Enabling DOE Regional Energy-Water Demonstrations

Briefing Book
Meeting #2 - Atlanta, GA
March 3 & 4, 2025

NATIONAL ACADEMIES Sciences Engineering Medicine

BRIEFING BOOK
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Enabling DOE Energy-Water Demonstrations Meeting #2

March 3-4, 2025

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Meeting Information

Enabling DOE Regional Energy-Water Demonstrations

Southeastern Information-Gathering Meeting

Meeting goals: Learn from stakeholders about regional energy-water issues in the southeast, begin identifying how demonstrations could provide solutions for these problems.

MARCH 3

Meeting Location: Auditorium at Georgia Power Environmental Lab 2480 Maner Rd SE, Atlanta GA 30339

11:00 am **Welcome and orientation**

- Welcome and introductions
- Discussion about criteria for prioritization — Chair

11:45 am **Overview presentation**

Katherine Zitsch, Georgia Water Planning and Policy Center

12:15 pm **Lunch and continued discussion**

Lunch provided by NASEM for registered attendees and speakers

1:15 pm **Session 1: Emerging water management issues at the intersection of energy, agriculture, and municipal water supply (15 min + panel discussion)**

Jordan Kern, moderator

- Anna Truszczynski, Georgia Environmental Protection Division
- Bob Sherrier, Southern Environmental Law Center
- Lee Ellenburg, Alabama Associate State Climatologist
- Peter Kwiatkowski, South Florida Water Management District

3:00 pm **Break**

3:15 pm **Session 2: Emerging Water Issues for an evolving energy mix (15 min + panel discussion)**

Curt Jawdy, moderator

- Rebecca Osteen, Southern Company
- Marta Hatzell, Georgia Tech

- Tricia Pridemore, Georgia Public Service Commission
- Justin Baker, North Carolina State University

5:00 pm **Adjourn**

MARCH 4
Location: 2480 Maner Rd SE, Atlanta GA 30339

9:00 am **Welcome** Chair

9:10 am **Session 3: Energy and water requirements for industrial growth (15 min + panel discussion)**
Kirk Ellison, moderator
- Jon Philipsborn, Atlanta Regional Commission
- Charles Werth, ARPA-E

10:10 am **Break**

10:30 am **Prioritization Exercise**

12:00 pm **Lunch and continued discussion**
Lunch provided by NASEM for registered attendees and speakers

1:00 pm **Adjourn**

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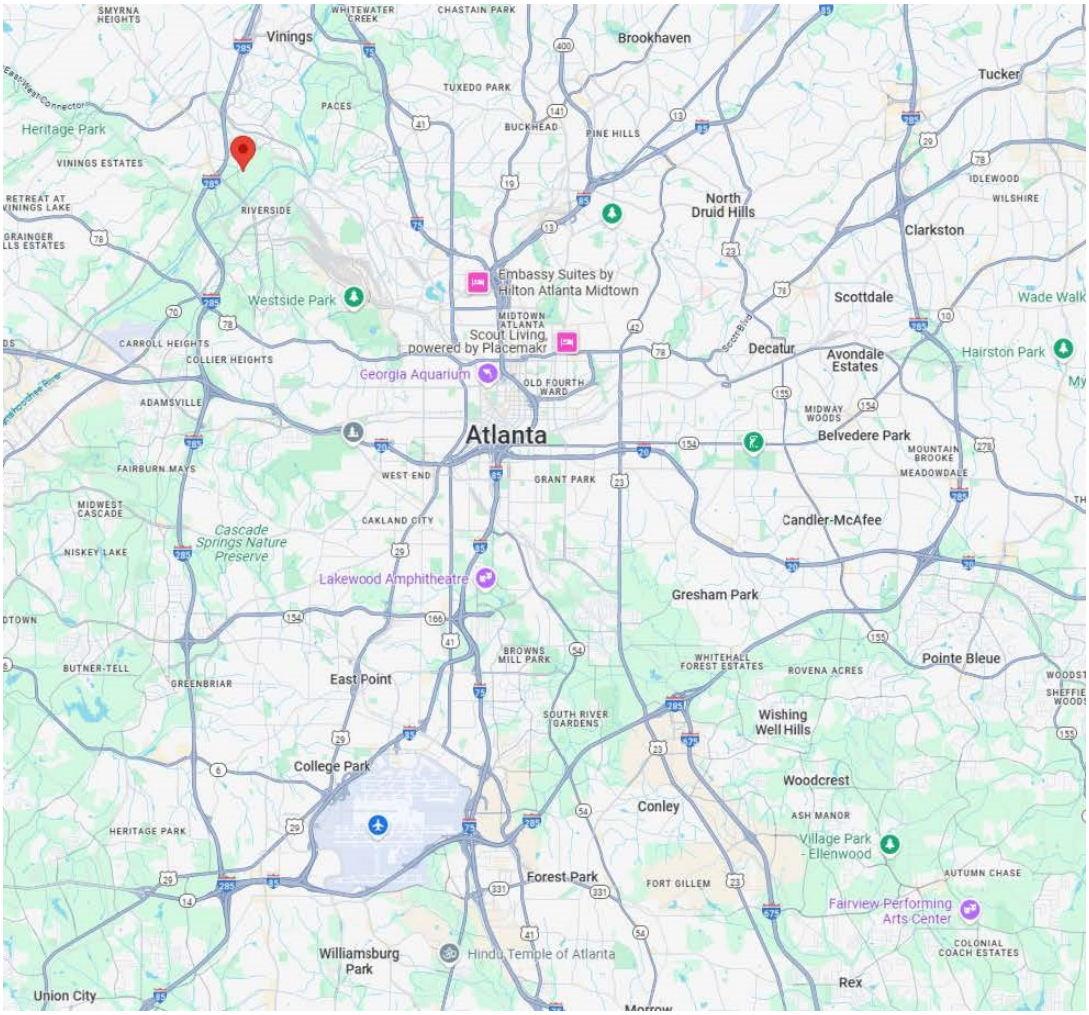
Meeting Location

Meeting Location: Auditorium, Georgia Power Environmental Laboratory 2480 Maner Rd SE, Atlanta, GA 30339



NATIONAL ACADEMIES Sciences Engineering Medicine

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- Reporting the incident to an employee involved in the activity in which the member or volunteer is participating, who will then file a complaint with the Office of Human Resources.

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Updated December 2, 2021

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Background Information

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Enabling DOE Regional Energy-Water Demonstrations

Statement of Task

An expert committee selected by the National Academies of Sciences, Engineering, and Medicine will outline possible visions and programmatic elements that could bolster the design and success of DOE's regional energy-water demonstrations. The expert committee will deliberate and provide conclusions and recommendations related to the following questions defining the scope of these demonstrations:

- What should be the criteria for selection of regional demonstrations, including such factors as: geographic area of the region; main characteristics of the industrial, residential/commercial, and agricultural issues within the region; the relative complexity of those issues; the level of stakeholder and community interests in energy-water issues in the region; and the potential to contribute to the development and deployment of solutions?
- How can existing and complementary activities, resources, and capabilities at other national entities be leveraged to inform and support demonstration of regional energy-water solutions?
- How can regional energy-water demonstrations best engage with diverse stakeholders to develop and deploy integrated solutions for energy-water management and climate resilience?
- What are the near- and long-term impacts of regional energy-water demonstrations? How should these initiatives be evaluated? What metrics should be used?

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https://www.nationalacademies.org/our-work/enabling-doe-regional-energy-water-demonstrations

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Committee Information

Enabling DOE Regional Energy-Water Demonstrations

Committee biographies

Katherine Jacobs (Chair) is a Professor of Environmental Science at the University of Arizona and Director of the Center for Climate Adaptation Science and Solutions (CCASS) within the Arizona Institute for Resilience (AIR). CCASS builds capacity on campus and off to accelerate adaptation and on-the-ground solutions to climate issues. She was the executive director of the Arizona Water Institute from 2006 to 2009 and from 2009 to 2013, Jacobs worked in the Office of Science and Technology Policy in the White House. She was director of the Third National Climate Assessment, and the lead advisor on water science, water policy, and climate adaptation. Prior to that, she worked 23 years for the Arizona Department of Water Resources (ADWR), including 15 as the appointed director of the Tucson Active Management Area (AMA). At ADWR she led the establishment of groundwater rights in the Tucson AMA and the statewide Assured Water Supply Rules, developed conservation requirements for all sectors, and contributed to aquifer recharge and statewide planning efforts. She serves as an elected board member of the University Corporation for Atmospheric Research. Jacobs received a B.A. in biology from Middlebury College and an M.L.A. in landscape planning from the University of California, Berkeley. She has served on nine National Academy panels and boards, including the Board on Environmental Change and Society.

Clifford Chan was appointed as the General Manager for the East Bay Municipal Utility District in 2020. He has been with the District for 27 years and most recently served as the Director of Operations and Maintenance for the District and previously served as the Manager of Maintenance and Construction and the Manager of Water Treatment and Distribution. Chan has expertise on climate change and the water/energy nexus and has worked with a number of partners, including the American Water Works Association the Water Research Foundation and the Department of Energy's Hyperion and FACETS projects. He also supported the development of the Environmental Protection Agency's Climate Resilience Evaluation and Awareness Tool. Chan is a member of the American Water Works Association, and serves on the Board of the Bay Area Council, California Urban Water Agencies, Water Research Foundation, and WateReuse California and previously served on committees for the American Water Works Association and the Association of Metropolitan Water Agencies. He was also inducted to the Academy of Distinguished Alumni at the University of California, Berkeley for the Department of Civil and Environmental Engineering. Chan received a B.S. in civil engineering and an M.S. in geotechnical engineering from the University of California, Berkeley and is a registered Professional Engineer in the state of California.

Heather Cooley is the Director of Research at Pacific Institute. In this role, she conducts and oversees research on an array of water issues, such as sustainable water use and management, the water-energy nexus, and the impacts of climate change on water resources. Prior to joining the Pacific Institute, she worked at Lawrence Berkeley National Laboratory studying carbon cycling and the interconnections between climate and land-use change. She has served on the California Commercial, Industrial, and Institutional Task Force and the California Urban Water

Conservation Council's Board of Directors. She received the U.S. Environmental Protection Agency's Outstanding Achievement Award. Cooley received a B.S. in molecular environmental biology and an M.S. in energy and resources from the University of California, Berkeley.

Kirk Ellison is the research area manager for the Electric Power Research Institute's (EPRI's) water and land management research programs. EPRI is a nonprofit research institute, formed for the benefit of the public with the mission of advancing safe, reliable, affordable, and clean energy for society through global collaboration, science and technology innovation, and applied research. Ellison has fifteen years of experience in the power industry and his experiences in water research include understanding the water and environmental impacts of the energy transformation and developing technologies and solutions to enable it. He is the lead organizer for the Water Energy Transformation (WET) Forum which is a public forum that brings together stakeholders to continue to drive thought leadership on water and environmental issues arising from the Energy Transformation. Additionally he has deep experience with environmental applications such as wastewater volume reduction technologies, taking a holistic view of brine management from the wastewater source through to valorization and disposal. Ellison received a B.S. and M.S. in environmental engineering from Clemson University.

Emily Grubert is an Associate Professor of Sustainable Energy Policy and Civil and Environmental Engineering and Earth Sciences at the University of Notre Dame. She previously served as Deputy Assistant Secretary for Carbon Management (July 2021-May 2022) and Senior Advisor for Energy Asset Transformation (December 2022-May 2023) at the U.S. Department of Energy. Her research focuses on justice-oriented deep decarbonization and decision support tools related to large infrastructure systems, with emphasis on water use for energy, life cycle assessment, and energy transitions. In particular, she is interested in resource intensity, de- and reindustrialization, environmental justice, and safety. Grubert is a Member of the American Society of Civil Engineers and an Affiliate Member of the American Sociological Association. Grubert received a B.S. in mathematics and atmosphere/energy engineering from Stanford university, an M.S. in environmental and water resources engineering and an M.A. in energy and Earth resources from the University of Texas at Austin, and a Ph.D. in environment and resources from Stanford University and is a licensed Professional Engineer.

Curt Jawdy is a Senior Manager of Operational Research and Support at the Tennessee Valley Authority (TVA). His early career focused on water resources, including work in groundwater remediation, floodplain modelling, and city-scale drainage optimization. Following his time consulting, Jawdy spent a decade as the lead technical person in TVA's River Management group. In this role, his projects included a complete overhaul of TVA's modelling and decision system covering 49 reservoirs, a probabilistic flood hazard analysis system driving the dam safety program, a dambreak consequences system determining breach impacts, paleoflood studies tying down the tail of the flood risk distribution, and dendrochronology studies tying down the tail of the drought distribution. Jawdy currently leads the R&D function for TVA, leading a team covering a wide array of topics as TVA adapts to become a decarbonized and decentralized provider of energy to their 10 million customers. Jawdy received a B.S. in environmental systems engineering from the Pennsylvania State University and an M.S. in biosystems engineering from the University of Tennessee, and is a licensed Professional Engineering in the state of Tennessee.

TVA and the U.S. Department of Energy Water Power Technologies Office are Federal partners in hydropower and pumped storage services. Jawdy leads both the CEATI Hydro Operations

and Planning Interest Group and the National Hydropower Association Water Innovation Council, which makes public statements about the role of hydropower.

