

ANNUAL *Report* 2023

USEA

United States Energy Association



Dear USEA Family,

In 2023, the United States Energy Association experienced remarkable growth and transformation. Since coming onboard, we have seen the organization grow and transform as we enter our 100th year of serving as a resource to energy stakeholders sharing policy, scientific, and technological information to foster the advancement of the entire energy sector. As the world of energy is changing and our membership is growing, we are changing and growing with it.

This changing world brings about new topics of conversation in the energy industry. Conversations surrounding the future of energy have been focused on technological breakthroughs and policy changes and now include how to utilize artificial intelligence and data centers, and the potential for hydrogen hubs. This year we saw these topics become intertwined with current global conflicts that impact the energy sector.

Our Fifth Annual Advanced Energy Technology Forum was hosted in November. This forum served as an opportunity to convene stakeholders to highlight ways the industry is moving forward and addressing challenges such as grid resilience, transitioning to renewable energy, and industry academic partnerships.

We launched the USEA Power Sector Podcast to air the voices of those building and implementing tomorrow's energy systems and of the policymakers who, in response to consumer demand, are setting the goals for a renewed power sector. The podcast draws on USEA's diverse technology- and business-oriented members now caught up in today's sweeping changes in the way energy is produced, used, and financed.

We hosted informative webinars on a wide range of emerging topics. These included a discussion on lithium, the critical material for vehicular and stationary batteries. The speakers addressed projections for lithium along with examples of new battery technologies, like iron flow

chemistry. The U.S. currently produces approximately 1% of the global lithium supply with the expected demand to reach 3.8 million tons by 2035. Hydrogen was also discussed in response to the Department of Energy announcing federal funding to establish regional hydrogen hubs, to jump-start an industry to help achieve climate goals.

I had the honor of testifying before the U.S. House Committee on Energy and Commerce Subcommittee on the Environment, Manufacturing, and Critical Materials Hearing: "America Leads the Way: Our History as the Global Leader at Reducing Emissions." When speaking before the Subcommittee, I highlighted how the U.S. has been a global leader in reducing greenhouse gas emissions, with a 16.6% reduction since 2005 according to the Environmental Protection Agency. American innovation is driving emission reductions through technologies like renewable and sustainable fuels, advanced solar panels, long-duration batteries, nuclear power, wind turbines, carbon capture, hydrogen, and methane abatement and monitoring. However, substantial new energy infrastructure is needed to achieve net zero goals, requiring permitting reform to accelerate the process. The U.S. also faces workforce challenges and supply chain constraints for the required scale of construction. While the U.S. and EU have pledged net zero by 2050, developing nations' emissions are projected to increase substantially to meet rising energy demands from population and economic growth. In addition to this outreach, I also had the opportunity to promote USEA's vision on PBS's White House Chronicle.

Our Virtual Press Briefing series continued with a variety of conversations led by experts on key energy issues, and I was honored to participate and provide commentary during these events. During the summer we discussed natural gas's role in the clean energy transition and the impact of extreme heat on utility providers. During the fall and winter, we highlighted the transformative future of energy, expectations for small modular reactors, the utilization of fossil fuels in a changing environment, and potential crises that could impact the industry. I always enjoy hearing from the experts and journalists who participate in these briefings and look forward to seeing this program continue to grow.

Overall, I'm proud of the work this team has accomplished this past year, and I'm looking forward to seeing the organization grow as we enter our next century.

Mark W. Menezes
President and CEO
United States Energy Association



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Dear USEA Members and Friends,

As I look back on 2023, I extend my gratitude to our Board of Directors, our membership, and our energy stakeholders around the globe for your unwavering support, dedication, and contributions to the United States Energy Association.

I want to say thank you and recognize the extraordinary leadership of our Acting Executive Director Sheila Hollis. Sheila took the helm after the unexpected passing of our beloved leader Barry Worthington. I had the honor of chairing the board and working alongside Sheila as she navigated USEA through the unthinkable and unprecedented COVID-19 global pandemic. Those years were filled with uncertainty and unknowns both for us as individuals and as an organization. Sheila, you maintained and broadened our vision and reach. USEA pivoted to virtual briefings and flagship events which attracted record attendance as we worked patiently and prudently to restore our in-person interaction. It was your passion and expertise that was instrumental in driving our mission forward and continuing to make an impact.

As we embark on a new chapter, I am proud and delighted to extend a warm welcome into the USEA family our new President and CEO, Mark Menezes. His experience as both Under Secretary and Deputy Secretary at the Department of Energy, an attorney, and former Chief Counsel to the House Energy and Commerce Committee provides him with incredible skill and knowledge critical to the vision of access to energy for everyone. Under Mark's leadership, we are eager to expand our initiatives and continue to drive innovation and sustainability in the energy sector.

2023 saw a lot of changes in the world of energy. We saw global conflicts in the Middle East and Europe that raised questions about energy independence. Domestically, we continued to balance utilizing our existing energy resources with newer, renewable options, and the Biden-Harris Administration

announced funding for regional clean hydrogen hubs to continue the push for renewable energy.

Our organization continued to host informative podcasts and press briefings where we highlighted new issues impacting our field of work. We discussed current trends with supply chains and the impact of extreme weather on our utility system. In addition, we looked to the future with the rise in artificial intelligence and data centers and how they impact our industry.

On a personal note, I was honored to receive the Rosa Parks Trailblazer Award for 2023. This award pays homage to the enduring legacy of Rosa Parks and her significant contributions to the Civil Rights Movement in the United States. Throughout my tenure in USEA I will continue to prioritize advancing social progress and equality, especially in the energy sector.

I have been honored to participate in the key USEA events this past year, as well as to represent the organization in external conferences and executive arenas. It has been gratifying to welcome new members to the USEA family, as well as to congratulate newly arrived Board members. I am grateful for the dedicated support of USEA's gifted staff and their enthusiasm to identify new ways to collaborate with all energy stakeholders.

2024 promises to be a year of great strides for USEA as energy continues to play a prominent role in all global economies, and as we enter our 100th year of operation. Thank you all for your steadfast engagement, your loyal support, and your willingness to join us. We look forward to a year of reconnection, new beginnings, and fresh opportunities to deliver reliable, affordable, and clean energy around the world.

Vicky Bailey
Executive Chairman
United States Energy Association



A MESSAGE FROM OUR Executive Chairman

Executive Chairman
U.S. Energy Association
VICKY A. BAILEY



Founder
Anderson Stratton
International, LLC

MARIO AZAR



Chairman & CEO
Black & Veatch

KRISTA JOHNSON



Head, U.S. Corporate Relations
Chief of Staff to the President
Shell USA, Inc.

ARSHAD MANSOOR



President & CEO
Electric Power Research
Institute

STANLEY PORTER



Vice Chairman, U.S. ER&I
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President & CEO
Natural Gas Supply Association

Counsel
U.S. Energy Association
JOHN BUCHOVECKY



Partner
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KARY CAUTHEN



Vice President, Federal
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DAVID MARVENTANO



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JAMES ROBB



President & CEO
North American Electric
Reliability Cooperation

ALBERT WILLIAMS



Vice President,
Corporate Affairs
Chevron Corporation

Treasurer
U.S. Energy Association
ROBERT GEE



President
Gee Strategies Group, LLC

KAREN HARBERT



President & CEO
American Gas
Association

MARIA KORSNICK



President & CEO
Nuclear Energy Institute

MAJIDA MOURAD



Senior Vice President,
Government Relations
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RANDALL ROE



Vice Chairman (Ret.)
Burns & Roe

DANIEL YERGIN



Vice Chairman
S&P Global

Secretary
U.S. Energy Association
BRIAN KEARNS



Chief Operating Officer/
Chief Financial Officer
USEA

DONALD HOFFMAN



President & CEO
EXCEL Services
Corporation

THOMAS KUHN



President & CEO
Edison Electric Institute

MARK MENEZES



President & CEO
United States Energy
Association

EDMUND SCHWEITZER III



President, Chairman of the Board
& Chief Technology Officer
Schweitzer Engineering Laboratories

MERRIBEL S. AYRES



Principal
Lighthouse Consulting
Group, LLC

SHEILA HOLLIS



Of Counsel and Chair,
Washington Office (Ret.)
Duane Morris, LLP

MICHAEL LECLAIR



President & CEO
Babcock Power Inc.

RICH NOLAN



President & CEO
National Mining
Association

MIKE SOMMERS



President & CEO
American Petroleum
Institute

BOARD OF DIRECTORS



USEA Members 2023

ADI Analytics LLC
 Advanced Engineering Associates International
 AECOM Corporation
 AEGIS Insurance Services, Inc.
 American Coal Council
 American Council of Engineering Companies
 American Electric Power
 American Fuel & Petrochemical Manufacturers
 American Gas Association
 American Petroleum Institute
 American Public Power Association
 American Society of Mechanical Engineers
 Amsterdam & Partners LLP
 Anderson Stratton International, LLC
 Arizona State University
 Association of Energy Engineers
 Association of Oil Pipe Lines
 ASTM International
 Babcock Power Inc.
 Baker Botts, LLP
 Bechtel Group, Inc.

