

The Role of Net Metering in the Evolving Electricity System

Committee

Janet G. Besser

Chair

Janet Gail Besser is an energy policy and regulatory strategy leader with a proven track record of developing and implementing frameworks, rules and markets to advance competition, efficiency, and clean energy and to support needed investment with: deep regulatory expertise and experience, including retail and wholesale market structures; national, regional, and state experience and recognition; broad industry experience as a regulator, utility, developer, consultant, and consumer advocate; particular strength in bringing together diverse groups in pursuit of a common goal. She most recently had been Vice President, Smart Electric Power Alliance, focusing on Regulatory and Utility Business Innovation. Previously, she was EVP of the Northeast Clean Energy Council; VP, Regulatory Strategy and Policy at National Grid; Chair and Commissioner of the Massachusetts Department of Public Utilities; and an executive and expert at consulting firms Analysis Group and Lexecon. She held senior staff roles at the Massachusetts Energy Office and New Hampshire Public Utilities Commission, was policy director for a national IPP association and worked for a small hydro developer and low-income consumer advocate. Janet chairs the Power Options Board and sits on the VEIC Board where she chairs the Impact and Evaluation Committee. She is currently organizing a session of Raab Associates' New England Electricity Restructure Roundtable focusing on decarbonization. Janet received the 2019 Northeast Energy and Commerce Association Vanguard Award and the 2014 New England Women in Energy and Environment (NEWIEE) Achievement award. She has a Master's in Public Policy from the Kennedy School of Government, Harvard University, and a B.A., magna cum laude, from Williams College, where she was elected to Phi Beta Kappa.

Anuradha M. Annaswamy

Member

Dr. Anuradha Annaswamy is the Founder and Director of the Active-Adaptive Control Laboratory in the Department of Mechanical Engineering at MIT. Her research interests span adaptive control theory and its applications to aerospace, automotive, propulsion, and energy systems as well as cyber-physical systems such as Smart Grids, Smart Cities, and Smart Infrastructures. She has received best paper awards (Axelby; CSM), as well as Distinguished Member and Distinguished Lecturer awards from the IEEE Control Systems Society (CSS) and a Presidential Young Investigator award from NSF. She is a Fellow of IEEE and the International Federation of Automatic Control. She is the recipient of the Distinguished Alumni Award from Indian Institute of Science for 2021. Anu Annaswamy received her Ph.D. in Electrical Engineering from Yale University in 1985. She has served as a faculty member at Yale, Boston University, and MIT. She is the author of a graduate textbook on adaptive control, co-editor of two vision documents on smart grids as well as two editions of the Impact of Control Technology report, author of several journals and conference publications, and a member of the National Academy of Sciences Committee study that published a report on the Future of Electric Power in the United States in 2021. She served as the President of CSS in 2020. She has been serving as a Faculty Lead in the Electric Power Systems workstream in the MIT Future Energy Systems Center since September 2021.

Galen Barbose

Member

Galen Barbose is a Research Scientist in the Electricity Markets and Policy Department at Lawrence Berkeley National Laboratory. Galen conducts research on issues in the electricity industry related to renewable energy and distributed energy resources, with a focus on distributed solar cost and technology trends, income and demographic adoption patterns of residential solar adopters, retail rate design, utility business models, and renewable portfolio standards. As part of his research portfolio, Galen manages three annual reports: Tracking the Sun, Residential Solar Adopter Demographic Trends, and U.S. Renewable Portfolio Standards Annual Status Report. Galen also provides direct analytical support to key decision-makers and stakeholders within the electricity industry. Since joining Berkeley Lab in 2001, Galen has authored more than 100 publications and has presented his work on hundreds of occasions. Prior to Berkeley Lab, Galen was a project engineer at Nexant and Schiller Associates, providing project management, engineering, and consulting services for utility-funded energy efficiency and other demand-side management programs. Galen holds bachelor's degrees in mechanical engineering and philosophy from U.C. Berkeley and U.C. Santa Cruz, respectively, and a master's degree from the Energy and Resources Group (ERG) at U.C. Berkeley.

Marilyn A. Brown

Member

Dr. Marilyn Brown (NAE/NAS) is a Regents' Professor in the School of Public Policy at the Georgia Institute of Technology and a Joint Faculty member at Oak Ridge National Laboratory. At Georgia Tech, she created and co-leads the Climate and Energy Policy Lab and the Master of Sustainable Energy and Environmental Management. Her research focuses on the design and modeling of energy and carbon reduction policies and programs, highlighting opportunities on the customer side of the electric meter. Using data analytics and energy-engineering-behavioral models, she examines technology and market transitions. Prior to Georgia Tech, she worked at Oak Ridge National Laboratory, where she deployed her expertise in scenarios focused on a clean energy future, bringing a fact-based and authoritative perspective to energy sustainability discussions, influencing policy initiatives in the US and around the globe. Focusing on the electric utility industry, Dr. Brown has joined fundamental behavioral and social science principles with economic-engineering models. She has demonstrated why energy efficiency and affordability are as essential to energy security as the more traditional dimensions of fuel diversity and import independence. Her research on determinants of energy burden is highly cited. In 2007, Dr. Brown contributed to the Intergovernmental Panel on Climate Change reports that shared the 2007 Nobel Peace Prize. From 2010 to 2017, she served two terms as a Presidential appointee to the Board of Directors of the Tennessee Valley Authority, the nation's largest public power provider. From 2014 to 2018 she served two terms on the U.S. Department of Energy's Electricity Advisory Committee where she chaired the Smart Grid Subcommittee. She has written 9 books on the clean energy transition, which have been used by researchers and students around the world. She is a member of the National Academy of Engineering and the National Academy of Sciences. She has served on eight National Academies committees.

Mohit Chhabra

Member

Mohit Chhabra is a Senior Scientist at the Natural Resources Defense Council (NRDC); he helps lead NRDC's research and advocacy efforts to decarbonize California's energy sector cost-effectively. Prior to joining NRDC, Mohit worked as a contract analyst to the Northwest Power and Conservation Council conducting energy conservation assessments. Mohit has expertise in evaluating and developing policy for distributed energy resources. He developed policy proposals to develop a new metric, and a new framework to set goals and develop budgets for all distributed resources; that metric was adopted by the California Public Utilities Commission (CPUC) for energy efficiency and demand response programs. He is currently working to update California's Net Energy Metering (NEM) policy at the CPUC. Mohit is a voting member of the Regional Technical Forum (RTF) of the Pacific Northwest and is also a part of the Conservation Resources Advisory Committee of the Pacific Northwest. In 2016, the RTF recognized his contributions to energy conservation in the Pacific Northwest. He holds a master's in civil environmental and architectural engineering from the University of Colorado, Boulder, and a bachelor's in mechanical engineering from the University of Pune in India.

Elena M. Krieger

Member

Dr. Elena Krieger is the Director of Research at the energy science and policy research institute Physicians, Scientists, and Engineers for Healthy Energy (PSE). She joined PSE in 2013 to launch the organization's clean energy practice area, and now oversees its scientific research efforts. Her current work focuses on accelerating the transition to clean energy resources, and developing transition pathways that realize health, environment, equity, and resilience co- benefits. She simultaneously works closely with community organizations, non-profits, policymakers, regulators, and other stakeholders to use science to inform energy policy. Dr. Krieger's recent and ongoing research areas include solar + storage resilience hubs; integration of health, equity, and environmental metrics into state-level deep decarbonization strategies; sociodemographic trends of solar adoption; and identification of opportunities to replace peaker power plants with energy storage. She is a member of the Disadvantaged Communities Advisory Group to the California Energy Commission and the California Public Utilities Commission, and a member of the National Academies' New Voices in Science, Engineering and Medicine Program 2021 Cohort. She received her Ph.D. in Mechanical & Aerospace Engineering from Princeton, where her research focused on optimizing energy storage in renewable systems and holds an AB in Physics and Astronomy & Astrophysics from Harvard.