Jordan Kern is an Assistant Professor at North Carolina State University in the Department of Industrial and Systems Engineering. Kern's research works to advance the optimal design and management of low-to-zero carbon energy systems, with a special focus on: 1) building high resolution, open-source models of bulk electric power systems; 2) simulating system dynamics under uncertainty and stress, especially extreme weather and climate hazards; and 3) informing optimal decision making around capital investment and short-term operations to meet reliability and policy objectives. In 2022, he was awarded the NSF CAREER award. Kern has served as an expert witness for the U.S. House of Representatives Committee on Energy and Commerce, Subcommittee on Energy, Climate, and Grid Security, and served as an expert on a White House Office of Science and Technology Policy panel concerning the potential role of artificial intelligence in managing climate change and the energy transition. Kern received a B.S., M.S., and Ph.D. in environmental sciences and engineering from the University of North Carolina at Chapel Hill.

Kern is currently funded by the U.S. Department of Energy Water Power Technologies Office on a subcontract to a competitive, merit-based award to the Pacific Northwest National Laboratory.

Safeeq Khan is an Associate Professor of Civil & Environmental Engineering at University of California, Merced. His research broadly focuses on understanding interactions between climate, regolith, and terrestrial ecosystems in the Earth's critical zone with an emphasis on developing nature-based climate solutions. He has worked extensively with state and federal land managers, utilities, NGOs, and other stakeholders on co-producing practical scientific solutions for building climate resilience. He is a member of the California Wildfire & Forest Resilience Task Force Science Advisory Panel and the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) Board of Directors. Khan received a master's degree in agricultural systems and management from Indian Institute of Technology, Kharagpur and a Ph.D. in natural resources and environmental management from the University of Hawaii.

Khan currently receives non-competitive research support from the Placer County Water Agency for developing adaptive climate solutions for water and power management.

Bruce Logan is an Evan Pugh University Professor in the Department of Civil & Environmental Engineering, and Director of the Institute of Energy and the Environment at Pennsylvania State University. His research is focused on renewable energy production and the development of an energy sustainable water infrastructure, desalination, and green hydrogen gas from water electrolysis and renewable methane. Logan is a member of the U.S. National Academy of Engineering, the China Academy of Engineering, and a fellow of the American Association for the Advancement of Science and several other professional organizations. He received his Ph.D. in Environmental Engineering from the University of California, Berkeley, his, and his Logan received a B.S. in chemical engineering and an M.S. in environmental engineering from Rensselaer Polytechnic Institute, and a Ph.D. in environmental engineering from the University of California, Berkeley.

Sheila Olmstead is a Professor at the Brooks School of Public Policy and Senior Faculty Fellow at the Atkinson Center for Sustainability at Cornell University. She was formerly the Dean Rusk Chair (2023-24) and Professor (2017-2024) at the LBJ School of Public Affairs at the University

of Texas at Austin, a Senior Fellow (2013) and Fellow (2010-13) at Resources for the Future (RFF), as well as Associate Professor (2007-10) and Assistant Professor (2002-07) of Environmental Economics at the Yale School of the Environment. Her research examines questions at the intersection of economics and environmental policy in areas such as water pricing, water markets, water quality valuation and regulation, flood risk in property markets, the environmental impacts of energy development, and carbon capture and storage. From 2016-2017, Olmstead served as Senior Economist for Energy and the Environment at the President's Council of Economic Advisers. She is a member of the U.S. EPA's Science Advisory Board, President-Elect of the Association of Environmental and Resource Economists (AERE), a University Fellow at RFF, and Senior Fellow at the Property and Environment Research Center. Olmstead received a B.A. in political and social thought from the University of Virginia, a Master's in Public Affairs from the University of Texas at Austin, and a Ph.D. in public policy from Harvard University.

Ashlynn Stillwell is an Associate Professor and the Elaine F. and William J. Hall Excellence Faculty Scholar in Civil and Environmental Engineering at the University of Illinois Urbana-Champaign. Her research focuses on creating sustainable water and energy systems in a policy-relevant context. Her previous work experience includes consulting engineering at Burns & McDonnell (2006-2007) and policy research at the Congressional Research Service (2009). Stillwell received the National Science Foundation CAREER award and the Universities Council on Water Resources (UCOWR) Early Career Award for Applied Research for her work on the energy-water nexus. She was honored with the 2015 Girl Scouts of Central Illinois Woman of Distinction Award in Science, Technology, Engineering, and Mathematics, the 2018 Rose Award for Teaching Excellence, and the 2018 AEESP Award for Outstanding Teaching in Environmental Engineering and Science. Stillwell received a B.S. in chemical engineering from the University of Missouri, an M.S. in environmental and water resources engineering, and a Master's in Public Affairs and Ph.D. in civil engineering from The University of Texas at Austin.

