



9th ANNUAL ENERGY POLICY RESEARCH CONFERENCE

ENERGY DECISION-MAKING IN TIMES OF DISRUPTIVE CHANGE

September 29 - October 1, 2019 Boise Centre, Boise, Idaho













WELCOME to the 9th ANNUAL ENERGY POLICY RESEARCH CONFERENCE!

On behalf of the Energy Policy Institute team, I want to extend a warm welcome to you.

Our discussions over the next couple days will consider complexities of energy decision-making amidst disruptive change. Whether we are examining influences associated with rapid price changes, novel business models, natural and man-made disasters, or related socio-technical shifts, the way we assess and implement choices will be the subject of our focus.

We are delighted to be joined by our keynote speaker, Ms. Carol Battershell, and special guest, Congressman Mike Simpson. We also want to extend thanks to our sponsors, partners, exhibitors, and board members – all of whom have contributed importantly to this experience. Four individuals of particular note include Stephanie Lenhart and Seth Blumsack, who co-chaired the Scientific Advisory Committee's review of the conference abstracts, along with David Gattie and Tom Ptak who completed the paper review with me to identify the Conference's top paper. To the talented team of experts who developed a fun and informative geothermal tour of Boise, thank you for highlighting the Idaho energy story. We're grateful to the State of Idaho, Boise Warm Springs Water District, the City of Boise, Edwards Greenhouse, and the Bishops' House for enabling the unique visit on a Sunday afternoon. Finally, this event couldn't happen without a terrific team at the Energy Policy Institute, the support of Boise State University, and our CAES collaborators.

Thank you for joining us. We look forward to many valuable discussions.

Kathleen Araújo Director of the Energy Policy Institute





Clean today. Cleaner tomorrow.**

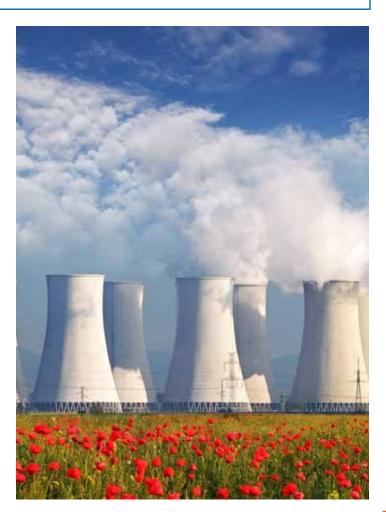
Idaho Power has a long history of providing reliable and affordable energy. As we look to the future, our goal is to provide **100% clean energy by 2045**. With our strong hydroelectric backbone, our focus on energy efficiency and our investments in clean energy sources – such as wind and solar – we're well on our way!

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SPEAKERS

CAROL BATTERSHELL

KEYNOTE SPEAKER

Carol Battershell served ten years (2008-2018) in the U.S. Department of Energy. She led multi-billion dollar technical programs in both the Bush and Obama Administrations; ran the Energy Efficiency and Renewable Energy field operations office, which at its peak was responsible for approximately \$7 billion of grants, research and construction; was a key contributor on two multi-Agency energy policy reviews; and served as Acting Director of the Policy Office during the Trump Administration transition.

Carol also worked for 25 years (1983-2008) in the energy industry for BP and Standard Oil, holding roles in operations management, strategy development, finance, and policy development, and spent ten years living and working in Europe.

Carol holds a BS in Engineering from Purdue University with a specialization in environmental engineering and an MBA from Case Western Reserve University.





MIKE SIMPSON

CONGRESSMAN US HOUSE OF REPRESENTATIVES

Mike Simpson is serving his eleventh term in the House of Representatives for Idaho's Second Congressional District. Mike serves on the House Appropriations Committee. He is the Ranking Member for the Subcommittee on Energy and Water Development. He also serves on the Interior and Environment Subcommittee. Simpson is one of the House's leading advocates for a new energy policy and a renewed commitment to research and development of improved nuclear energy technologies.

