2024
IET Annual Report

The Edison Foundation

Institute for
The Energy Transition

Message from the Executive Director

Eric Holdsworth, Executive Director

2024 was a busy year for the Edison Foundation's Institute for the Energy Transition (IET) and for clean energy technologies in general. The year saw the announcement of several new advanced nuclear initiatives, significant declines in the price of advanced geothermal energy, the deployment of several different types of long-duration energy storage pilot projects, and an increased focus on advanced transmission technologies, amongst other developments. IET continued its mission of educating CEOs and other key stakeholders and being a reliable source of information for the industry on the status of key 24/7 zero-emitting technologies that can help meet rising energy demand and achieve carbon emissions reduction goals reliably and affordably. These efforts were achieved by undertaking the following activities,

- Organized CEO Clean Tech Dialogues on wildfire mitigation technologies, carbon capture and storage technologies, and a range of other current and emerging clean energy technologies of interest.
- Organized the inaugural Long-Duration Energy Storage (LDES) Summit with LDES Partnership members DOE, EPRI, and the LDES Council.
- Highlighted advanced transmission technologies during CERAWeek.
- Co-sponsored several events focusing on wildfire mitigation technologies.
- Released a report by ICF analyzing U.S. power sector carbon emissions and how they compare to power sector emissions from other countries and other sectors.

These dialogues, events, and reports are helping educate industry leaders and other key stakeholders on the latest developments with key 24/7 zero-emitting technologies and demonstrating the industry's leadership in clean energy technology development. 2025 promises to be an equally exciting year, and we look forward to continuing this important work.

– Eric Holdsworth, Executive Director

2024 ANNUAL REPORT

The Institute for the Energy Transition (IET) was launched in June 2022 to assess the key 24/7 zero-emitting technologies necessary to achieve carbon emissions reduction goals reliably and affordably. In 2024 IET undertook the following activities in pursuit of that mission.

- Organized multiple CEO Clean Tech Dialogues on current and emerging technologies of interest
- Held a wildfire mitigation technology discussion with CEOs and technology providers as part of January Board of Directors meeting
- Organized a range of programming on current and emerging clean energy technologies of interest as part of The Hub at EEI 2024.
- Held a carbon capture and storage discussion as part of the September Board of Directors meeting
- Organized the Inaugural Long Duration Energy Storage (LDES) Summit with LDES Partnership members DOE, EPRI and the LDES Council.
- Held a panel discussion during CERA Week on advanced transmission technologies
- Co-sponsored the EEI-IET Wildfire Technologies Summit that brought EEI members and technology developers and other key stakeholders together.

These activities, along with additional information on IET, are described in greater detail on the following pages.

CEO Clean Tech Dialogues

One of the key roles of IET is to educate CEOs about the most promising innovative and near-term technologies as identified by the IET Advisory Committee. IET does this in part through CEO Clean Tech Dialogues, which feature an overview of the current economics of each technology, followed by a dialogue between member company CEOs and their technology developers. In 2024, IET hosted CEO Clean Technology Dialogues on wildfire mitigation technologies, carbon capture and storage technologies and a range of current and emerging clean energy technologies as part of The Hub at EEI 2024.

Clean Tech Dialog – Wildfire Mitigation Technologies

In January, IET facilitated with EEI a segment on wildfire mitigation technologies at the EEI Winter Board meeting. This segment paired three member company chief executives—Patti Poppe with Pacific Gas & Electric (PG&E), Jeffrey Martin with Sempra, and Maria Pope with Portland General Electric—with their respective technology partners Pano, Palantir, and Schweitzer. The discussions focused on how companies are using technologies that can de-energize lines before they hit the ground, process data from sensors to detect fires earlier, and that can help more precisely determine when and where to engage in power shutoffs.

Clean Tech Dialog – Grid Technologies and Innovation Showcase

In June, IET worked with The Edison Foundation's Institute for Electric Innovation (IEI) to organize a range of events at EEI 2024 under the auspices of The Edison Foundation. Most notably, the Foundation helped sponsor The Hub programming that was emceed by IET Executive Director Eric Holdsworth and featured a mix of panels, fireside chats, and tech talks. The conversations included the panels below.

- "Must. Commercialize. Faster" discussed how technology companies, the federal government, and other stakeholders can help speed up RD&D and accelerate the commercialization of critical clean energy technologies. This panel featured speakers from EEI, Energy Impact Partners (EIP), Edison International, and DOE.
- "Wildfire Mitigation Technologies: The Case for Investment" featured a discussion of a new Guidehouse report that examines how to mitigate wildfire risks and address the financial impacts of wildfires.
- "Wildfire Mitigation and Prevention" took a deeper dive into wildfire mitigation technology options and the benefits that they can provide. This panel featured representatives from Pano, PG&E, Southern California Edison, and Technosylva.
- "Pioneering the Grid Revolution with GETs" discussed the role of grid enhancing technologies in the clean energy transition, including an advanced transmission and distribution project that AES and LineVision are undertaking.
- "Innovative Partnerships to Support America's 21st Century Electrical Grid" discussed collaborative approaches in developing and expanding clean energy capacity and featured Duke Energy, Google, and NV Energy.

- "Powering the EV and AI Revolution" highlighted collaborative efforts between EV and AI companies, electric companies, and other stakeholders to address increasing demand for electricity and featured BrightNight, Idaho Power, Puget Sound Energy, RCR LLC, and Westly Group.
- "How Robotics is Accelerating the Build Out of the Electric Grid" featured a Tech Talk with Infravision and PG&E on the role of robotics in the deployment of advanced transmission and distribution technologies.
- "Building System Resilience: Lessons from Texas as We Look to the Future" examined the state of the Electric Reliability Council of Texas (ERCOT) market, actions taken post-Uri, and the potential for ERCOT to be a leader in technology deployment.
- "Virtual Power Plants" examined the use of virtual power plants by Caterpillar through a Tech Talk with Shawn Borden, Utility Program Development Manager.
- "Advanced Nuclear: Key to a Clean Future" looked at the key role of advanced nuclear power in the clean energy transition in a panel discussion with representatives from ClearPath, GE Hitachi Nuclear, and TVA.

Clean Tech Dialog – CEO CCS Segment

As part of the September EEI Board of Directors meeting, IET held a panel on carbon capture and storage (CCS). This discussion was moderated by Chairman and CEO of Entergy Drew Marsh and included IET Advisory Committee member and Senior Vice President of Generation Transition and System Optimization at Duke Energy Regis Repko, President and CEO of EPRI Arshad Mansoor, and CEO of the Global Carbon Capture and Storage Institute Jarad Daniels.

The goals of the segment were: to help members understand the importance of considering CCS as a potential option for reducing emissions once it is commercially available, depending on the company's circumstances; and to update them on developments with CCS technologies both within the energy sector and across other industries, including the emerging economics and expected timelines for its deployment.

Key takeaways included that CCS, once it is demonstrated and commercially available, should be considered as a potential option for reducing emissions for companies near favorable geologies and where natural gas will play a significant role in meeting increased demand, and that the development and use of CCS technology is moving forward in other industrial sectors and in the energy sector in other countries.

Inaugural LDES Summit

On April 8-9, IET and the other members of the LDES partnership (DOE, EPRI, and the LDES Council) held the inaugural LDES Summit at EEI. The summit was in fulfillment of an MOU signed by the LDES Partnership members in 2023 outlining their roles and responsibilities to advance the deployment of LDES. The Summit's objectives were two-fold: 1) educate the audience about recent developments with LDES technology and the key role it can

play in the clean energy transition, and 2) bring together key stakeholders to identify specific challenges to LDES deployment and begin developing potential solutions.

Day one focused on education and highlighted three case studies involving different types of LDES technologies operating in different states and involving different use cases: The "Electrochemical Storage Case Study" examined lessons learned from the successful implementation by Xcel Energy and Form Energy of an LDES project in Minnesota and its approval in an integrated resource plan: The "Grid-scale Deployment: The Mechanical Storage Case Study" focused on the Columbia Energy Storage project in Wisconsin, which is being led by Alliant Energy and Energy Dome and was awarded $30 million in funding by DOE: The "Grid-scale Deployment: The Thermal Storage Case Study" examined an energy storage project in Alaska being led by the Golden Valley Electric Association and Echogen, which also was awarded funding by DOE.

Day one also featured keynote remarks by Gene Rodrigues, the Assistant Secretary for Electricity at DOE, who spoke on the important role LDES can play in the clean energy transition, and lunch remarks by Will McNamara with Sandia National Lab, who outlined the LDES Consortium effort Sandia is leading with other National Labs. Then-Edison Foundation's Chair Warner Baxter and current board member Tom Kuhn also spoke. Day one closed with DOE announcing the twelve finalists for the DOE Decadal LDES Challenge competition. The finalists gave brief presentations, and the audience-both in the room and virtually-rated them and offered comments.

Day two of the summit featured a closed-door discussion among the four key stakeholder groups: electric companies, technology developers, investors, and regulators. Stakeholders shared their perspectives on LDES technology and what it would take for their organization to deploy it or invest in it. This was followed by an open roundtable discussion to identify near-term actions that can be taken to address barriers to LDES deployment, including educating key stakeholders on the benefits of LDES technologies, advocating for increased funding for LDES pilots, and developing educational materials.

CERA Week - Advanced Transmission Technologies

In March, IET held a well-attended panel discussion on advanced transmission technologies at CERAWeek. The event featured then EEI Chair Pedro Pizarro, President and CEO of Edison International; then EEI Vice Chair Maria Pope, President and CEO of Portland General Electric; Tim Heidl, the CEO of VEIR—a company that makes advanced conducting cables—and Robin Millican, the Head of Strategic Initiatives and Integration with Breakthrough Energy. Jigar Shah, then Director of the Loan Programs Office at DOE, offered closing remarks.

The event highlighted the importance of building more transmission and expanding the capacity of the existing grid to help meet increased demand and that advanced transmission technologies.

—along with advanced computational and dynamic situational awareness—are tools that can help address transmission challenges, improve the efficiency and effectiveness of electricity delivery, and increase the reliability and resilience of the system. The discussion also emphasized the key role of advanced transmission technologies in the clean energy transition.

Wildfire Mitigation Technologies

Wildfire mitigation-related technologies that aid in detection, prevention, and suppression are part of IET's focus. Not only can wildfire-related technologies help electric companies prevent causing wildfires, but they can also improve the functioning of the grid and enhance reliability. In addition to the CEO Clean Tech Dialogue noted above, IET undertook the following wildfire mitigation technology-related events in 2024.

Wildfire Technology Summit

On February 21-22, IET and EEI co-sponsored a Wildfire Technology Summit in La Jolla, California, which featured members and technology developers from across the country. The objectives of the summit were to explore near-term technology solutions that enable the prevention, detection, and mitigation of wildfire risks; identify opportunities for collaboration among the electric industry, technology developers, the national laboratories, and state/local stakeholders; and facilitate discussions between EEI member companies to advance the implementation of potential technology solutions. IET Executive Director Eric Holdsworth gave opening remarks that highlighted IET's work on wildfire mitigation technologies.

The Summit addressed a range of topics including:

- The importance of thoroughly understanding an entity's unique wildfire risk and how advanced analytics and modeling techniques can enhance risk assessment.
- How the use of weather data drives long-term and real-time mitigation decisions and is critical to managing wildfire risk.
- How technology can be used to supplement traditional crew-based inspections.
- The importance of strengthening infrastructure to withstand and minimize the impact of wildfires and reduce faults that can lead to ignitions.
- Technology advancements emerging from National Labs and the commercial marketplace.
- The range of operational practices available and how on-the-ground risk mitigation can impact the system and customers.

Members and technology developers highlighted included Anterix, Avista, Guidehouse, PG&E, SDG&E, Technosylva, and Xcel.

NARUC Wildfire Mitigation Event

On July 16, IET hosted the "Wildfire Mitigation Technologies: The Case for Investments," a lunch panel discussion at the NARUC Summer Policy Summit in Florida. The event explored key findings from a recent Guidehouse report on the multiple broad systems and customer benefits that flow from investments in critical wildfire mitigation technologies. It featured a

discussion with Washington Commissioner Ann Rendahl, Rober Le Maine with Southern California Edison, and Aditya Ranade with Guidehouse, which was moderated by Phil Moeller, EEI Executive Vice President of the Business Operations Group and Regulatory Affairs.

IET-ICF Power Sector Emissions Report

In March, IET released a report prepared by ICF that analyzed how U.S. power sector carbon emissions compare to power sector emissions from other countries and regions, and how they compare to emissions from other emitting sectors. The report found that the U.S. power sector is driving U.S. economy-wide carbon emission reductions and is a leader in reducing carbon globally. However, the European Union has a higher percentage of clean energy in its fuel mix, driven in part by several nuclear and hydro-dominant countries. The report also delves into the challenges that need to be overcome to continue reducing emissions, such as supply chain issues, interconnection queues, and maintaining energy security and grid reliability.

2024 Calendar of IET Activities

January

- CEO Clean Tech Dialog - Wildfire Mitigation Technology
- IET Advisory Committee Meeting

February

- Wildfire Mitigation Technology Summit

March

- CERAWeek Advanced Transmission Technology event
- Joint meeting of the IET Advisory Committee and Edison Foundation Board

April

- LDES Summit

May

- IET Advisory Committee meeting

June

- Grid Technologies and Innovation Showcase at The Hub at EEI 2024

July

- NARUC Wildfire Mitigation Technology event
- IET Advisory Committee meeting

September

- CEO Clean Tech Dialog- CCS Segment
- Joint meeting of the IET Advisory Committee and Edison Foundation Board

December

- IET Advisory Committee Meeting

IET Advisory Committee Members

The IET Advisory Committee provides insights and guidance on IET programming

- Chair - Gerard M. Anderson, Executive Chairman, DTE Energy (ret.)
- Regis Repko, Senior Vice President, Generation Transition and System Optimization, Duke Energy
- Dr. Mark Berry, Senior Vice President, Southern Company Services R&D, Southern
- Arshad Mansoor, President and CEO, EPRI
- Mark Peters, President and CEO, MITRE
- Bob Rowe, President & CEO, NorthWestern Energy (ret.)
- Ralph Izzo, President & CEO, PSEG (ret.)
- Charles E. Bayless, Advisor, TS Conductor

Edison Foundation Leadership

IET is governed by and reports to the Edison Foundation Board

- Chair - Pedro J. Pizarro, President & CEO, Edison International
- Nicholas K. Akins, Executive Chair, American Electric Power (ret.)
- Gerard M. Anderson, Executive Chairman, DTE Energy (ret.)
- