing factors to find winwin solutions where reliable energy and healthy global commerce is achieved with minimal environmental impact. This effort leads to elimination of silo'ed approaches and brings the focus the interdisciplinary interfaces. The workshop will lead to a white paper encouraging federal agencies to consider cofunding cross-cutting initiatives. Moderators: Alan Mantooth, Distinguished Professor, Executive Director, National Center

for Reliable Power Transmission, Department of Electrical Engineering, University of Arkansas and Stephen Boss, Director of Environmental Dynamics Program and Sustainability Academic Programs, University of Arkansas Discussants:

Jay Caspary, Director of Research, Development, and Special Studies, The Southwest Power Pool (SPP) Gerald Geernaert, Director of the Climate and Environmental Sciences Division, Office of Science, U.S. Department of Energy Jon Johnson, Executive Director, Applied Sustainability Center, University of Arkansas JoAnn Lighty, Director of the Division of Chemical, Bioengineering, Environmental, and Transport Systems, National Science Foundation

#### W20. Decisions Need Information, Information Needs Data, and Data Need a System: Putting it Together (*Tidewater 1*)

This workshop will begin a critical dialogue on how reporting and data systems can be major drivers of positive change and opportunity for decision-makers and those at the leading edge of institutions managing climate and energy planning and implementation. This session will be an early-stage brainstorm and creative opportunity to contribute ideas around the potential solutions and partnerships needed to create a more integrated approach that could facilitate regular reporting, provide data stewardship and flexible interfaces and tools, and present scalable research and learning opportunities. In addition to our invited leaders, we encourage a broad diversity of attendees and expect that solutions will require public, private, and non-profit participation.

<u>Moderator</u> Anne Waple, Director of Resilience Initiatives, Second Nature

Discussants:

Michael Gillenwater, Executive Director, Greenhouse Gas Management Institute Maureen Hart, Executive Director, International Society of Sustainability Professionals Shirley Vincent, Director, Center for

Environmental Education Research, National Council for Science and the Environment

**Meghan Fay Zahniser**, Executive Director, Association for the Advancement of Sustainability in Higher Education (AASHE)

#### S40. Nuclear Energy: Technologies for 2025 and 2050 and Advancing Nuclear Energy Options (*Prince William*)

This symposium will explore nuclear energy technologies that may come online over the coming decades that have significant potential to decarbonize the world's energy supplies at a large scale. Following a 90 minute symposium, the session will evolve into a workshop discussion on how to advance to options which nuclear energy technologies can provide energy decision-makers.

<u>Moderator:</u> Alex Cannara, Cannara Consulting and Thorium Energy Alliance of Silicon Valley <u>Discussants:</u>

Rod Adams, Publisher, Atomic Insights Stephen Boyd, CEO, Havelide Systems, Inc. Alice Caponiti, Director for Space and Defense Power Systems, U.S. Department of Energy Darryl Siemer, formerly Consulting Scientist with Idaho National Labs

**John Steinbruner**, Professor of Public Policy and Director of the Center for International Security Studies, University of Maryland

# Energy and Climate Change Exhibition

Tuesday Hours – 9:00 a.m. to 5:00 p.m. Wednesday Hours – 8:00 a.m. to 8:30 p.m. Thursday Hours – 8:00 a.m. to 2:00 p.m.

- 1 Union of Concerned Scientists
- 2 U.S. Department of Agriculture
- 3 American Meteorological Society
- 4 U.S. Environmental Protection Agency
- 5 National Council for Science and the Environment
- 6 U.S. Geological Survey
- 7 U.S. Forest Service

- 8 United Nations Environment Programme
- 9 Johns Hopkins University
- 10 Environmental Law Institute
- 11 Diesel Technology Forum
- 12 NASA Hyperwall
- 13 WebsEdge



### Poster Session

Note: Posters will be up for the duration of the conference from Tuesday through Thursday in the Regency Ballroom Foyer and in the Regency Ballroom (please see map on previous page).

#### 1. A global collaborative approach to clean energy technology development: the U.S.-China Advanced Coal Technology Consortium Sarah Forbes, David Sonnefeld, Xiaoliang Yang SUNY College of Environmental Science and Forestry, World Resources Institute

2. A science-faith partnership to provide education and facilitate action on climate change and energy use

Jason Cervenec, Craig Foster, Greg Hitzhusen, Sara Ward, The Ohio State University, Foster Energy Management Co, Ohio Interfaith Power and Light, Byrd Polar Research Center

- 3. **Examining energy production and use in our changing climate** James A. Brey, Ira W. Geer, Chad M. Kauffman, Kira A. Nugnes *American Meteorological Society, California University of Pennsylvania*
- 4. Ethanol-based gelfuel production from biomass for household cooking fuel Biniam Taddele Maru, Tesfaldet Gebreegziabher, Francesc Medina, NurelegneTefera, *Universitat Rovira I Virgili, Catalonia*
- 5. Service and sustainbility learning: Inter-instituional civic engagement in a shared watershedmarine ecosystem

Francisco Acoba, Robert Franco, Ulla Hasager, Krista Hiser, Wendy Kuntz, Tanya Renner Kapi'olani Community College, University of Hawai'i at Manoa

- 6. **Combining technological and behavioral policy innovations to reduce GHG emissions** Max Kummerow, *Curtin University*
- 7. Less energy and more efficient design with a pro-social framework Adrienne Schwarte, *Maryville College*
- 8. Blending three different models for interdisciplinary sustainability: Local partnerships, servicelearning, and faculty workshops Mark O'Gorman, Adrienne Schwarte, *Maryville College*
- Ocean renewable power company: Lessons from the first commercial, grid-connected tidal system in the U.S. Mark Gallo, Vesela Veleva, University of Massachusetts – Boston
- 10. Achieving sustainable landscapes by integrating bioenergy crops into agricultural systems M. Cristina Negri, Herbert Ssegane, *Argonne National Laboratory*
- 11. Mitigating impact of climate change on water quality by landscape design with best management and practices (BMPs) in biofuel production: A Midwest case study Mi-Ae Ha, May Wu, *Argonne National Laboratory*

- 12. WATER (Water Assessment Tool for Energy Resources) Yiwen Chiu, Miae Ha, May Wu, Sashi Yalamanchili, *Argonne National Laboratory*
- 13. Limiting short-lived climate pollutants in curbing climate change: An atmospheric chemistry synopsis

Song Gao, Nova Southeastern University

- Long-range transport and in-situ transformation of atmospheric aerosols: Tales from African dust and Shanghai smog Song Gao, Nova Southeastern University
- 15. **On-line initiatives to galvanize climate mitigation in the Great Lakes Region** Steven Ackerman, Margaret Mooney, *University of Wisconsin, Madison*
- CO<sub>2</sub> heat pump for simultaneous heating and cooling applications Supriya Dharkar, Eckhard Groll, Orkan Kurtulus, Kazuaki Yazawa, *Purdue University*
- 17. Commercialization of next generation nuclear reactor for long term energy sustainability Guanheng Zhang, *University of California, Berkeley*
- Design of photovoltaic systems for supplying electricity to natural mine water treatment facilities Jinyoung Song, *Pukyong National University*
- 19. Influence of climate change beliefs on support for an offshore wind farm David Bidwell, *University of Rhode Island*
- 20. Separate contributions of land use activities and fossil fuel burning to global climate forcing: A country-level analysis Daniel S. Ward, Natalie M. Mahowald, *Cornell University*
- 21. Energy planning, a tool for a sustainable campus Lionel R. Orama, Uroyoan R. Walker, *University of Puerto Rico*
- 22. Say goodbye to green: Taking climate change communications from margin to mainstream Richard Alley, Kelly Harris, Michael Mann, Alex Novak, Denice Wardrop, *The Pennsylvania State University*
- 23. A model to predict electric grid stress events under climate change Lisa Bramer, James Dirks, John Hathaway, Michael Kintner-Meyer, Ian Kraucunas, Ruby Leung, Ying Liu, Jennie Rice, Trenton Pulsipher, Daniel Skorski, *Pacific Northwest National Laboratory*
- 24. Numerical simulations of wind turbine power plants Charles Meneveau, Claire VerHulst, *Johns Hopkins University*
- 25. Climate education solutions for the U.S. corn belt Marci Bird, Deana Hudgins, Kristi Lekies, Wade Miller, Richard Moore, Nsalambi Nkongolo, Morgan Schafbuch, Dennis Todey *The Ohio State University, Iowa State University, Lincoln University, South Dakota State University*

- 26. Getting from here to a sustainable world Why resource sufficiency evaluation is critical Ed Barry, *Sustainable World Initiative*
- 27. A sustainable solution to global warming: The North American Renewable and Neutral Energy Alliance (NARNEA) Karl Edinger, Molly Fisher, José A. Rial, *University of North Carolina Chapel Hill*
- 28. Opportunities for sustainable energy management and generation at water & wastewater utilities

Barry Liner, Water Environment Federation

29. The adoption of anaerobic digestion of source separated organics as a revenue stream in large municipalities

Nickolas Alles, Stewart Gibson, Diana MacDonald, Katherine Rosa, Brittany Shrubb, *Fleming College* 

- 30. **Biomimicry: What nature can teach us about energy reduction** Allyssa Davies, Brad Mahony, Connor Overbaugh, Olivia Prinzen, Anne-Lise Watson, *Fleming College*
- 31. The Cuban energy revolution: Policy implications for conservation and accessibility in marginalized communities Allan Fretz, Jennifer Greene, Jeffery McFarlane, and Daphne Paszterko, *Fleming College*
- 32. **Turning problems into solutions: Using hydrothermal liquefaction of microalgae to produce biofuel from harmful algal blooms** Joseph Broughton, Cody Hildebrant, Liam Prichard, Jonathan Shaddock, *Fleming College*
- 33. High-density urban rainwater harvesting for non-potable uses in high-rise building operational systems

Jason Ryan Solnik, Davis Spencer, Reuben Van Zeumeren, Fleming College

- 34. Eat the heat: Using waste heat to produce food in urban environments Kaitlyn Finnegan, Laura Gerencser, Elizabeth Moore, Molly Teather, Catherine Wisniowski, *Fleming College*
- 35. Quantifying the greenhouse gas benefits of agriculture and forestry management practices Marlen Eve, Coeli Hoover, Stephen Ogle, Diana Pape, Wendy Powers *Colorado State University, ICF International, Michigan State University, U.S. Department of Agriculture*
- 36. Biogas utilization: A regional snapshot in understanding factors that affect water resource recovery facilities – highlighting WEF Phase II biogas data collection results Dan Basoli, Eloise Castillo, Barry Liner, Lisa McFadden, Shannon Ragland, Patrick Serfass *Abt. Associates Inc., American Biogas Council, Water Environment Federation*
- 37. Biogeomorphodynamics of coastal ecosystems under conditions of climate change and nutrient enrichment

Cristina Da Lio, Massimiliano Ignaccolo, Marco Marani, Michaela Margida Corecomplete LLC, Duke University, Instituto di Scienze Marine, University of Toledo

#### 38. Tidal power: Harnessing clean, consistent currents

Isaac Burns, Keith Burns, Kyle Corbin, Jessica Ezzie, David Krane, Ryan Oaks, Logan Rickle *Building Ohio's Sustainable Energy Future* 

- 39. A data assimilation approach to differentiate and optimize biogenic and anthropogenic CO<sub>2</sub> sources in North and East China from 2005 to 2009 Zhang Bin, Archana Dayalu, J. William Munger, Thomas Nehrkorn, Chris Nielsen, Yuxuan Wang, Steven C. Wofsy Atmospheric and Environmental Research Inc., Harvard University, Tsinghua University
- 40. Lake Erie phosphorous reduction, One CAFO at a time Austin Bartos, Stephanie Clendenen, Sarah Jindra, Lauren Marshall, Joseph McVeen, Madeline Tomczak, Alex Williams, *University of Toledo*
- 41. Climate communication insights from a sea level rise adaptation planning project in Beaufort County, South Carolina

Sean Bath, College of Charleston

- 42. Splitting water by cheap materials, An effective solution to power future Yunfei Xu, *Harvard University*
- 43. Applying the learning community model to teach energy management and sustainability to graduate students Randall S. Bohlman, Soizik Laguette, Haochi Zheng, University of North Dakota
- 44. Environmental education in primary school Meri Mullins, *University of Toledo*
- 45. The Geospatial Research Laboratory's basic and applied research on linking water/climate/human security with national security Swathi Veeravalli, U.S. Army Corps of Engineers
- 46. **Mid-infrared dual frequency comb spectrometer for the detection of methane in ambient air** Mahmood Amani, Ruqayyah Asker, Aysenur Bicer, James Bounds, Vassilios Kelessides, Alexandre A. Kolomenskii, Hans Schuessler, Feng Zhu, *Texas A&M University*
- 47. Yield performance of two locally adapted and two introductions of common cowpea in response to amended in-row spaces and planting dates Mohamed M. A. Abdallah, Mohamed F. Mohamed, Ayman M. A. Rashwan, Assiut University
- 48. A farm-level assessment of the potential for managing crop production systems, livestock production systems, and agricultural land for greenhouse gas mitigation within the United States

Jan Lewandrowski, Derina Man, Diana Pape, Marybeth Riley-Gilbert *ICF International, U.S. Department of Agriculture* 

49. Creating experiential learning opportunities within a large general education class for non-STEM college students to explore the science of energy/environmental sustainability Joy Ferenbaugh, Paul Goodall, *James Madison University* 

# **Collaborating Organizations**

NCSE extends a special thank-you to the following collaborating organizations for their generous participation in the conference program and assistance in spreading the word about our conference.

American Energy Society American Geophysical Union Association for Environmental Studies and Sciences Association for the Advancement of Sustainability in Higher Education CAFÉ Foundation Citizens' Climate Lobby Second Nature Security and Sustainability Forum The Global Environmental Facility World Alliance for Decentralized Energy

The National Council for Science and the Environment welcomes the participation of these satellite locations:







Colleges of the Fenway, University of Rochester, Western Washington University, University of Wisconsin-Madison, The University of Vermont, Frostburg State University, Ball State University, El Centro Community College, George Mason University, Penn State Institutes of Energy & the Environment, Northern Arizona University, Indiana University, Indiana University, Indiana University, Indiana University Indianapolis

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NCSE thanks our volunteers, session organizers and chairs, note-takers, reporters, assistants, and discussants for their generous support.

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### **Council of Environmental Deans and Directors**

What is	
CEDD	

The Council of Environmental Deans and Directors (CEDD) is a leadership organization of environmental program heads who come together to improve and advance the quality, stature and effectiveness of interdisciplinary environmental and sustainability research, education and scholarship on the nation's campuses. CEDD is facilitated by the National Council for Science and the Environment (NCSE) as a part of its University Affiliate Program.

- What CEDD Does
- <u>Exclusive</u> CEDD Values NCSE's Services and Benefits

- Supports improved management of academic programs
- Promotes leadership development
- Facilitates collaborative program opportunities
- Initiates special projects
- Builds partnerships to educate future environmental professionals and leaders
- ✓ Biannual CEDD meetings and program conferences
- ✓ Access to NCSE's Center for Environmental Education Research (CEER) reports
- ✓ Leadership development workshops
- ✓ Access to information on federal funding on environmental research and education. Federal Funding Handbook for Environmental R&D.
- ✓ Complimentary registrations to NCSE's National Conference and Global Forum
- ✓ Subscription to Daily Environmental News Digest, grants, careers, internships, and events
- ✓ 2-year and 4-year collaborations for faculty and student success

### Join CEDD

Contact **Shelley Kossak** (Director of University Relations, NCSE) at shelley@ncseonline.org or (202) 207-0009.

"As the institutional representative to CEDD for the past six years, I have made dozens of valuable contacts with peers around the country. From these conversations, and from the resources developed by CEDD staff, I have learned a tremendous amount about overcoming challenges to developing and implementing strong environmental and sustainability programs and in improving sustainability leadership across my campus. It is the most useful professional organization I have ever joined." – Roderic Parnell Jr., CEDD President-Elect, Professor of Earth Sciences and Environmental Sustainability, Northern Arizona University.

### **NCSE University Affiliate Members**

Univ. of Alabama

Univ. of Arizona

Univ. of Arkansas, Fayetteville

Univ. of California, Los Angeles

Univ. of California, Berkeley

Univ. of California, Davis

Univ. of California, Irvine

Univ. of California, Merced

Univ. of Central Florida

Univ. of Connecticut

Univ. of Dayton

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Univ. of Georgia

Univ. of La Verne

Univ. of Idaho

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Univ. of Maryland - College Park

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Univ. of Minnesota, Twin Peaks

Univ. of Montana, Missoula

Univ. of Nebraska – Lincoln

Univ. of Nevada, Reno

Univ. of North Florida

Univ. of North Texas

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Vermont Law College

Wake Forest University

Warren Wilson College

Wayne State University

Williams College

Yale University

Winthrop University

West Virginia University

Worcester Polytechnic Institute

Villanova University

Vassar College

**Environmental Science** 

Univ. of California, Riverside

Univ. of California, San Diego

Univ. of the District of Columbia

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- Alabama A&M University
- Alabama State University
- Allegheny College
- American University
- Antioch University New England
- Arizona State University
- Arkansas State University
- Ball State University
- Bard College
- Bellarmine University
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- Champlain College
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- George Mason University
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- Georgia State University
- Goshen College
- Guilford College
- Haverford College
- Heritage University

- Houston Advanced Research Center
- Howard University
- Indiana University at Bloomington
- Jackson State University
- Johns Hopkins University
- Kentucky State University
- Lehigh University
- Lewis and Clark College
- Lewis University
- Louisiana State University
- Loyola Marymount University
- Macalester College
- Manhattan College
- Maryville College
- Michigan State University
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- Monmouth University
- Moravian College
- Morgan State University
- Mount Holyoke College
- New College of Florida
- North Carolina A&T State University
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- Northern Arizona University
- Northern Illinois University
- Oberlin College
- Ohio State University, The
- Old Dominion University
- Oregon State University
- Pace University
- Pennsylvania State University
- Pomona College
- Portland State University
- Purdue University
- Robert Morris University
- Rutgers The State University of New Jersey
- Salisbury University
- Salish Kootenai College
- Sewanee, The University of the South
- Siena College
- Smith College

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 Southern New Hampshire University

Swarthmore College

Texas A&M University

Texas Tech University

Towson University

Tufts University

Unity College

- Stetson University
- Suffolk University
- SUNY-College of Environmental Science and Forestry





### **Community College Affiliate Program**

What is CCAP

What

CCAP Does The **Community College Affiliate Program (CCAP)** works to enhance environmental and sustainability programs at member schools and in their respective communities. CCAP strives to provide students with the knowledge and skills to understand today's environmental challenges, and prepare students at member schools to implement solutions to create resilient communities. CCAP is facilitated by the National Council for Science and the Environment (NCSE).

- Advances the quality of interdisciplinary sustainability education and workforce training and development
- Collaboration with other community colleges, 4-year institutions and federal agencies
- participation of administrators, faculty, staff and students in environmental and sustainability efforts on campus and in the surrounding community
- Student engagement, leadership and research in sustainability efforts
- Exclusive CCAP Values NCSE's Services and Benefits

Join

CCAP

- ✓ Biannual CCAP meetings and program conferences
- ✓ Access to NCSE's Center for Environmental Education Research (CEER) reports
- $\checkmark$  2-year and 4-year collaborations for faculty and student success
- ✓ Access to information on federal funding on environmental education and research. Federal Funding Handbook on Environmental R&D.
- ✓ Complimentary registrations to NCSE's National Conference and Global Forum
- ✓ Subscription to Daily Environmental News Digest, grants, careers, internships, and events

Contact **Shelley Kossak** (Director of University Relations, NCSE) at <u>shelley@ncseonline.org</u> or (202) 207-0009.

"NCSE's CCAP is a remarkable organization that allows two year institutions to participate in the environmental health and sustainable efforts of community, local citizens, students, faculty and staff. CCAP organization has inspired our students to Adopt as Species- the Mexican wolf, promoted campus recycling, conversation, education, and habitat preservation; our efforts under the CCAP banner have also resulted in an award of appreciation from the local community recycling council. Following the CCAP banner has raised awareness of all kinds of initiatives and programs in environment and sustainability nation- wide, and is an invaluable resource for our future efforts and basis of regional partnerships in environment and sustainability. Join CCAP and become a leader in global sustainability in your part of the planet!!!" – Christopher Dyer, CCAP President, Executive Director, University of New Mexico-Gallup.

"As an active member of CCAP, I have been given the opportunity to leverage my peers and resources at the national level to strengthen my environmental and sustainability programs close to home." – Allessandra Cairo, CCAP Secretary/Treasurer, Sustainability Coordinator, Prairie State College.