His political career began in 1980, when he was elected to the Blackfoot City Council. In 1984, he was elected to the Idaho Legislature where he served until 1998, the last six years serving as Speaker. Simpson was born in Burley, Idaho and raised in Blackfoot.

MARK CHILES

VP, REGULATORY AFFAIRS & CUSTOMER SERVICE MONTANA-DAKOTA UTILITIES GROUP

Mark Chiles is Vice President - Regulatory Affairs and Customer Service for Montana-Dakota Utilities Group, which includes Intermountain Gas Company (IGC) and Cascade Natural Gas Corporation (CNGC). Prior to his current position he was Vice President and Controller for IGC and CNGC.

Mark oversees the regulatory functions for IGC and CNGC in the states of Idaho, Oregon, and Washington and is also responsible for the customer relations functions of the utility group. He began his career in the energy industry with IGC in 1992 and has worked for companies in the utility, gas marketing, and exploration and production businesses. Prior to joining IGC, Mark worked in public accounting with Balukoff, Lindstrom & Company.



MITCH COLBURN



DIRECTOR, RESOURCE PLANNNG & OPERATIONS IDAHO POWER COMPANY

Mitch leads an organization responsible for the energy future of the 1.2 million people that Idaho Power serves. Mitch also oversees work on hydrologic forecasting, water policy, river engineering, cloudseeding, streamflow gaging and developing the billion-dollar joint-venture Boardman to Hemingway transmission line project.

Mitch has an in-depth understanding of the energy industry after working in the industry for 12 years. He graduated Summa Cum Laude from the University of Idaho with a Bachelor of Science degree in electrical engineering, with an emphasis on power systems. He earned his Master of Engineering from the University of Idaho, and his Master of Business Administration from Boise State University.

Mitch serves on the United Way Education Vision Council and the Advisory Board for the University of Idaho Electrical and Computer Engineering Department.

JEFF GRUBB

DIRECTOR, RESOURCE POLICY & PLANNING GEORGIA POWER COMPANY

Jeff leads the team responsible for long term generation planning including the development of the Company's Integrated Resource Plan (IRP).

Jeff was previously a Project Manager in Resource Planning at Southern Company Services (SCS), a role he held from June 2011 until March 2016. In that role he managed the development and coordination of the system-wide integrated resource plan for the retail operating companies of Southern Company, as well as economic evaluations for special projects. He also provided regulatory support to the operating companies and was involved in many planning coordination activities across the system. Jeff began his career as a cooperative education student in Marketing in 1992 and served in various roles within Marketing until 2001.



Jeff has a Bachelor degree in Mechanical Engineering from Georgia Tech and a Masters of Business Administration from Auburn University.



BARBARA LOCKWOOD

VP, REGULATION ARIZONA PUBLIC SERVICE COMPANY

Barbara Lockwood is vice president of regulation for Arizona Public Service, Arizona's largest electric company, where she manages federal and state regulatory activities for APS. Prior to moving into regulatory activities, she served as general manager of energy innovation, where she managed technology and renewable energy programs.

Lockwood began her career at DuPont in chemical engineering and management roles. She then spent a number of years in environmental consulting providing property development and business acquisition services to national and global companies in a variety of industries. Lockwood joined APS in 1999.

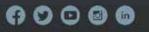
Her policy and regulatory experience includes testimony before the U.S. House of Representatives Select Committee on Energy Independence and Global Warming, as well as a field hearing with Congresswoman Gabrielle Giffords on the Federal Investment Tax Credit and its effect on solar development in the Southwest.

IDAHO NATIONAL LABORATORY

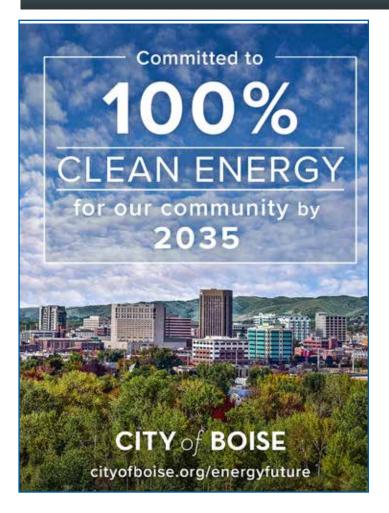


or 70 years, work done by the scientists, engineers, technicians and support staff at Idaho's national laboratory has helped empower America's future.