Berstein Shur
 Black & Veatch Corporation
 Brookhaven National Laboratory
 Burns and Roe Enterprises, Inc.
 Canary, LLC
 Catalisto
 Chemonics
 Cheniere Energy, Inc.
 Chevron Corporation
 Clifton Larson Allen, LLP
 Combined Cycle Journal
 ConocoPhillips
 Contour Global
 CyberCon
 DAI Global, LLC
 Dastur Energy
 Delaware Office of Community Services
 Deloitte & Touche LLP
 DHL Customer Solutions & Innovation
 Duane Morris LLP
 ECODIT
 Edison Electric Institute
 Electric Power Research Institute
 Electric Power Supply Association
 Enbridge

Enchant Energy Corporation
 Encoord
 Energy & Mineral Law Foundation
 Energy Equipment & Infrastructure Alliance
 Energy Exemplar Ltd.
 Energy Markets Group, Inc.
 Energy Policy Institute of Australia
 ENGIE North America
 Ernst & Young
 ESS, Inc.
 ESTA International
 ETAP
 Excel Services Corp.
 Exelon Corporation
 ExxonMobil
 Fluor
 Fuel Cell and Hydrogen Energy Association
 Gas Systems Engineering, Inc.
 Gas Technology Institute
 Gas Turbine Association
 Gee Strategies Group, LLC
 Geothermal Resources Council
 Global Development Opportunities, LLC
 Gorrelick, Tievy & Abacus
 Grant Thornton, LLP

Hunton Andrews Kurth
 ICF International
 Idaho National Laboratory
 IHS Markit
 InfraGlobal Partners
 INTEK Inc.
 International Brotherhood of Boilermakers
 Interstate National Gas Association of America
 Jordan Capital Management
 K&M Advisors LLC
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 Large Public Power Council
 Lawrence Livermore National Laboratory
 Lehigh University
 Lighthouse Energy LLC
 LNG Allies
 London Economics International LLC
 Morgan Stanley Dean Witter
 Morgan, Lewis & Bockius LLP
 Mott MacDonald
 National Energy Foundation
 National Hydropower Association
 National Mining Association
 National Ocean Industries Association

National Rural Electric Cooperative Association
 Natural Gas Supply Association
 Nikaforce
 North American Electric Reliability Corporation
 Nuclear Energy Institute
 OnGrid Options (Formerly Bluewave Resources)
 Peabody Energy
 Petco International LLC
 Planning & Forecasting Consultants
 Power Engineers
 PricewaterhouseCoopers, LLP
 Sacramento Municipal Utility District
 Sazmining Inc.
 Schweitzer Engineering Laboratories
 Segura Consulting LLC
 Shell USA, Inc.
 Smart Electric Power Alliance
 Solar Energy Industries Association
 Solar Turbines
 Southern Company
 Strategen Consulting
 Strategic Power Systems, Inc
 Summit Power Group
 Synfuels Americas

Tellurian Inc.
 Tennessee Valley Authority
 Tetra Tech
 U.S. - China Energy and Environmental
 Technology Center / Tulane University
 U.S. Agency for International Development
 U.S. Department of Energy
 University of Florida - Public Utilities
 Research Center
 University of Minnesota Duluth
 University of Southern California Energy Institute
 Utilities Technology Council
 Van Ness Feldman, P.C.
 West Financial Services, Inc.
 Westinghouse
 WorleyParson



2023 Forums & Flagship Events

2023 STATE OF THE ENERGY INDUSTRY FORUM

Our 19th Annual State of the Energy Industry Forum, held in January, was an electrifying gathering of dynamic leaders representing the full spectrum of the energy arena. Convened annually by USEA, this premier forum engages Washington's top energy associations, providing a vital platform for dialogue on the latest developments shaping the industry.

This year's theme - navigating a changing regulatory, administrative, and political landscape while meeting America's energy demands - set the stage for thought-provoking insights. An outstanding lineup of speakers took the podium, each offering a unique perspective from their sector.

No stone was left unturned, with perspectives provided on pipelines, liquefied natural gas, modern energy solutions, renewables, clean power, innovation, solar power, public policy impacts, and even gas turbine technology. This

comprehensive agenda guaranteed that every major energy domain's challenges and opportunities were thoughtfully explored.

With so many dynamic forces at play, this forum allowed energy's brightest minds to illuminate the challenges and opportunities that lie ahead. Their forward-looking discourse painted a vivid picture of where the industry is headed amidst tectonic regulatory and political shifts. As the energy transition unfolds, events like these are crucial for charting the course.



(L to R): Mike Sommers, President & CEO, American Petroleum Institute; Arshad Mansoor, President and CEO, Electric Power Research Institute; Acting Executive Director Sheila Hollis (l) and USEA Board Chair Vicky Bailey (r) speak during the 2023 State of the Energy Industry Forum; Charlie Riedl, Executive Director, Center for Liquefied Natural Gas, speaks during the 2023 State of the Energy Industry Forum

2023 ANNUAL MEMBERSHIP MEETING & PUBLIC POLICY FORUM

The United States Energy Association (USEA) held its Annual Membership Meeting & Public Policy Forum on May 25, 2023. The event allowed top energy officials to share insights on the changing regulatory landscape, meeting future energy demands, and the industry's path forward amid the clean energy transition.

USEA presented its highest individual honors - the 2023 United States Energy Award to Robert C. Rowe (President & CEO (Ret.) of NorthWestern Energy), a Lifetime Achievement Award to Thomas R. Kuhn (President & CEO of the Edison Electric Institute), and Volunteer Awards. The United States Energy Award recognizes preeminent energy leadership and contributions to advancing global energy initiatives. The Lifetime Achievement Award honored Kuhn's distinguished career and decades of service on USEA's Board.

USEA also recognized the Southern African Power Pool (SAPP) Coordination Centre with the Corporate Volunteer Award for their contributions to USEA's Energy Utility Partnership Program which supports energy development globally. The Individual Volunteer Award went to Michael Meason of Western Farmers Electric Cooperative for his expertise in helping utilities worldwide strengthen cybersecurity and digitalization.

USEA AWARDS

Congratulations to the 2022-2023 Award Recipients



2023 United States Energy Award
Robert C. Rowe, President and CEO, NorthWestern Energy, (Ret.)



Lifetime Achievement Award
Thomas R. Kuhn, President and CEO, Edison Electric Institute



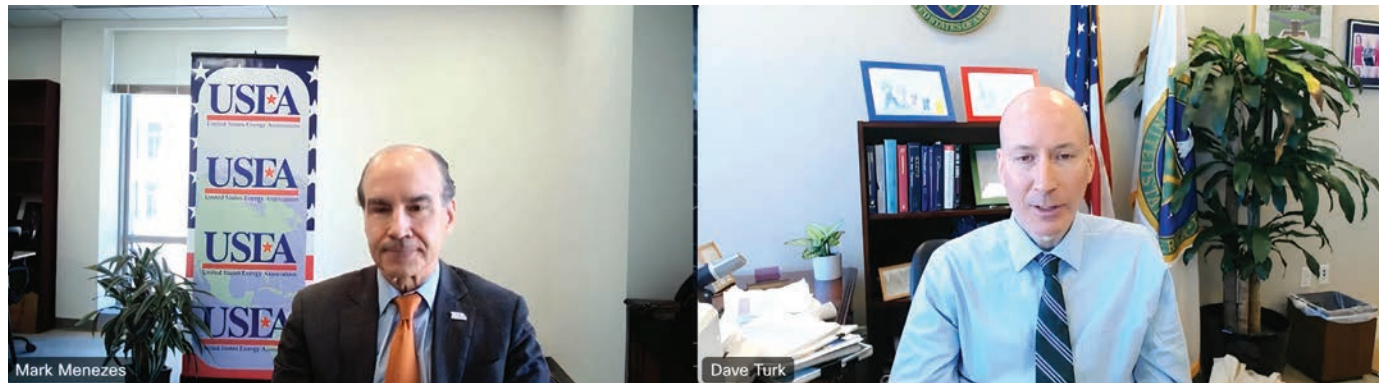
Corporate Volunteer
Stephen Dihwa, Executive Director, Southern African Power Pool Coordination Centre



Individual Energy Volunteer
Michael Meason, Senior Manager, Information and Security, Western Farmers Electric Cooperative

2023 5TH ANNUAL ADVANCED ENERGY TECHNOLOGY FORUM

Each year, USEA's Advanced Energy Technology Forum explores technological innovation in the energy sector. The event focuses on research and development in the corporate and government sectors, including national labs and universities.



USEA President and CEO Mark Menezes speaking with Deputy Secretary of Energy David Turk at the 2023 AETF.

This year, expansions of artificial intelligence and machine learning initiatives like those at the University of Florida provided insights into challenges and opportunities for applying these technologies in the electricity sector. This highlighted the importance of industry-academic partnerships and innovative startups in driving the energy transition, as well as efforts by institutions like the Massachusetts Institute of Technology to enable green development globally.

Representatives from national labs including the Idaho National Laboratory (INL) and the National Renewable Energy Laboratory (NREL) discussed their distinct but complementary roles in the innovation ecosystem. INL focuses on nuclear energy and other priorities through industry and university collaborations, while NREL accelerates renewable energy and efficiency solutions across sectors.

Cross-sector partnerships involving academia, industry, startups, and national labs were emphasized as critical for overcoming obstacles, capitalizing on opportunities, and advancing technologies to facilitate the energy transition from scientific discovery through commercialization.



JSET

Supporting The Clean, Secure Energy Transition Across Europe And Eurasia

The USEA Just and Secure Energy Transition (JSET) program supports the countries of Europe and Eurasia as they make a secure transition to a clean energy economy. In partnership with the United States Agency for International Development (USAID), the JSET program builds upon 30 years of groundbreaking development assistance in the region and sets an ambitious plan to improve the renewable energy readiness of countries in the region while ensuring that they can maintain reliable, secure energy during the clean energy transition. The program harnesses US energy industry expertise and experience, as well as the expertise of partner organizations around the world, to aid in the region's transition.

For the countries in the region—with a particular focus on those in Southeast Europe, the Balkans, and the South Caucasus—the JSET program aims to: operationalize and integrate regional energy markets; improve energy system operation and integrate reliable, cost-effective clean energy technologies into energy networks; improve regional energy sector resilience and response capabilities to disasters and extreme events; increase adoption of US-developed or supplied grid enhancing technologies; and improve public understanding of the benefits of a clean energy transition.

IMPROVING QUEUE MANAGEMENT

Many countries face a similar challenge: the need to prioritize and rank-order all the offers they receive for connection to the high-voltage grid, particularly for clean energy, which are often far greater than the grid can accommodate. While providing considerable benefits, rapidly increasing renewable generation capacity requires considerable planning and investment in substations and the network, and presents issues relating to congestion, balancing, cross-border flows, and reliability.