### **NCSE Community College Affiliates**

- Baton Rouge Community College (Baton Rouge, LA)
- Bay de Noc Community College (Escanaba, MI)
- Bristol Community College (Fall River, MA)
- Cascadia Community College (Bothell, WA)
- Cedar Valley College DCCCD (Lancaster, TX)
- El Centro College DCCCD (Dallas, TX)
- Foothill De Anza CCD (Los Altos Hills, CA)
- Gateway Community College (Phoenix, AZ)
- Georgia Piedmont Technical College (Atlanta, GA)
- Hawkeye Community College (Waterloo, IA)
- Hillsborough Community College (Tampa, FL)
- Indian River State College (Fort Pierce, FL)
- Ivy Tech Community College (Lafayette, IN)
- Johnson County Community College (Kansas City, KS) Valencia College (Orlando, FL)

- Kankakee Community College (Kankakee, IL)
- Kapi'olani Community College (Honolulu, HI)
- Moraine Valley Community College (Palos Hills, IL)
- Northern Virginia Community College (Springfield, VA)
- Northeast College Houston CCCD (Houston, TX)
- Prairie State College (Chicago Heights, IL)
- Saddleback Community College (Mission Viejo, CA)
- Seminole State College (Sanford, FL)
- South Mountain Community College MCCCD (Phoenix, AZ)
- St. Philip's College (San Antonio, TX)
- The University of New Mexico Gallup (Gallup, NM)
- Triton College (River Grove, IL)



# **EnvironMentors**

Since 1992, EnvironMentors has prepared high school students for degrees and careers in environmentally-related fields. At 13 chapters across the country, students conduct experimental research projects under the guidance of a mentor. Each spring, top EnvironMentors high school students travel to Washington, DC to compete for college scholarships in the National Fair. To learn more: www.environmentors.org.

	2015 EnvironMentors National Awards Ceremony
Toin Hal	Monday, June 1, 2015
Join Us:	5:00 – 7:00 pm
	USDA Whitten Building, Washington, DC





### **Council of Energy Research and Education Leaders**

What is CEREL

The Council of Energy Research and Education Leaders (CEREL) is a multidisciplinary organization of leaders of university-based energy centers and programs working together to advance the role of higher education in the energy field. The National Council for Science and the Environment (NCSE) serves as the Secretariat.

- Strengthens the links among energy sciences and engineering in academia, government, and industry
- Advances university-based energy education and research
- Promotes the role of energy research and education in society
- Advocates funding for university-based energy research; advancing and elevating the national dialogue about energy
- Shares approaches and best-practices to prepare the future workforce
- Brings together research and education from all fields of energy
- Builds partnerships to educate future environmental professionals and leaders
- Exclusive CEREL Values NCSE's Services and Benefits
- ✓ National Energy Education Summit
- ✓ Academic-Federal-Foundation Dialogue
- ✓ Access to information on federal funding on environmental research and education. Federal Funding Handbook for Environmental R&D.
- ✓ Complimentary registration to NCSE's National Conference and Global Forum
- ✓ Subscription to Daily Environmental News Digest, grants, careers, internships, and events
- ✓ 2-year and 4-year collaborations for faculty and student success

Join CEREL

Contact **Gwen Perrin** (CEREL Program Coordinator, NCSE) at gperrin@ncseonline.org or (202) 207-0006.

What CEREL Does



# NCSE Affiliates Events 2015: Save the Dates

April 13-14, 2015 Academic-Federal-Foundation Dialogue

Environment and Energy Education and Research In Collaboration with GW Sustainability Collaborative

Milken Institute School of Public Health The George Washington University Washington, DC

## April 15, 2015

### **Congressional Visit Day**

United States Congress Washington, DC



## June 22 - 24, 2015

### **Summer Program Conferences**

Council of Environmental Deans and Directors Community College Affiliate Program

Hosted By Scripps Institution of Oceanography University of California, San Diego San Diego, CA



### June 24-27, 2015

Association for Environmental Studies and Sciences\*

### **AESS 2015 Conference**

University of California, San Diego San Diego, CA www.aess.info

\*AESS is an independent 501 (c) (3) Organization







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