Tomorrow's Idaho National Laboratory will continue to have profound impacts across the nation's energy and security sectors.









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hen Idaho National Laboratony's Transportation Services Installed a no-idie, solar/battery-powered air-conditioning and heating system on an INL bus in summer 2017, the goal was sustainability – reducing fuel consumption and emissions.

DE TRANSMARY.

Once the system is installed on all 84 INL buses, fleet managers expect to see annual savings of 10,000 gallons of diesel fuel and greenhouse gas reduction of more than 87 metric tons per year.



Idaho National Laboratory

🖄 SUN POWER

The solar-powered system allows drivers to maintain temperatures in the coach by both heating and cooling without running the engines. A complete no-idle system includes three roof-mounted solar panels, a battery pack and a blower, motor and compressor to run bus air conditioning separately from the bus engine.







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IDAHO BUSINESS REVIEW

ENERGY DECISION-MAKING IN TIMES OF DISRUPTIVE CHANGE

SUNDAY, September 29, 2019

11:30 am - 2:00 pm	BOISE'S GEOTHERMAL HISTORY TOUR WITH IDAHO NATIONAL LABORATORY'S EFFICIENCY-OPTIMIZED BUS Departure: Front Street next to the Grove Hotel
	A shuttle bus ride and walking tour will review Boise's historic and currently used geothermal sites, including the only U.S. Capitol to be heated by geothermal energy. The INL bus for the tour has maximized efficiency with a no idle, solar/battery-powered air conditioning and heating system to reduce fuel consumption and emissions.
3:15 pm - 4:30 pm	ROUNDTABLE: THE ENERGY WORKFORCE OF THE FUTURE Trueblood Room, Student Union Building, Boise State University
	CO-LEADS:
	KATHY ARAÚJO, Boise State University TOM PTAK, University of Idaho
6:00 pm - 8:00 pm	WOMEN IN CLEAN ENERGY RECEPTION (All are welcome) Bodovino, 404 S. 8 th Street Boise, Idaho
	CO-HOSTED BY: The Energy Policy Institute (EPI) and Women in Clean Energy (C3E)

MONDAY, September 30, 2019

8:00 am - 3:00 pm	REGISTRATION Boise Centre East, 4 th Floor, Top of Escalators
8:00 am - 9:45 am	BREAKFAST Boise Centre East, Foyer outside of Room 420
9:00 am - 9:45 am	WELCOMING REMARKS Boise Centre East, Room 420 DR. MARLENE TROMP, President, Boise State University DR. KATHY ARAÚJO, Director, Energy Policy Institute DR. NOEL BAKHTIAN, Director, Center for Advanced Energy Studies KEYNOTE ADDRESS MS. CAROL BATTERSHELL
10:15 am - 11:30 am	 RESEARCH PRESENTERS-SESSION 1 Boise Centre East, Rooms 410A - 410C 1A - CROSS-SECTORAL CHALLENGES AND OPPORTUNITIES Room 410A Moderator: JOHN CHATBURN, Idaho State Office of Energy and Mineral Resources EMILY GRUBERT, Georgia Institute of Technology Conventional Hydroelectricity and the Future of Energy JENNY FRANK, The State University of New York Assessing Indian Point's Electricity Generation through Renewable Energy Pathways: A Technical and Economic Analysis JOHN BELL, University of Idaho Fuel Supply Chains in the Western Interconnect: Evaluating Availability during Extreme Weather Events