With an efficient and transparent queue management process, transmission companies, regulators, and policymakers can accelerate and bring online the most cost-effective clean power options. Since 2023, the USEA JSET program has supported the Western Balkans to meet their ambitious clean energy targets by helping design and implement a multi-faceted “first-ready, first-served” approach to determine which new generation projects should be able to connect, and in what order, using worldwide best practices as applied to each country.

ASSESSING RESOURCE ADEQUACY

The region is anticipating sharp reductions in fossil generation, rapid additions of renewables, cross-border integration of power markets, and transmission upgrades to satisfy future demand and achieve climate goals. Stitching all these changes together into a plan that will continue to provide reliable power supplies to all customers—24/7/365—is the essence and the challenge of resource adequacy.

JSET is conducting the first-ever resource adequacy assessment focused on Southeast Europe with analysis down to the 110kV network level to determine whether reliability is at risk in 2030. If a reliability risk is identified, JSET will recommend—and help the countries implement—a range of solutions, including incentivizing investment in cleaner, more flexible generation, upgrading the grid, implementing demand response programs, accelerating renewables and storage, and organizing a regional capacity market.

GEORGIAN ENERGY LEADERS ADOPT PROJECTIONS FOR NATURAL GAS DEMAND

The Republic of Georgia has experienced a rapid increase in natural gas demand over the last five years. If growth in demand continues at this pace, the Georgian gas transmission network may be unable to deliver sufficient volumes of gas, especially during peak demand periods.

Each organization across the Georgian energy sector traditionally used its own data and methodology/software and generated its own unique assumptions about natural gas demand to make predictions about energy use. However, additional coordination was necessary to develop a country-wide outlook of natural gas annual and peak demand over the next 25 years. The JSET program assisted in developing a set of scenarios and data models to predict Georgia's annual and peak-load demand for natural gas through 2050.



In October 2023, JSET convened an executive and expert project group that included operators of electricity and gas transmission systems, a national oil and gas trading company, a regulator, and representatives of the government's Ministry of Economy and Sustainable Development. At the end of the meeting, after achieving a consensus agreement on the USEA report, participants adopted it as the recognized gas demand forecast for the energy sector of Georgia. The nation's energy sector now has expertise in long-term forecasting and modeling, which will serve Georgia well into the future. Policymakers can now use the report—and recommendations made within it—to make decisions about the country's energy future. The report will inform the need for future projects (including construction of additional natural gas infrastructure) and will be used as a negotiation platform for gas supply agreements with other democratic countries in the region and with the EU/ Energy Community countries.

SUPPORTING MOLDOVA'S ENERGY SECURITY AND INDEPENDENCE

JSET and other partners under the USAID U.S.-Europe Energy Bridge are helping Moldova build new energy linkages across Europe and prepare for EU accession.

In 2023, JSET conducted a prefeasibility study to identify the interconnection points for a third tie-line between the Moldovan and Romanian transmission networks. That analysis will inform a full feasibility study and, ultimately, the construction of the line necessary to integrate energy markets.

USEA also helped Moldova develop a winter emergency contingency plan to prepare for the possible disruption in electricity or gas supply by its current supplier. The plan provided detailed instructions for Moldova's electricity dispatchers to import electricity over the 110kV network shared by Moldova and Romania.

JSET has facilitated a valuable peer mentoring relationship between Transelectrica and Moldelectrica, the transmission system operators in Romania and Moldova. Over the last two years, Transelectrica has been an integral part of efforts to improve Moldova's energy security by lending its expertise and experience to help Moldelectrica implement changes that will help Moldova meet requirements for permanent synchronization with ENTSO-E, the European electricity network.



IMPROVING RESILIENCE AND RESPONSE TO CYBERSECURITY THREATS

Since 2023, JSET has supported Albania's energy sector critical infrastructure operators to improve their cybersecurity posture by providing hardware, software, technical support, and training to inventory network assets, assess network vulnerabilities, improve situational awareness, and respond to attack.



SUPPORTING MARKET COUPLING PROJECTS IN EUROPE AND EURASIA

Under the USAID U.S.-Europe Energy Bridge, JSET is working with countries in Southeast Europe and the South Caucasus region to help integrate their electricity networks with regional and EU energy markets. Connected energy markets throughout Europe create a more secure energy supply by providing countries with diverse options for electricity and gas while accelerating a just and secure clean energy transition for the region. JSET and other Energy Bridge partners are helping transmission system operators, market operators, and national regulatory authorities to restructure and modernize their operations and procedures to align with EU principles, legal and regulatory guidelines, market rules, and operational codes. This assistance includes the development of regional and national energy regulations to promote transparency and competition, the development of new institutions such as power exchanges and market operators to oversee competitive electricity markets, supporting market participants with training and capacity building, enhancing trading strategies, and enabling consumer choice.

JSET is now helping neighboring countries in the Western Balkans couple their electricity markets with EU countries to join the European single electricity market. In November 2023, JSET facilitated the signing of a memorandum of understanding between energy stakeholders in Albania, Kosovo, Greece, and North Macedonia to begin a comprehensive effort to prepare for the coupling. JSET subsequently facilitated a 12-party agreement that lays out the technical details of this work. The JSET program conducted gap analyses for non-EU transmission system operators focused on implementing operational changes required to couple markets with Greece and other EU members in the coming years. This movement is gaining momentum with the first successful coupling of Albania and Kosovo's day-ahead electricity markets in March 2023 – the first in the Western Balkans region.

JSET facilitated a memorandum of understanding between USEA, Moldelectrica, and Transelectrica, the national transmission system operators of Moldova and Romania, outlining the scope of cooperation on market coupling to come in 2024.

RAPID RESPONSE IN ARMENIA

In October 2023, the USEA JSET program helped to convene and dispatch a rapid energy security and assessment and response team to Armenia during the most recent Nagorno-Karabakh conflict. The team developed plans to improve resilience of the national energy sector and to ensure a stable supply of energy in the event Armenia's natural gas and nuclear fuel supply or electricity interconnections were disrupted as a result of an expanded regional conflict.

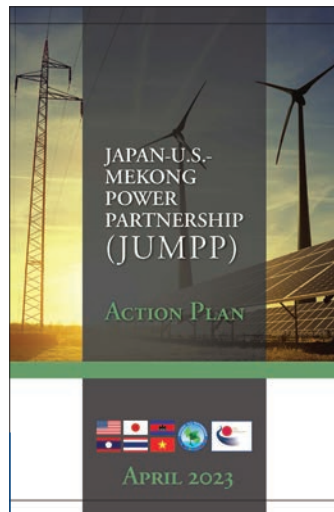
EMIM



Energy Market Investment and Modernization

CLEAN EDGE (ENHANCING DEVELOPMENT AND GROWTH THROUGH ENERGY) ASIA: INDO-PACIFIC ENERGY MARKET INVESTMENT AND MODERNIZATION

The Indo-Pacific Energy Market Investment and Modernization (EMIM) project is funded by the U.S. Department of State's Bureau of Energy Resources (ENR) and implemented by USEA. The goals of EMIM are to strengthen the energy security of U.S. allies and partners; create open, efficient, rule-based, and transparent energy markets; improve free, fair, and reciprocal trading relationships; and expand access to affordable, reliable energy to advance the goals of ENR's Power Sector Program and Energy and Mineral Governance Program as well as the U.S. government's Clean EDGE Asia initiative and the Japan-U.S.-Mekong Power Partnership (JUMPP).



ADVANCING COMPETITIVE POWER MARKETS AND CLEAN ENERGY IN THE LOWER MEKONG REGION

From January through December 2023, EMIM convened representatives from Cambodia, Lao PDR, Thailand, Vietnam, and Japan for quarterly JUMPP Technical Advisory Group (TAG) meetings to discuss the priorities for technical cooperation reflected in the JUMPP Action Plan, which was released in April 2023. The Action Plan is a 2020 ministerial commitment under the Mekong-U.S. Strategic Partnership that sets goals and technical assistance priorities on clean energy, power trade, and market development. Key accomplishments included discussing the selection and advancement of pilot interconnectors between Cambodia, Lao PDR, and Thailand to improve regional power trade on existing transmission infrastructure – an economical way to improve regional interconnectivity and energy security in the power grid. The JUMPP TAG is an example of U.S. and Japanese support for Mekong energy security, power sector decarbonization, and enhanced interconnectivity.

The JUMPP Action Plan, containing a strategic vision for U.S.-Japanese-Mekong cooperation in the power sector and over 40 agreed activities to support the Lower Mekong's clean energy transition goals.

USEA organized the first in-person meeting of the JUMPP Technical Advisory Group in Bangkok, Thailand in April 2023.



SUPPORTING CAMBODIA'S ELECTRIC GRID RESILIENCE

In December 2023, USEA hosted a workshop in Phnom Penh, Cambodia for a soft release of a Market Study for battery energy storage systems (BESS) in Cambodia under JUMPP. The BESS Market Study was carried out in partnership with ENR implementer and USEA member Deloitte & Touche Tohmatsu. The workshop included the discussion of key recommendations to accelerate the deployment of BESS in Cambodia for grid support services and peak shaving – storing excess energy from solar resources during periods of low power demand and dispatching the energy to the grid during periods of high demand. The workshop included stakeholders from the Ministry of Mines and Energy of Cambodia (MME), Électricité Du Cambodge (EDC), and the Electricity Authority of Cambodia (EAC). The market study lays the foundation for the integration of over 120 MW of utility-scale BESS projects in Cambodia through 2040. BESS will be a key enabler for Cambodia's target to commission more than 3,000 MW of solar PV generation by 2040, a significant amount of variable renewable energy in the context of Cambodia's power grid, which currently has an installed generation capacity of 4,800 MW.



Representatives from the Ministry of Mines and Energy of Cambodia (MME), Électricité Du Cambodge (EDC), and the Electricity Authority of Cambodia (EAC) participate in the Stakeholder Workshop for the Market Study for BESS in Cambodia.