Berry H. (Nick) Tew, Jr. was appointed State Geologist and Oil and Gas Supervisor of Alabama in October 2002 and, in these roles, serves as Director of the Geological Survey of Alabama (GSA) and the State Oil and Gas Board of Alabama (OGB). Prior to his appointment, Tew served in numerous roles at GSA/OGB from 1984 to 2002. Through his 43 years of professional geological experience in stratigraphy, sedimentology, and petroleum geology, he has gained comprehensive knowledge of Alabama's surface and subsurface geology, as well as that of the entire Gulf Coastal Plain geologic province. Tew serves as Alabama's Official Representative to the Interstate Oil and Gas Compact Commission (IOGCC) and has just completed a two-year term as President of the Groundwater Protection Council. He is a Fellow of the Geological Society of America and a member of the American Association for Petroleum Geologists. Tew is a past President of the Association of American State Geologists and the American Geosciences Institute (AGI). He was awarded the E.W. Marland Award, IOGCC's highest honor, in 2013, and the Medal in Memory of Ian Campbell for Superlative Service to the Geosciences, the highest award of the AGI, in 2016. Tew received a B.S., M.S., and Ph.D. degrees in geology, as well as a B.A. in anthropology from the University of Alabama. He previously served on the National Academies' Roundtable on Unconventional Hydrocarbon Development.

Pei Xu is the PESCO Endowed Professorship and C. Herb Ward Family Endowed Interdisciplinary Chair in the Department of Civil Engineering at New Mexico State University (NMSU), and the research director of the New Mexico Produced Water Research Consortium. She leads basic and applied research on water quality, water reuse, desalination,

and resource recovery. The goal of her research is to address critical water challenges in arid and semi-arid regions using non-traditional water supplies such as brackish water, produced water, desalination concentrate, and industrial and municipal wastewater to enhance water sustainability and resilience. She has developed an extensive public-private partnership with state and federal agencies, industry professionals, community groups, policymakers, and NGOs on the convergence of sustainable water-energy-environment-food systems. She was selected as a Leshner Fellow on Food and Water Security by the American Association for the Advancement of Science. She served as the lead cartographer on brackish water for the National Alliance for Water Innovation, and the co-lead of Engineering Thrust for the National Science Foundation Engineering Research Center ReNUWIt (Reinventing the Nation's Urban Water Infrastructure). Xu received a B.S in environmental engineering from Xi'an University of Architecture & Technology, China, an M.S. in environmental engineering from Lanzhou Jiaotong University, China and a Ph.D. in hydroscience from the National Institute of Agricultural Engineering, Water and Forestry.

Julie Zimmerman serves as Yale's inaugural Vice Provost for Planetary Solutions. She holds joint appointments as a Professor in the Department of Chemical and Environmental Engineering, School of Engineering and Applied Sciences, and School of the Environment at Yale University and serves as the Deputy Director of the Center for Green Chemistry & Green Engineering at Yale. Zimmerman's work is focused on advancing innovations in sustainable technologies and yielded the seminal publications on the "Twelve Principles of Green Engineering." This framework, in conjunction with Green Chemistry, is guiding the innovation of products and processes in academia and industry including her own research group on topics that include breakthroughs for the integrated biorefinery, carbon dioxide valorization, designing safer chemicals and materials, novel materials for water treatment, and analyses of the water-energy nexus. Zimmerman is the co-author of the textbook, Environmental Engineering: Fundamentals, Sustainability, Design and serves as the Editor in Chief for Environmental Science & Technology, is a Member of the Connecticut Academy of Sciences, and Fellow of the Royal Society of Chemistry. Prior to coming to Yale University, Zimmerman was a program manager at the U.S. Environmental Protection Agency where she established the national sustainable design competition, P3 (People, Prosperity, and Planet) Award, which has engaged thousands of students from hundreds of universities across the United States since its inception in 2004. Zimmerman received a B.S. in civil engineering from the University of Virginia and a Ph.D. from the University of Michigan jointly from the School of Engineering and Applied Sciences and the School of Environmental and Sustainability. She previously served on the National Academies' Committee on Grand Challenges and Opportunities in Environmental Engineering for the Twenty-first Century.