10:15 am - 11:30 am	ROBERT SCHMITT, United States Department of Energy Pursuing Innovative Finance Models to Enable Beneficial Energy and Water Infrastructure and Systems
	1B - ADAPTIVE PRACTICES AND REGULATION OF EMERGENT TECHNOLOGY IN ENERGY SYSTEMS Room 410B
	Moderator: LEAH GUZOWSKI, Center for Advanced Energy Studies and Idaho National Laboratory
	WILL FRAZIER, National Renewable Energy Laboratory Assessing the Role of Energy Storage as a Peaking Capacity in the United States
	JUAN PABLO CARVALLO, Lawrence Berkeley National Laboratory The Economic Value of Integrating Distributed Energy Resources in Electric Utility Resource Planning
	ANNA KARMAZINA, Oregon State University Barriers and Facilitators of Demand-side Management in the U.S. Electricity Sector: Comparative Case Study
	1C - MARKET REDESIGN AND NEW BUSINESS MODELS
	Room 410C Moderator: TIM TATUM, Idaho Power Company
	STEVE DAHLKE, Colorado School of Mines Integrating Energy Markets: Implications of Increasing Electricity Trade on Prices and Emissions in the Western United States
	SHAUN MCRAE, Instituto Tecnológico Autónomo de México Retail Pricing in Colombia to Support the Efficient Deployment of Distributed Generation and Electric Vehicles
	JAMES VAN NOSTRAND, West Virginia University College of Law Quantifying the Resilience Value of Distributed Energy Resources
12:00 pm - 1:30 pm	LUNCH, NETWORKING & MODERATED DISCUSSION Boise Centre East, Room 420
	"Decision-Making for Energy Utilities in the Current Policy Environment"
	MODERATORS: DR. DAVID GATTIE, University of Georgia and DR. KATHY ARAÚJO, Energy Policy Institute
	PANEL: BARBARA LOCKWOOD, Arizona Public Service MITCH COLBURN, Idaho Power MARK CHILES, Montana-Dakota Utilities Group JEFF GRUBB, Georgia Power / Southern Company
1:45 pm - 3:00 pm	RESEARCH PRESENTERS-SESSION 2 Boise Centre East, Rooms 410A - 410C
	2A - CROSS-POLICY COMPLEXITIES Room 410A Moderator: TERRY JESTER, Solpad
	BRAETON SMITH, Argonne National Laboratory Does Participation in Green Pricing Programs Hinder the Adoption of Net Meters?
	ROBERT GODBY, University of Wyoming Estimating the Impact of State Taxation Policies on the Cost of Wind Development in the West
	SARAH MILLS, University of Michigan The Role of Politics and Place in Support for Renewable Energy Policy

1:45 pm - 3:00 pm	2B - ADAPTIVE PRACTICES AND REGULATION OF EMERGENT TECHNOLOGY IN ENERGY SYSTEMS Room 410B
	Moderator: HALEY FALCONER, City of Boise Public Works
	HANNA BREETZ, Arizona State University Political Feedbacks Can Undermine Ambitious Energy Policy Goals
	JESSICA PRICE, The Nature Conservancy Improving Solar Development Policy and Planning through Stakeholder Engagement: The Long Island Solar Roadmap Project
	NAIM DARGHOUTH, Lawrence Berkeley National Laboratory Implications of Rate Design for the Customer-Economics of Behind-the-Meter Storage
	GERALD BRAUN, The Integrated Renewable Energy Systems Network, Inc. Policies for Local Energy Collaboration
	2C - MARKET REDESIGN AND NEW BUSINESS MODELS Room 410C Moderator: SETH BLUMSACK, Pennsylvania State University
	GABRIEL CHAN, University of Minnesota Analyzing the Drivers of Green Power Programs: Insights from Minnesota Cooperatives
	VALERIE BRADER, Rivenoak Consulting, Inc. Virtual Power Reduction Agreements
	ASHWIN RAMDAS, National Renewable Energy Laboratory California Time-of-Use (TOU) Transition: Effects on Distributed Wind and Solar Economic Potential
3:15 pm - 4:30 pm	RESEARCH PRESENTERS-SESSION 3 Boise Centre East, Rooms 410B - 410C
	3B - GEOPOLITICS AND INTERNATIONAL COMPLEXITY Room 410B
	Moderator: ZACHARY TUDOR, Idaho National Laboratory
	DAVID GATTIE, University of Georgia U.S. Energy Policy: In the World As It Is
	ALEXANDER NAGEL, University of Idaho A Nexus Approach to Understanding Chile's Renewable Energy Landscape
	TOM PTAK, University of Idaho From Powershed to Energy Conduit and Integrative Energy Center: Tracing the Evolution of Southwest China's Yunnan Province
	3C - MARKET REDESIGN AND NEW BUSINESS MODELS Room 410C
	Moderator: JETTA WONG, Clean Tech Incubator
	LYNNE KIESLING, Carnegie Mellon University From Airbnb to Solar: Toward a Transaction Cost Model of a Retail Electricity Distribution Platform
	DAVID BERNELL, Oregon State University The Role of Community Choice Aggregation in California's Transition to Renewable Energy
	GALEN BARBOSE, Lawrence Berkeley National Laboratory Utility-Owned Residential Rooftop Solar: An Analysis of Ratepayer and Shareholder Impacts
	EVVAN MORTON, Arizona State University Emissions Trading and Climate Change: The Consequences of Pairing Old Solutions with New Problems
6:00 pm - 8:00 pm	RECEPTION Zion Bank Building, 800 West Main Street, Boise, 17th Floor