ENABLING SRI LANKA'S CLEAN ENERGY TRANSITION

In May 2023, USEA organized a Study Tour on Clean Energy Integration for the Sri Lanka Sustainable Energy Authority (SEA), Ceylon Electricity Board (CEB), and Public Utilities Commission of Sri Lanka (PUCSL). The Study Tour to the United States focused on clean energy transition topics including battery energy storage systems (BESS) and renewable energy forecasting and integration. Technical experts from the GE Vernova, Pacific Gas & Electric, Sacramento Municipal Utility District, and the California Energy Commission shared the latest technology trends and leading practices to enable Sri Lanka to pursue its goals of accelerating the clean energy transition and provide affordable, reliable, and clean energy to all.



Power sector leaders from Sri Lanka tour Pacific Gas & Electric's Elkhorn BESS site.

SUPPORTING CLEAN ENERGY INNOVATION IN BHUTAN

In January 2023, EMIM, in partnership with USEA member Tetra Tech and Roland Berger Consulting, delivered technical assistance to the Bhutan Department of Energy to support Bhutan's aspirations of developing a green hydrogen economy and preserving its status as a carbon-neutral economy. Through this project, EMIM completed a green hydrogen market Study for Bhutan, which includes a framework and strategy for targeted investments, policy reforms, and stakeholder organization to develop a green hydrogen market using Bhutan's abundant hydropower generation resources. EMIM and the Bhutan Department of Energy unveiled the market study to stakeholders in Thimphu in January 2023. Following the completion of the market study, EMIM organized a Study Tour on Green Hydrogen, bringing Bhutanese stakeholders to the United States to visit green hydrogen companies and identify technologies to deploy in Bhutan. EMIM continued its support by working with the Bhutan Department of Energy in developing a detailed "National Green Hydrogen Roadmap," which was released to the public in December 2023 at Bhutan's first ever country pavilion at the UNFCCC 28th Conference of Parties in Dubai, UAE.



EMIM staff and a team of consultants survey the future site of Bhutan's first green hydrogen production facility outside the capital city of Thimphu.

EMPOWERING SOUTHEAST ASIAN AND PACIFIC WOMEN ENERGY PROFESSIONALS

From January through November 2023, the Female Leadership In Energy (FLIE) partnership, with funding from ENR, continued to advance the professional development of early to mid-career women working in energy sectors across Southeast Asia and the Pacific region. Through FLIE, thirty-two women from Southeast Asia and the Pacific participated in a two-year leadership skills development and mentorship program, which partners the mentees with senior female energy leaders from the United States. In 2023, EMIM held the final two of a series of six workshops intended to increase participants' industry and job function knowledge, as well as leadership skills, to empower them to lead the clean energy transition. The workshops took place in-person in Bangkok, Thailand and Bali, Indonesia, focusing on clean energy technologies, the experiences of women energy leaders, and leadership skills development training. During the workshops, industry experts delivered technical presentations on solar, wind, hydrogen, battery energy storage systems, grid management technologies, and energy systems of the future. Mentees also engaged with several women industry leaders, who shared their professional career experiences and advice for advancement. Finally, mentees completed two study tours in 2023 with nine mentees participating in a one-week job shadow program at the Pacific Northwest National Laboratory.



Participants in the FLIE mentorship program meet in Bangkok, Thailand in April 2023 to deliver presentations on their accomplishments through developing FLIE Capstone projects.

Principal Deputy Assistant Secretary for Energy Security Laura Lochman from the U.S. Department of State, Bureau of Energy Resources presents certificates to some of the FLIE participants celebrating their successful completion of the mentorship program in November 2023.



2022-2023 Energy Award

**Robert C. Rowe - President & CEO,
NorthWestern Energy 2023 Recipient**

USEA is honored to recognize Bob Rowe as the recipient of the 2023 United States Energy Award. The United States Energy Award is one of the most respected awards within the energy industry. Established in 1989, the award recognizes preeminent energy leadership and contributions to the international understanding of energy issues.

Each year, USEA announces the call for nominations of individuals to receive this prestigious award. The Award Selection Committee examines each nominee's leadership, history of proven accomplishments, and efforts in advancing global energy initiatives. Support for the United States Energy Association is also a major consideration.

In 2023, the Selection Committee found the award to be a fitting tribute to Mr. Rowe. He not only meets but far exceeds the qualities that USEA seeks in its United States Energy Award recipients. Bob joins a group of elite industry leaders who share this honor and distinction.

"Bob is a passionate and eloquent advocate for collective action to accelerate the pace and scale of the clean energy transformation, as well as for the importance of investing in infrastructure and partnerships to enhance resilience against the impacts of climate change. He also is a firm advocate for smart energy regulation and its immense value for advancing the needs of all customers and all communities. Taken together, I can think of no better person than Bob Rowe to be recognized by USEA for outstanding leadership. Congratulations, Bob."

- Tom Kuhn, President & CEO, Edison Electric Institute

Bob Rowe served as CEO of NorthWestern Energy from August 2008 until retiring in January 2023, and was also the only non-independent director on NorthWestern's Board. Bob is widely respected throughout the electric and natural gas sectors, and in the regulatory and investor communities. Bob and his strong and cohesive management team tripled NorthWestern's market capitalization, earnings per share, and rate base.

They built a national reputation for excellent corporate governance. Bob's areas of focus included longterm infrastructure planning; building a diversified electric supply portfolio; employee safety and culture; customer service and community engagement.

Bob's strengths include collaborative approaches to working with boards and management; excellent corporate governance skills; strategic planning and execution; legal and regulatory experience; public policy development; financial acumen; and, technical acumen.

Bob served on the American Gas Association (AGA) Board of Directors and Executive Committee. He served on the Edison Electric Institute (EEI) Board of Directors and Executive Committee, and co-chaired both EEI's Institute for Electric Innovation, and its CEO Committee on State Policy and Engagement. Bob also served on the Western Energy Institute (WEI) Board of Directors and Executive Committee (Past Chair).

In addition, Bob serves on multiple non-profit boards, including Yellowstone Forever, the non-profit partner of Yellowstone National Park. Bob has been an NACD Governance Fellow since 2011, and in 2021 earned the NACD Directorship Certified (trademark).

Prior to joining NorthWestern, Bob was Co-founder and Principle of Balhoff, Rowe & Williams, LLC, a national policy and financial consulting firm, focusing on technology and telecoms companies, including transactions and strategy. Clients included mid-cap and large-cap wireline and wireless companies and associations.

From 1993 to 2004 Bob was a Commissioner on the Montana Public Service Commission. During this time he served as President of the National Association of Regulatory Utility Commissioners (NARUC); as Chair of the NARUC Telecommunications Committee; as a member of the Federal Communications Commission (FCC) Federal-State Joint Board on Universal Service; as proposer and member of the FCC Federal-State Joint Conference on Advanced Services; and as proposer and Chair of the thirteen state Operations Support Systems Collaborative working with Qwest and its competitors on compliance with the 1996 Federal Telecommunications Act. Rowe also served on the National Research Council, Computer Science and Telecommunications Board, Committee on Broadband Technology; and, on numerous university-based advisory boards focused on technology, utilities, regulation and public policy.

From 1980 until 1993, Bob was an attorney with Montana Legal Services Association, having served as a VISTA Volunteer (Volunteers in Service to America) immediately after law school.

Bob earned a Juris Doctorate from the University of Oregon. He has a Bachelor of Arts degree from Lewis & Clark College in Portland Oregon. Bob also completed the University of Chicago Booth School of Business Advanced Management Program; and, the Harvard University Kennedy School of Government Executive Program, among other professional education programs.

Where we've made A DIFFERENCE





2023 Virtual Press Briefings

**S&P Global
Platts**

**The
Guardian**

UTILITY DIVE

Throughout the year, the United States Energy Association (USEA) orchestrated a comprehensive series of virtual press briefings, hosted by Llewellyn King, each tackling pivotal issues within the energy sector. Expert panels engaged in robust discussions on topics ranging from deployment timelines to regulatory hurdles, while journalists from publications such as Forbes, The Wall Street Journal, Energy Central, Utility Dive, and E&E News posed probing questions. In February, the spotlight was on Small Modular Reactors (SMRs), heralded as the next frontier in nuclear power.

In March, attention shifted to the mounting challenges confronting the U.S. electricity supply system. With escalating demand driven by electrification initiatives, concerns over grid stability and infrastructure resilience took center stage.

Subsequent briefings delved into an array of topics, including the burgeoning adoption of distributed energy resources (DERs), the transformative potential of electric vehicle (EV) proliferation, and the integration of artificial intelligence (AI) in utility operations.

As the year progressed, the discussions expanded to encompass broader themes such as the transition away from fossil fuels, the impact of climate change on energy infrastructure, and the looming specter of energy crises exacerbated by extreme weather events. With each briefing, the USEA provided a neutral platform for stakeholders to collaborate, share knowledge, and forge innovative solutions to the multifaceted challenges facing the energy sector.

As the year drew to a close, the spotlight turned to energy crises amidst organic growth, increasing electrification demands, and supply chain disruptions. As always, our panel of journalists guided discussions, probing into the complexities of energy resilience and the urgent need for strategic planning in the face of unprecedented challenges.

Throughout the year, the USEA's virtual press briefings served as critical forums for stakeholders to engage in nuanced discussions, explore emerging trends, and chart a sustainable path forward in an increasingly complex and interconnected energy landscape.

POLITICO
Forbes

In 2023, the United States Energy Association launched the Power Sector Podcast. The USEA Power Sector Podcast brings new voices and new ideas to key energy system conversations in 15-minute interviews targeting urgently needed solutions. Topics range from when, where, and how generation and transmission should be expanded to what resources and technologies are needed to ensure distribution systems remain reliable.

The podcast highlights the voices of those building and implementing tomorrow's energy system and of the policymakers who, in response to consumer demand, are setting the goals for a renewed power sector. It also features regular check-ins with state and federal agencies like the Department of Energy and public utility commissions to see what they are doing to drive and support change.

USEA Power Sector Podcast

New Episodes Every Week



Herman K. Trabish
Contributing Editor
Utility Dive



The podcast draws on USEA's diverse technology- and business-oriented members now caught up in today's sweeping changes of the way energy is harvested, used, and paid for. And it will draw on USEA's international membership to link U.S. challenges to those facing the rest of the world.