Joshua M. Pearce

Member

Joshua M. Pearce is the John M. Thompson Chair in Information Technology & Innovation at the Thompson Centre for Engineering Leadership & Innovation. He holds appointments at Ivey Business School, the top-ranked business school in Canada and the Department of Electrical & Computer Engineering at Western University in Canada, a top 1% global university. He runs the Free Appropriate Sustainability Technology research group, which concentrates on the use of open-source appropriate technology (OSAT) to find collaborative solutions to problems in sustainability and to reduce poverty. His research spans areas of engineering of solar photovoltaic technology, open hardware, and distributed recycling and additive manufacturing (DRAM) using RepRap 3-D printing, but also includes policy and economics. According to Elsevier's citation metrics last year he is in the top 0.06% most cited scientists globally and is continually ranked in the top 0.1% for his accessible research on Academia.edu. He was the first Endowed Richard Witte Professor at the Michigan Technological University. He was a Fulbright-Aalto University Distinguished Chair, a visiting professor of Photovoltaics and Nanoengineering at Aalto University, Finland and visiting Professor Équipe de Recherche sur les Processus Innovatifs (ERPI), Université de Lorraine, France. He received his Ph.D. in Materials Engineering from the Pennsylvania State University for the development of low-cost solar cells.

Autumn F. Proudlove

Member

Autumn Proudlove is the Senior Policy Program Director at the North Carolina Clean Energy Technology Center at NC State University. Autumn's professional expertise is in clean energy policy, with an emphasis on distributed energy resources (DERs). Autumn is the lead author of the Center's 50 States of Solar quarterly report series, which tracks policy changes under consideration across the U.S. related to net metering, DER valuation, utility rate design, among other topics. Autumn received her Master's degree in Energy Regulation and Law from Vermont Law School and her Bachelor's degree in Environmental Studies from Dartmouth College.

Varun Rai

Member

Dr. Varun Rai is the Walt and Elspeth Rostow Professor in the LBJ School of Public Affairs at the University of Texas at Austin, with a joint appointment in Mechanical Engineering. Through his interdisciplinary research, delving with issues at the interface of energy systems, complex systems, decision science, and public policy, he is developing effective policy approaches to help accelerate the transition of the global energy system into a more sustainable and resilient one. He was a Global Economic Fellow in 2009. During 2013-2015 he was a Commissioner for the vertically-integrated electric utility Austin Energy and from 2019-2021 he served as director of the UT Austin Energy Institute. In 2016 the Association for Public Policy Analysis & Management (APPAM) awarded him the David N. Kershaw Award and Prize, which "was established to honor persons who, at under the age of 40, have made a distinguished contribution to the field of public policy analysis and management." He received his Ph.D. and MS in Mechanical Engineering from Stanford University and a bachelor's degree in Mechanical Engineering from the Indian Institute of Technology (IIT) Kharagpur.

Mohammad Shahidehpour

Member

Dr. Mohammad Shahidehpour joined the Illinois Institute of Technology (IIT) in 1983 where he is presently a University Distinguished Professor. He also serves as the Bodine Chair Professor and Director of the Robert W. Galvin Center for Electricity Innovation at IIT. Dr. Shahidehpour has been the Principal Investigator of over \$60 million in grants and contracts on power system operation and control, smart grid research and development, and large-scale integration of renewable energy. His DOE Project on Perfect Power Systems has converted the entire IIT Campus to an islandable microgrid. He has co-authored 6 books and over 800 papers on electric power system operation and planning and was the recipient of 6 best paper awards for his IEEE publications. He served as the VP of Publications for the IEEE Power and Energy Society, Editor of IEEE Transactions on Power Systems, and the founding Editor-in-Chief of the IEEE Transactions on Smart Grid. He is a Fellow of IEEE, Fellow of the American Association for the Advancement of Science (AAAS), Fellow of the National Academy of Inventors (NAI), Laureate of KIA (Khwarizmi International Award), and an elected member of the US National Academy of Engineering. He is listed as a highly cited researcher on the Web of Science (ranked in the top 1% by citations demonstrating significant influence among his peers).

Nicole D. Sintov

Member

Dr. Nicole Sintov serves as Assistant Professor at the Ohio State University's School of Environment and Natural Resources. As an environmental psychologist, she strives to advance psychological theory while producing insights that can be applied to benefit the environment and human welfare. Broadly, her work focuses on the role of individual-level behavior and decision-making in sustainable consumption with an emphasis on energy contexts, such as home energy use or energy-efficient technology adoption and use. Using an equity lens, her work also examines the financial, health, and social impacts of emerging energy technologies and programs (e.g., utility rate plans) on members of different vulnerable groups. In her career, she has published 25 refereed articles, 2 book chapters, 16 peer-reviewed conference proceedings, and given more than 30 scholarly presentations. Her work has appeared in high-impact scholarly outlets such as Nature Energy, and has received media coverage by CNN, NPR, National Geographic, The Guardian, Scientific American, LA Times, among dozens of other outlets. She holds a Ph.D. in Psychology from the University of Southern California and a B.S. in Psychology / Ecology from the University of California, San Diego.