TUESDAY, October 1, 2019

7:30 am - 11:00 am	REGISTRATION Boise Centre East, 4 th Floor, Top of Escalators
7:30 am - 9:00 am	BREAKFAST Boise Centre East, Foyer outside of Room 420
8:45 am - 10:00 am	RESEARCH PRESENTERS-SESSION 4 Boise Centre East, Rooms 410B- 410C
	4B - ADAPTIVE PRACTICES AND REGULATION OF EMERGENT TECHNOLOGY IN ENERGY SYSTEMS Room 410B
	Moderator: JUAN PABLO CARVALLO, Lawrence Berkeley National Laboratory
	WESLEY COLE, National Renewable Energy Laboratory Challenges of High Penetration Renewables for the U.S. Power System
	JOHN GARDNER, Boise State University Mesh Network Communication for Robust Aggregation of Distributed Resources
	BRADY STOLL, National Renewable Energy Laboratory Contributions of Solar and Storage to Future Power Needs
	YOUNGSUN BAEK, Union of Concerned Scientists The Economic Feasibility of Solar Plus Storage System in Illinois
	4C - ORGANIZATIONAL CHANGE, FRAMING, AND INDICATORS Room 410C
	Moderator: HANNA BREETZ, Arizona State University
	MATTHEW GRIMLEY, University of Minnesota An Innovation System Perspective on Load Management: Technology Deployment in Midwestern Electric Cooperatives, 1940s to Present
	STEPHANIE LENHART, Boise State University, Energy Policy Institute Comparing and Contrasting the Institutional Relationships, Regulatory Frameworks, and Energy System Governance of European and U.S. Electric Cooperatives
	WILL GORMAN, Lawrence Berkeley National Laboratory Integrating Transmission Expenditures for Utility-Scale Wind and Solar into LCOE Estimates for New Generating Technologies
	CAMILA APABLAZA, Georgia Institute of Technology An Evolutionary Game Theory Approach to the Role of Government in Technology Transitions
9:00 am - 10:00 am	POLICY AND STRATEGY COMMITTEE MEETING (by invitation) Boise Centre East, Room 410A
10:15 am - 11:30 am	RESEARCH PRESENTERS-SESSION 5 Boise Centre East, Rooms 410B-410C
	5B - CROSS-POLICY COMPLEXITIES
	Room 410B Moderator: SARAH ROBEY, Idaho State University
	DANIEL RAIMI, Resources for the Future Greenhouse Gas Impacts of Increased U.S. Oil and Gas Production
	ELISABETH GRAFFY, Arizona State University Integrating Governance of Energy Transitions and Climate Engineering
	GABRIEL CHAN, University of Minnesota Co-Benefits of California Climate Policies: How Are Local Air Pollution and Health Benefits Distributed?
	5C - ORGANIZATIONAL CHANGE, FRAMING, AND INDICATORS Room 410C Moderator: WESLEY COLE, National Renewable Energy Laboratory
	BRIAN SERGI, Carnegie Mellon University Aligning Climate and Health Benefits of Power Plant Siting and Retirement Decisions

10:15 am - 11:30 am	GREGORY STELMACH, Oregon State University Issue Framing in the LNG Export Terminal Siting Process
	BENJAMIN LARSEN, Boise State University, Idaho Policy Institute Urban Energy Planning: Policy through Consultative Surveys
12:00 pm - 1:30 pm	LUNCH, NETWORKING & MODERATED DISCUSSION Boise Centre East, Room 420
	"Issues and Opportunities for the US in Energy Policy" MODERATOR: DR. KATHY ARAÚJO, Energy Policy Institute
	PANEL: MS. CAROL BATTERSHELL CONGRESSMAN MIKE SIMPSON
1:45 pm - 3:00 pm	RESEARCH PRESENTERS-SESSION 6 Boise Centre East, Room 410B
	6B - CROSS-SECTORAL CHALLENGES AND OPPORTUNITIES Room 410B Moderator: ANDREW COCKERILL, Consultancy
	ANDREW KLEIT, Pennsylvania State University Reaching the Limits of Capacity Markets
	JOACHIM SEEL, Lawrence Berkeley National Laboratory Impact of High Variable Renewable Energy Futures on Wholesale Power Prices and Electric Sector Decision-Making: Demand-Side Effects
	SANDRA SATTLER, Union of Concerned Scientists Opportunities in Energy: Climate Change, a National Low-Carbon Electricity Standard and the Green New Deal
2:00 pm - 3:00 pm	SCIENTIFIC ADVISORY MEETING (by invitation) Boise Centre East, Room 410A
4:00 pm - 6:00 pm	CAES 10 TH ANNIVERSARY (by invitation) Boise State University, Stueckle Sky Center

RESEARCH POSTER PRESENTERS

MAYUR BANDEKAR, University of Michigan Assessing the Social Dynamics of Wind Energy Sites in Michigan to Predict Contention among Prospective Wind Projects

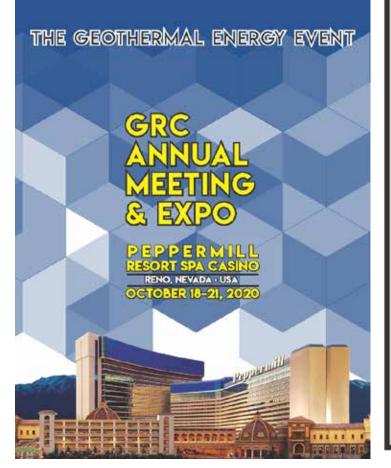
BEN CHOU, Pennsylvania State University Plugging In and Charging Up: Increasing Plug-in Electric Vehicle Adoption by Residents of Multifamily Buildings in Los Angeles County

DANIEL GARZ, Idaho State University A Disaster Response Complex for Training of Emergency Responders in Idaho JASON JOHNSON, Technical University of Berlin Blockchain Technology in the Energy Sector: A Review of the Role of Policy Makers and Regulatory Sandboxes in Bringing the Technology into the Mainstream

KRISTIN MCGILL, Walden University Exploring Potential Solar Consumers' Understanding of Energy Policy Development in Hawaii

EVVAN MORTON, Arizona State University Emissions Trading and Climate Change: The Consequences of Pairing Old Solutions with New Problems

JOHN PETERSON, University of Idaho Informing Electrical Grid Policy with a Nuclear Power Plant Simulator





THE 2021 NORTHWEST POWER PLAN

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GAIN's mission is to provide the nuclear energy industry with access to the technical, regulatory, and financial support necessary to move new or advanced nuclear technologies toward commercialization in an accelerated and cost-effective fashion. Through private-public partnerships, GAIN connects nuclear innovators to DOE national laboratory capabilities and RD&D programs.





Collaboration Inspiring Innovation and Impact

CAES is a research, education, and innovation consortium bringing together Idaho National Laboratory, Boise State University, Idaho State University, University of Idaho, and University of Wyoming.



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