The USEA Power Sector Podcast is hosted by Herman K. Trabish, a contributor for Utility Dive and recurring panelist on USEA's virtual press briefings.



EUPP

Energy Utility Partnership Program

The Energy Utility Partnership Program (EUPP) is a cooperative initiative between the United States Energy Association and the United States Agency for International Development under the Bureau for Resiliency, Environment, and Food Security (REFS). EUPP establishes bilateral and regional volunteer partnerships between the U.S. energy industry and energy organizations in USAID-assisted partner countries. Practitioner-to-practitioner partnerships allow advanced energy entities to share best practices and hands-on experience with their overseas counterparts through technical exchanges and other capacity building activities.

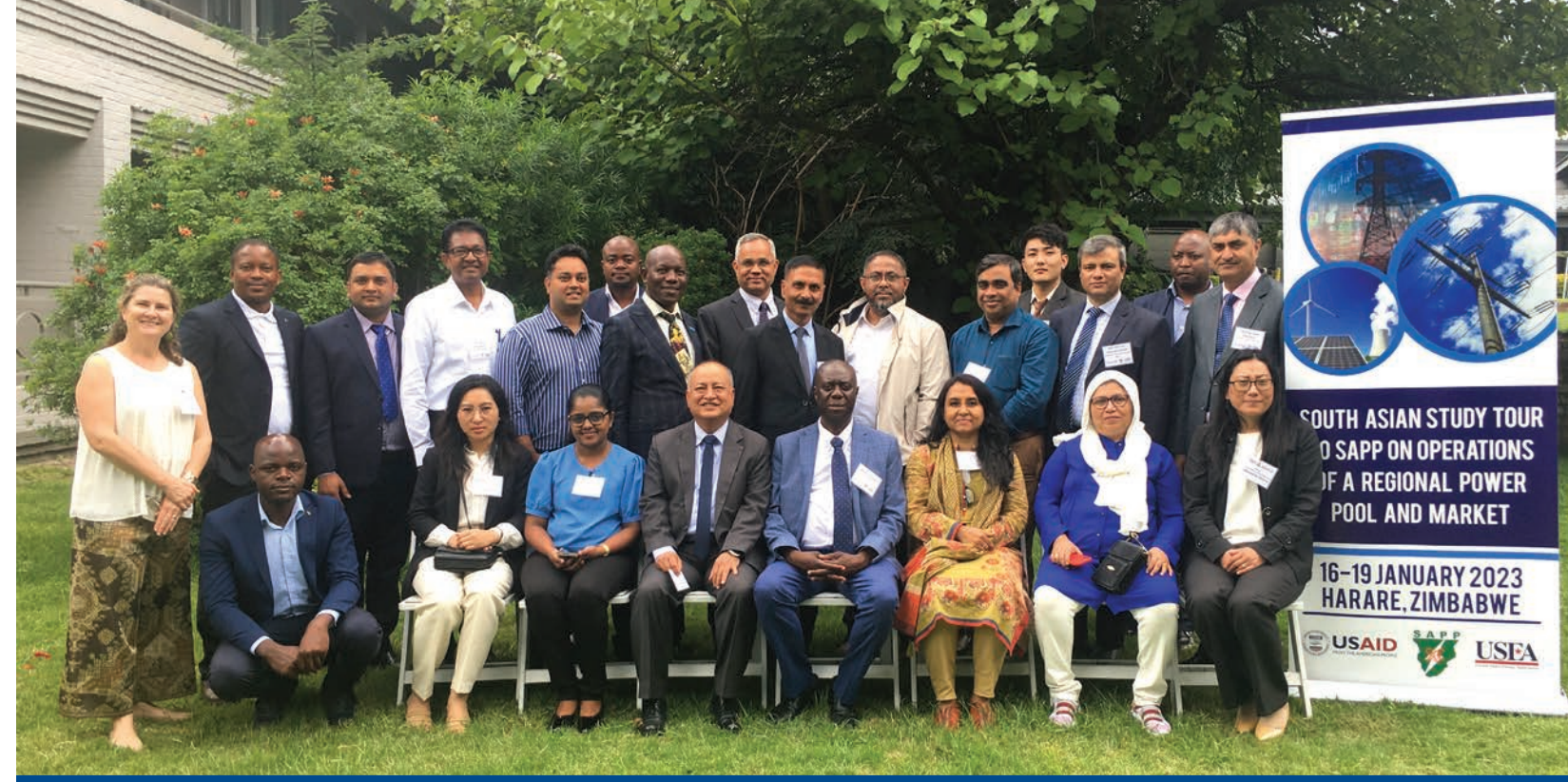
EMPOWERING SOUTH ASIA'S ENERGY MARKET: STRATEGIES FOR ENHANCED TRADE AND TRANSFORMATION

Cross-border energy trade delivers economic growth, optimizes energy resource utilization, promotes resource-efficient integration of variable renewable energy, provides environmental benefits and risk mitigation, and ultimately enhances energy security. The establishment of a regional power market in South Asia would have significant impacts on the region.

For the past 25 years, EUPP has assisted the region to improve their institutional capacity to design and operate energy market mechanisms and enable systemic

conditions for energy trade. A key part of this has been the sharing of best practices with the South Asian's counterparts, including the Southern African Power Pool (SAPP) Coordination Center. This year, SAPP hosted select government officials and administrative leaders from energy and power ministries and regulatory boards representing Bangladesh, Bhutan, Nepal, and Sri Lanka. This visit focused on SAPP's development mandate, market regulations and monitoring, operational issues, economics, environment, and IT. The culmination of these talks was a visit to the new SAPP Coordination Centre and Control

South Asian officials visiting the African Transmission Corporation (ATC) Centragrid Solar Farm in Nyabira, Zimbabwe

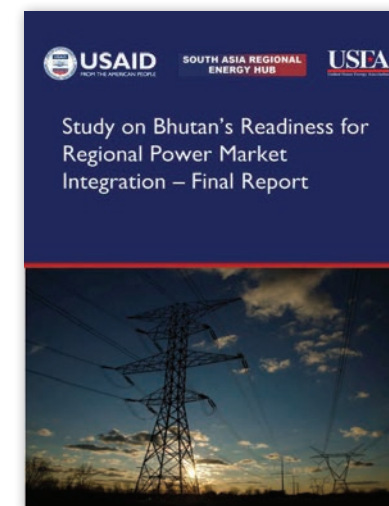


South Asian study tour participants and USEA with the Southern African Power Pool Coordination Centre staff in Harare, Zimbabwe in January 2023

Room, where the participants could witness the common power grid between the Southern African countries and a common market for electricity in the Southern African Development Community (SADC) region. SAPP continues to be a role model for regional cooperation and coordinated planning and operation of electric power systems, showcasing how to facilitate electricity trading and increase access to affordable electricity in a reliable and sustainable manner.

BHUTAN: PREPARING THE COUNTRY FOR A REGIONAL MARKET

Bhutan is the only country in the world where prosperity is measured through a Gross National Happiness (GNH) index. Traditionally, Bhutan's policies on socio-economic development are guided by an expected increase in the GNH. Blessed with abundant resources of clean energy (mainly hydro), Bhutan has rightly recognized that developments in the energy sector and increase in power export can open new avenues for economic growth and sustainable development to improve the quality of life for its citizens.



Bhutan's experience of cross border electricity trade has been exemplary; however, the trade is limited with India only. With an estimated hydropower potential of 30 GW, only about 1.7 GW has been tapped so far and the country offers huge potential of power export to other countries in the Bangladesh-Bhutan-India-Nepal sub-region. With the rising electricity demand in the region, regional power cooperation will gain further importance as economies focus on increasing affordability and reliability of supply, while trading low carbon and energy secured pathways.

To support this shift, EUPP commissioned a study to highlight Bhutan's readiness for regional electricity integration and make recommendations to accelerate power trade past India and beyond the inter-governmental agreement route. The study focused on the structural, institutional, financial, and judicial strengths and weaknesses of Bhutan and their willingness to reform these areas. As a result of the study, Bhutan has a roadmap of the necessary policy and regulatory reforms, human infrastructure and capabilities, grid infrastructure, and geo-political pieces necessary to accelerate their market driven scale-up and for cross border trade to flourish.

USEA consultant leads a training session on power system modeling for Central Asian transmission operators, Tashkent, Uzbekistan, September 2023.



CENTRAL ASIA: HELPING REGIONAL UTILITIES EXPAND RENEWABLE ENERGY INTEGRATION

All Central Asian country governments have set ambitious goals for the development of renewable energy – 50 percent by 2050 in Kazakhstan, 25 percent by 2030 in Uzbekistan, and 20 percent by 2030 in Tajikistan. These clean energy targets have become increasingly important vectors of the regional government's strategy for economic development. USEA has provided regional utilities with technical assistance and capacity building support that will create an enabling environment for the establishment of a unified power system in Central Asia and for expanded integration of renewable generation throughout the region.

- Provided the regional Coordinating Dispatch Center (CDC) Energia with a regional dynamic model for the existing topology and with a System Stability and Reliability Study – Current State to determine potential future network instability issues due to the integration of new renewable generation facilities and developing possible technical and engineering solutions to address those issues.
- Provided Tajikistan transmission system operators with a study on System Stability and Reliability Studies – Prospective State to analyze the future system's behavior and develop possible technical and engineering solutions to avoid network instability that might be caused by renewable integration.
- Activities by the numbers:
 - ✓ 6 regional energy stakeholders provided with clean energy capacity building assistance
 - ✓ 5 trainings conducted
 - ✓ 84 utility personnel trained
 - ✓ 41 utility personnel certified by the Institute for Electrical and Electronics Engineers (IEEE)

TANZANIA: PREPARING TANZANIAN POWER SYSTEM FOR INTERCONNECTION WITH KENYA

The Tanzania and Kenya power systems are scheduled to connect to ensure stable, reliable, and affordable power supply and reduce operational costs in both countries and the region, contributing to East Africa's economic development. In the long run, it will establish a favorable environment for cross-border power trade and contribute to the reduction of Greenhouse Gas (GHG) emissions by replacing some thermal energy production with cheaper hydropower. To ensure that the Tanzania Electric Supply Company (TANESCO) has adequate capacity to take full advantage of the interconnections and maintain the stability of the national power grid, EUPP provided TANESCO with a detailed list of identified gaps in existing protocols and procedures for managing the interconnection and recommendations for improvement. TANESCO also received an Operational Planning Document within Interconnected Systems Guidelines and Roadmap for the Establishment of Main Coordination Processes, and an Inter-ISO Operation Agreement template. EUPP also provided power dispatchers of TANESCO's National Grid Control Center with comprehensive training to develop the knowledge and skills of multi-tasking dispatchers, including the management of essential control room equipment and the understanding and application of the latest operational procedures.



Tanzanian power dispatchers learn best practices of operating an interconnected power system at the National Control Center of Serbia, Belgrade, November 2023.

PROMOTING U.S. BATTERY STORAGE OPTIONS IN COLOMBIA

In Colombia, reducing the energy burden from diesel in remote areas and increasing access to reliable and clean energy is a priority of the Ministry of Mines and Energy, especially in the peace zones. EUPP worked with USAID/Colombia and the U.S. Trade Mission to Colombia/U.S. Commercial Service in Colombia to bring together four U.S. private sector companies to share details on their equipment and remote battery storage trends to address the energy needs of remote and off grid communities. Battery storage options can provide a reliable source of power, reduce dependence on fossil fuels, enhance energy security, and enable sustainable development in remote regions by ensuring access to electricity, even in the absence of a centralized or reliable grid. The presentations demonstrated the technological capabilities and competitive advantages of using U.S. equipment, due to their rugged use cases and high reliability.



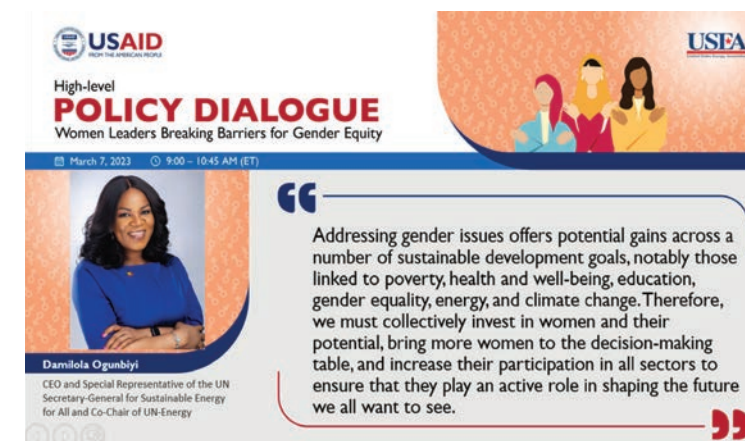
ENGAGING INDIGENOUS COMMUNITIES IN COLOMBIA

In response to the Colombian Government's interest in empowering indigenous energy communities through community-led renewable energy projects, EUPP conducted multiple activities on energy communities. EUPP began the project by hosting an Energy Community Workshop on best practices and international examples of relevant energy communities from around the world. Speakers shared their expertise on energy justice, policy development, and community-focused energy development. EUPP supported the 6th La Guajira Renewable Energy Congress to share international energy community examples. Following the Congress, recommendations were shared with Colombian stakeholders to help drive a new government policy on community energy. EUPP organized the third workshop for the private sector to get their perspective on energy communities and hear about their experiences with community energy projects. Following this series of workshops, the Colombian Government released several resolutions on Community Energy, and the regulator is looking at what regulations are needed in order to expand electricity access via such communities. Interest has been high, with more than 12,000 communities expressing interest in participating. These energy communities go beyond the energy cooperative model to democratize and increase participatory governance within the energy system, promoting both equitable and sustainable development. Including indigenous groups and other marginalized and under-represented communities is an effective way to ensure a just and secure energy transition and build the resilience of populations vulnerable to climate impacts, as well as help indigenous people and local communities achieve net zero.

DIVERSITY EQUITY AND INCLUSION

Women in Energy Interview Series

EUPP's partnerships champion diversity, equity, and inclusion to remove barriers. A more targeted effort is USEA's **Women in Energy Interview Series** which helps expand the visibility of women leaders and role models in energy with a focus on sustainability, clean energy, energy access and energy security, technology, infrastructure, and just transitions. Every month EUPP features a trailblazer woman who has shown exemplary leadership, overcome odds, and carved out her niche in the traditionally male-dominated energy sector. To date USEA has featured 65 women, representing 26 countries through the series. In 2023 we featured some remarkable women leaders.



High-Level Policy Dialogue Marking International Women's Day 2023

On the eve of International Women's Day, EUPP hosted a virtual **High-Level Policy Dialogue: Women Leaders Breaking Barriers for Gender Equity**. The program embraced equity and spotlighted the tremendous contribution of women working with national governments, the private sector, and civil society, prioritizing keeping gender central to green growth and climate action.

This "open for all" virtual dialogue included a high-level panel discussion on "Women Leaders Taking Affirmative Action on Gender Equity."

AmpUp

Advancing Modern Power Through Utility Partnerships (AmpUp)

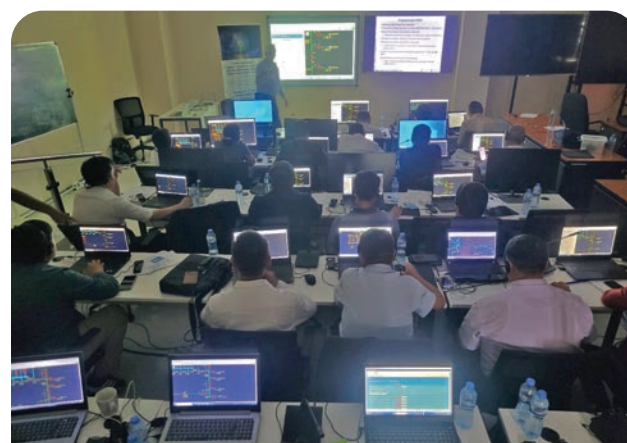
Advancing Modern Power Through Utility Partnerships (AmpUp) is a USAID-funded program centered around peer-to-peer relationships and strong practitioner and stakeholder networks to support net-zero goals. The development assistance is implemented by a consortium centered around peer-to-peer relationships and strong practitioner and stakeholder networks. The AmpUp program utilizes the vast experiences and knowledge of the organizations comprising the Consortium – a diverse team of five partners that avails USAID and the overseas partner utilities of an unparalleled network of utility and energy sector expertise. AmpUp leverages the expertise and knowledge of utilities and energy sector experts from around the world, applying lessons learned and incorporating new models of engagement to support the global energy transition. AmpUp is comprised of five organizations making up the implementing consortium: Arizona State University, MK Advisors, NRECA International, Segura Consulting, and USEA.

CYBERSECURITY: ENABLING UTILITIES IN LAC, CENTRAL ASIA AND VIETNAM TO RESPOND TO CYBER ATTACKS ON TRANSMISSION NETWORKS

Today's energy industry is undergoing rapid digitalization, conducting more and more operations and planning via online platforms that are vulnerable to attack. Because of this rapid change, the development of cybersecurity strategies is critical to reduce vulnerabilities, protect assets and ensure reliability. To address this need, AmpUp created and began implementing a Cybersecurity and Digitalization Partnership targeting utilities in USAID partner countries.

Virtual Simulation Training to Counter Cyber Attacks

In 2022, the cost of cyberattacks in the energy sector reached \$4.72 million worldwide. In 2023, cybercrime was expected to cost globally \$8 trillion, with critical infrastructure – including electric utilities – facing very high cyber risk exposure. To ensure that participating utilities receive the skills necessary to address cybersecurity challenges, AmpUp provided electric utilities in Latin America and the Caribbean, Central Asia, and Vietnam with an innovative virtual simulation training on Anticipating Generation/Transmission Emergencies and Preventing Equipment Damage. This training strengthened local partners' ability to counter and prevent cyber-attacks on critical energy infrastructure by building their capacity to detect, protect, respond, and recover from cyber-attacks.



Central Asian energy stakeholders participate in a virtual simulation training on responding to and preventing cyber attacks on transmission networks, Tashkent, Uzbekistan, September 2023.



A representative of the National Electricity Transmission Company of Uzbekistan and a volunteer speaker from the Electricity Transmission System Operator of North Macedonia discuss cybersecurity maturity models during a Workshop on Cybersecurity and Digitalization for the Energy Sector in Central Asia, Almaty, Kazakhstan, June 2023.

Comprehensive Course on Digitalization and Cybersecurity for the Energy Sector

Digitalization of the energy sector will help lower costs, increase efficiency and flexibility, and reduce emissions but will also result in more cyberattacks on critical infrastructure. To ensure that electric utilities are prepared to ramp up the development of robust cybersecurity strategies and resources to reduce cyber vulnerabilities, protect assets, and ensure reliability, AmpUp

provided energy stakeholders in Latin America, the Caribbean and Central Asia with a comprehensive online course on Cybersecurity and Digitalization for the Energy Sector. At the end of the course, participants developed Cybersecurity Strategic Action Plans for their respective organizations, summarizing useful cybersecurity practices gleaned from the course and ideas on how these practices can be utilized in participants' organizations.

- The course by the numbers:
- ✓ 73 participants competed the course and received certification by the Institute for Electrical and Electronics Engineers (IEEE)
 - ✓ 40 energy stakeholders in 14 countries provided with cybersecurity capacity building assistance
 - ✓ 40 Cybersecurity Strategic Action Plans developed

ENERGY EFFICIENCY (EE) INVESTMENT PROMOTION IN GUATEMALA

The key to reaching climate goals for the 21st century is not only to make reforms in electricity generation but also to improve energy efficiency across the board. Improvements to both power system efficiency and how electricity is used by the end customer are required to reduce country-wide carbon footprints. AmpUp consortium member Segura launched an initiative to identify specific opportunities for energy efficiency investments at the basic business unit level in Guatemala and assist the company owners in formulating investments as “bankable” projects with the aim to reach financial close.