Thomas S. Stanton

Member

Tom Stanton retired at the end of June 2022, when the National Regulatory Research Institute (NRRI) closed permanently. Tom had been Principal Researcher, Energy and Environment, at NRRI since fall 2010. NRRI was founded by and served the National Association of Regulatory Utility Commissioners (NARUC). NRRI provided regulatory policy research and educational services for agencies responsible for public utility regulation in the 50 states and U.S. territories. Tom conducted research and writing, and provided education on public utility regulatory policy, primarily about renewable energy, energy efficiency, infrastructure modernization, industry innovation and restructuring, and climate change. Prior to joining NRRI in fall 2010, Tom worked 10 years for the Michigan State Energy Office and then over 22 years as a member of the Michigan Public Service Commission (MPSC) staff. While on MPSC Staff, Mr. Stanton served as a renewable energy section manager. He helped establish Michigan's initial voluntary net energy metering (NEM) program and then helped implement Michigan's initial legislated renewable energy portfolio standard (RPS) and NEM program. Tom provided expert witness testimony in sixteen MPSC cases from 1993 to 2009. He has experience in project design and implementation, technology assessments, and program evaluations. His avocations include appropriate technology, sustainable development, and ecovillages. Tom has been an adjunct professor, at three Michigan colleges and universities, designing curricula and teaching both undergraduate and graduate-level courses. He received a B.A. in Communications and M.A. in Journalism from Michigan State University and an M.S. in Public Administration from Western Michigan University.

Terrance G. Surles

Member

Dr. Terrence Surles consults with Stanford University evaluating California's ability to meet its carbon neutrality goals. He consults with UC/Berkeley/CIEE for the CPUC on expediting disputes related to the installation of behind the meter generation, as well as analysis and policy development for demand response, energy-efficient, and storage technologies. He consults with Hawaii Natural Energy Institute (HNEI) as part of HECO's Integrated Grid Planning process for the integration of distributed resources while maintaining grid stability and resiliency. He led the review of USDOE national laboratory capabilities for the Department of Energy's Grid Modernization Initiative. Previous full-time positions included Administrator for the Hawaii State Energy Office, Clean Energy Solutions lead for the University of Hawaii (UH) College of Social Sciences and HNEI's Technology Integration and Policy Analysis Lead. He held leadership positions at Argonne and Lawrence Livermore National Laboratories and Electric Power Research Institute. Dr. Surles has been involved and has led efforts in energy and environmental systems analysis since 1974. The more recent focus is on addressing climate change by reducing carbon emissions from electricity generation. This work includes an analysis of impacts on the grid by increasing percentages of intermittent renewable resources. He has previously served on five NRC committees and panels.

Susan F. Tierney

Member

Susan Tierney works on economic, environmental, regulatory, and policy issues related to the nation's energy transitions, especially in the electric sector. She consults governments, foundations, non-governmental organizations, energy companies, energy consumers on these issues. Sue chairs the NREL External Advisory Council and serves on the boards of foundations and think tanks working on addressing climate change. She was the Assistant Secretary for Policy at the U.S. Department of Energy, and in Massachusetts served as cabinet officer for environmental affairs and commissioner of the Department of Public Utilities. Her research, writing, consulting, and pro-bono activities focus on issues at the intersection of economics, environmental improvement, energy system performance, and policy design. She has written about, provided expert testimony on and participated actively in industry discussions on US electric industry transitions. Sue is a National Associate of the National Research Council, is a member of the NASEM Committee on Accelerating Decarbonization in the United States and served on the Committee on the Future of Electric Power in America. She was a Visiting Fellow in Policy Practice at the University of Chicago's Energy Policy Institute. In 2015, she received NARUC's Mary Kilmarx Award for Good Governance, Clean Energy and the Environment, and in 2014, received the Lifetime Achievement Award from DOE's Clean Energy Education & Empowerment (C3E) Initiative. Sue has a Ph.D. and Master's Degree in regional planning from Cornell University, and a B.A. in Art History from Scripps College.