Eight Guatemalan companies joined USAID's pilot program, including the second largest consumer of electricity in the country, a large steel mill. AmpUp is also working with three commercial banks to further explore using their green credit lines. In 2023, the AmpUp technical team inspected the property, plant, and equipment (PPE) of the companies and began drafting assessments that explored the potential for significant EE gains with the end goal of structuring projects and promoting EE investments, thus reducing GHG emissions.



PROMOTING AND ACCELERATING CLEAN ENERGY TRANSITIONS AND RESILIENCE IN PACIFIC ISLAND COUNTRIES

Addressing environmental justice and ensuring a just transition are necessary steps to achieve deep decarbonization and social equity. As societies move toward zero-emissions targets, policymakers, businesses, and the broader climate community have an obligation to ensure the well-being of communities disproportionately affected by these changes. Over 70 energy sector leaders and stakeholders from ten Pacific Island Countries came together to collaborate on project ideas and action plans that will help accelerate the transition to clean and resilient energy in the region.

The two-day regional workshop on Accelerating Clean Energy Transitions and Resilience in Pacific Island Countries organized by AmpUp consortium member Arizona State University mapped pathways, resources, and expertise needed to accelerate the transition towards zero emissions, renewable energy, and transformational investments for a resilient future. A training program was outlined to continue advancing the energy transition through additional workshops, technical assistance, training, and coaching.

SHARING BEST PRACTICES ON SUCCESSFUL OPERATION OF MINI-GRIDS WEBINAR SERIES

In recent years with improvements in renewable energy generation, power electronics, energy storage, and mini grids have expanded as an attractive off-grid electrification option to reach rural and remote communities with reliable electricity service.

AmpUp consortium member NRECA conducted and facilitated three webinars with energy sector experts from around the world, sharing global knowledge and practices on developing and operating mini grids as a viable option to bring lasting electric service to rural communities. Topics included how to successfully operate mini grids as a business, increase efficiency, reduce commercial losses, and the challenges of funding and sustaining mini grids. Attendees also learned why support and buy-in from the community it serves is crucial for the long-term success and sustainability of a mini-grid, and how to build and sustain community support.

SUPPORTING INDIA'S TRANSITION FROM COAL

Over the past two decades, approximately 650 coal-burning generators totaling over 85 gigawatts of generating capacity have retired in the United States (source: U.S. Energy Information Administration). A majority of the 217-remaining coal-burning power plants in the country were built in the 1970s and 1980s and are nearing the end of their operational lifetime. India's situation almost mirrors that of the United States. India's generation capacity from renewable sources nearly doubled in the last five years from 72 gigawatts (GW) to 133 GW, and they are moving quickly towards their target of 500 GW by 2030



To support this rapid transition, EUPP collaborated with the World Bank to conduct a study tour focused on current practices for retiring and repurposing of coal-fired power plants. Executives from the federal and state utilities and ministries of India spent a week in the United States studying approaches for the repurposing of decommissioned coal plant sites into cleaner energy purposes. The delegation focused on the reuse of the existing power transmission infrastructure, development of new generation capacity needed for the incoming years, providing relevant ancillary services to the system, and mitigating socio-economic impact of the proposed site and operating asset changes.

Site visit of the Brayton Point grid connection point for a 1,200-megawatt wind farm 37 miles off the coast of Massachusetts. Brayton Point Power Station, at 1,600 MW, was the largest coal-fired plant in New England when it retired in 2017.

SUPPORTING WOMEN ENTREPRENEURS IN KENYA

AmpUp created an accelerator and support program for energy entrepreneurs in Kenya in a partnership between the AmpUp consortium and Factor[e] Ventures. AmpUp consortium member Arizona State University (ASU) is leveraging their expertise leading regional National Science Foundation (NSF) Innovation Corps and lean start-up programs for market assessment, technology transfer, and technology piloting in the U.S. and globally.

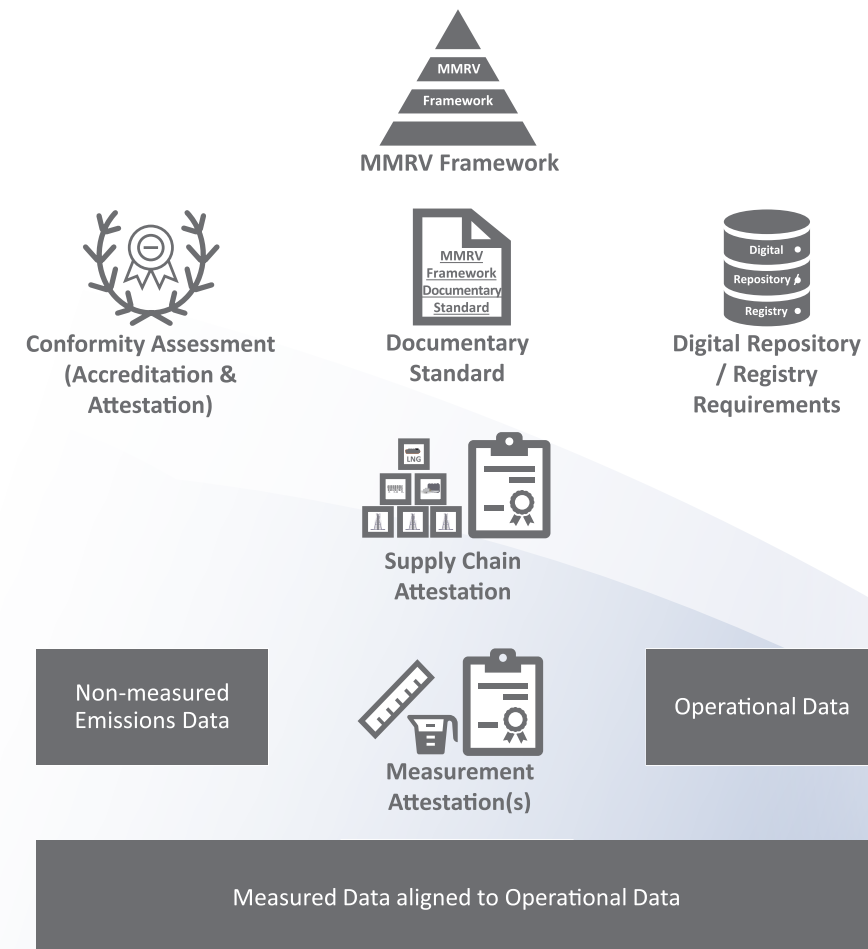
The activity targets early-stage energy sector companies that are women led and/or have a product or service that provides improvements to gender equity. The project goal is to support Kenyan women entrepreneurs to scale their businesses by providing \$50,000 USD grants and tailored technical assistance and mentorship. AmpUp selected three companies to participate in the program which is ongoing.



Consensus Oil & Natural Gas

Building International Consensus on Oil and Natural Gas

To tackle the joint challenges of ensuring energy security and mitigating climate impacts of energy systems domestically and internationally, USEA continued "Building International Consensus on Oil and Natural Gas." As the world continues to rely on oil and natural gas resources to meet energy and power demand, USEA is working with industry and governments to ensure that they are utilized responsibly. USEA continued to work in partnership with the U.S. Department of Energy's Office of Fossil Energy and Carbon Management to strengthen international energy relationships and promote the responsible use of oil and natural gas to enable a cleaner energy future.



Consistent measurement, monitoring, reporting and verification of greenhouse gas emissions data in the natural gas sector is critical as governments target lower greenhouse gas emissions. The diagram above shows the preliminary structure of a uniform framework for MMRV.

DEVELOPING A UNIFORM GREENHOUSE GAS AND METHANE EMISSIONS MEASUREMENT, MONITORING, REPORTING AND VERIFICATION FRAMEWORK

In 2023, USEA supported the U.S. Department of Energy, Office of Fossil Energy and Carbon Management, in a multilateral project with the governments of Australia, Brazil, Canada, Colombia, the East Mediterranean Gas Forum, Egypt, the European Commission, France, Germany, India, Italy, Japan, Korea, Malaysia, Mozambique, Norway, the United Arab Emirates, and the United Kingdom to improve international capacity to accurately analyze life cycle emissions of methane and greenhouse gases in the natural gas sector. The project kicked off in 2023 with the establishment of a Working Group and Technical Group to develop the foundation of this uniform, voluntary framework. In November 2023, the partner countries jointly announced the project and a commitment to finalizing the MMRV Framework in 2024.



U.S.-INDIA LOW EMISSION GAS TASK FORCE (LEGTF)

USEA serves as Secretariat for the U.S.-India Low Emission Gas Task Force (LEGTF) under the U.S.-India Strategic Clean Energy Partnership.

Throughout 2023, USEA worked with DOE officials, U.S. industry, the Government of India and India's natural gas industry to meet India's climate and energy goals through the deployment of maximally-abated natural gas.

The LEGTF supports the Government of India in three strategic areas where the U.S. industry has expertise:

1. Natural Gas Markets and Regulation
2. Natural Gas Grid Strengthening
3. Natural Gas for Lower Emissions

The Government of India meets six percent of its total energy consumption with natural gas; it seeks to increase that to 15 percent by 2030. Natural gas is an important tool for the Government of India to meet the emissions reduction targets announced at the COP26 Summit. In particular, natural gas can enable fuel switching from high-polluting fuels in the industry, agriculture, transportation, and residential sectors. Deploying natural gas, while mitigating greenhouse gas (GHG) emissions associated with gas infrastructure, can reduce hazardous emissions, with positive health benefits, and lower energy costs for users.

In 2023, LEGTF members continued the implementation of several pilot projects in India on using natural gas to displace high polluting fuels, accelerate the development of a clean hydrogen market in India using natural gas infrastructure, and creating virtual LNG pipelines using ISO containers outfitted with leak detection and monitoring equipment.



Consensus Carbon Management

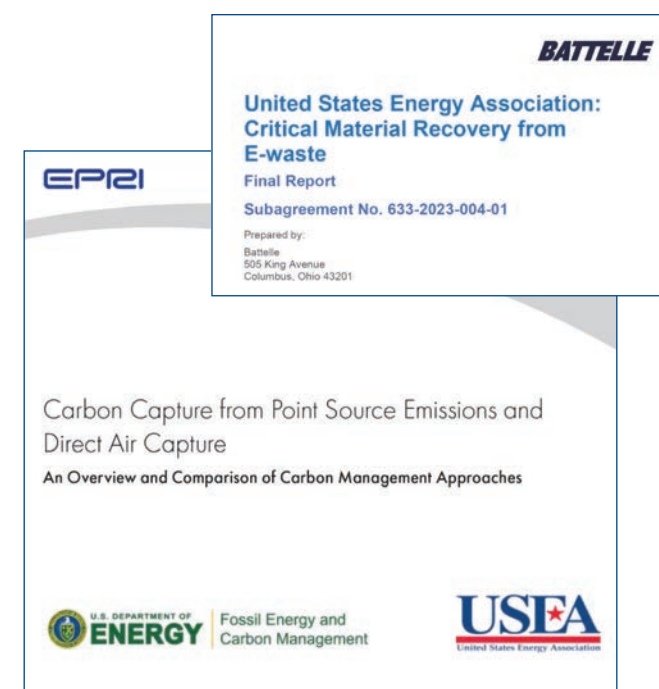
Promoting Consensus On CCUS and Carbon Management Technologies

The goal of the Promoting Consensus on CCUS and Carbon Management Technologies program is to educate the public, policy makers, industry, and other stakeholders and build a consensus on the benefits of Carbon Capture, Utilization, and Sequestration and other Carbon Management Technologies such as Carbon Dioxide Removal, Blue Hydrogen, and sustainable and domestic development of Critical Materials and Rare Earths technologies.

In keeping with its mission to increase understanding of energy developments domestically and internationally, USEA's Consensus Program, launched in 2008, is a cooperative program with the U.S. Department of Energy's Office of Fossil Energy and Carbon Management (DOE-FECM) to promote consensus on the need for Carbon Capture, Utilization, & Storage (CCUS) and other Carbon Management technologies to meet the world's decarbonization goals. While dramatic progress continues to be made in developing these technologies, neither the progress achieved to date nor the full capability of CCUS and carbon management technologies is widely understood - yet it must be if they are to have a significant global impact. The reality that much of the developing world will continue to use fossil fuels for decades to come, further underscores the need for these technologies.

These technologies also support an expanding market of opportunities for the use of CO₂ and carbon byproducts in the production of cement, fertilizer, fuels and more. Deployment of CCUS and carbon management technology holds the potential for rural job creation and revitalization through the energy transition. On this global journey towards decarbonization, in addition to CCUS and Carbon Management, Consensus promotes the importance of other energy technologies surrounding Hydrogen, Energy Storage, and the Rare Earth Elements and Critical Minerals that are essential to national security, electrification, and life in the 21st century.

The program accomplishes its goals by hosting webinars and briefings, workshops, the production of reports and white papers, and a semi-monthly newsclips newsletter to keep stakeholders informed.



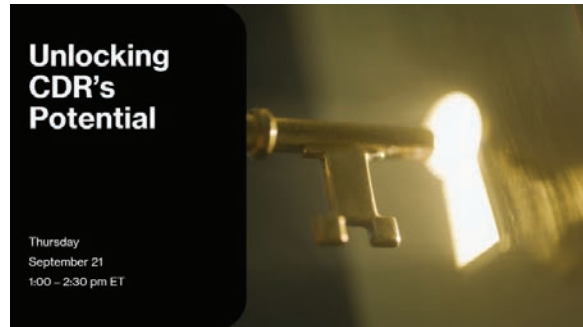
REPORTS PUBLISHED IN 2023

The Consensus program works with its subcontractors such as Battelle and EPRI to produce a variety of reports and white papers to add to the Carbon Management body of knowledge in a manner that is accessible to a diversity of stakeholders such as the general public, policy makers, industry, and other stakeholders. In 2023, Consensus produced four reports:

- Carbon Capture from Point Source Emissions and Direct Air Capture: An Overview and Comparison of Carbon Management Approaches
- CO₂ Storage and Pipeline Infrastructure in the U.S.
- Critical Material Recovery from E-Waste
- Underground Hydrogen Storage (UHS) in Depleted Reservoirs

WEBINARS HOSTED IN 2023

The Consensus program hosts a variety of webinars, fireside chats and briefings to provide the carbon management community with the latest industry knowledge in an easily accessible manner. Among the 19 webinars and fireside chats hosted in 2023, the program is especially proud of its efforts to highlight issues impacting the Native American Tribal community through its National Tribal Energy Roundtable series.



- De-Risking CCUS
- DOE Carbon Utilization Procurement Grants Webinar
- DOE-FECM and CETP Funding Opportunities within CCUS, Hydrogen, and Renewable Fuels
- Fireside Chat with Mike Moore: Appalachia's Next Energy Revolution, Direct Use Of Natural Gas In Manufacturing With Capture And Permanent Geological Storage Of CO2
- Fireside Chat with Mike Moore: Importance of Scale & Economics in Carbon Management
- Fireside Chat with Mike Moore: Tax Credit Monetization Under the Inflation Reduction Act
- Fireside Chat with Mike Moore: USDOE Office of Manufacturing and Energy Supply Chains 101
- Fireside Chats with Michael Moore; Biomass + CCS, Is a Business Case for Energy and Climate finally becoming Real?
- Fireside Chats with Michael Moore; Challenges Ahead for Energy Supply: New lessons from Large Volume CO2/Water Injection and Induced Seismicity
- Fireside Chats with Michael Moore; Utilizing Risk Management & Insurance to Support CCUS Project Enablement

THE NATIONAL TRIBAL ENERGY ROUNDTABLE

- Fireside Chats with Michael Moore; with Peter Connors and Mark Ruth on the recently released National Clean Hydrogen Strategy and Roadmap
- Introduction to Novel Hydrogen and Methane Detection Technologies
- National Tribal Energy Roundtable, Webinar #3: Critical Minerals, Research and Development, and Advanced Manufacturing
- National Tribal Energy Roundtable, Webinar #4: Hydrogen, Ammonia, and Clean Fuels of the Future
- National Tribal Energy Roundtable, Webinar #5: Agriculture/Forestry Carbon Management, and Hemp
- NETL's Cost of Capturing CO2 from Industrial Sources and Industrial Carbon Capture Retrofit Database
- NETL's Updated Performance and Cost Estimates for Power Generation Facilities Equipped with Carbon Capture
- The National Tribal Energy Roundtable, Webinar #6: Energy Infrastructure, the Great Northern Corridor, and Economic Development
- Underground Hydrogen Storage (UHS) in Depleted Reservoirs
- Unlocking CDR's Potential

WORKSHOPS HOSTED IN 2023

The Consensus Program works with DOE-FECM to host near monthly workshops across the country, as well as internationally, both to inform stakeholder groups of FECM's portfolio and to gather feedback from academia, industry, researchers, and other non-government entities on the best pathways to a decarbonized future. The Consensus program hosted the following 10 workshops in 2023:

- Biomass Storage and Burial for Carbon Removal: A BiCRS/WHS Workshop (Washington, DC)
- Carbon Management Technology Showcase (Pittsburgh, PA)
- CCS Regulation in the United States with Japanese Delegation (Washington, DC)
- CO2 Mineralization Workshop at the University of Minnesota (Minneapolis, MN)
- India - U.S. Workshop on Geological Storage of Carbon (New Delhi, India)
- Saline Storage Cost Modelling Workshop (Washington, DC)
- U.S. - Norway Bilateral Meeting (Washington, DC)
- Western Tribal Carbon Management and Critical Minerals Strategies Forum Spring 2023 (Moab, UT)
- Western Tribal Carbon Management Strategies Forum Fall 2023 (Santa Fe, NM)
- Workshop on Measurement, Monitoring and Controlling Potential Environmental Impacts from the Installation of Point Source Capture (Birmingham, AL)
- Workshop on Non-CO2 GHG Emissions and Mitigation in NEMS (Washington, DC)



Site visit participants following Biomass Storage and Burial for Carbon Removal workshop



Gassnova's Kari-Lise Rørvik in the Overview session of the U.S. - Norway Bilateral Meeting (Photo credit: Torleif Madsen)

USEA Communications

2023 Webinars

USEA increased public briefings by 35% from similar public USEA events held in 2022.

The United States Energy Association (USEA) hosted a briefing that recapped the Department of Energy's (DOE) announcement of \$7 billion in federal funding for regional hydrogen hubs across the country. This funding, provided through the Inflation Reduction Act, was part of the Administration's push to jumpstart the hydrogen industry and support climate goals.

Leaders from the Department of Energy, the Fuel Cell and Hydrogen Energy Association, and Hydrogen for Mobility at Air Products provided their expertise on this subject and how it can be utilized in the energy sector.

The briefing was the first in a series hosted by USEA this year to feature perspectives from government agencies and private sector leaders working to advance hydrogen technologies and infrastructure. Attendees gained insights into the significant federal investment, program objectives, and industry efforts underway in this emerging clean energy sector.



Dr. Satyapal, DOE



Frank Wolak, FCHEA



Eric Guter, Air Products

USEA also hosted a panel discussion on new lithium technologies and production to meet the rapidly growing demand from electric vehicles, renewable energy storage, and industrial applications. With the U.S. currently producing just 1% of the global lithium supply, experts projected the demand could reach 3.8 million tons by 2035, necessitating increased domestic production. Panelists from the National Mining Association, EnergySource Minerals, and Lithium Americas addressed the anticipated lithium needs and highlighted innovative extraction methods aimed at reducing water usage and carbon emissions.

The briefing drew a wide range of attendees invested in the emerging lithium economy. Seasoned industry professionals provided projections on future demand while newer participants learned about lithium's importance across multiple sectors undergoing electrification and clean energy transitions. The panel examined sustainability challenges as well as technological solutions for responsibly ramping up lithium production to meet this critical mineral's surging demand.



Derek Benson,
EnergySource Minerals




Scott Gemperline, National
Mining Association



Tim Crowley,
Lithium Americas



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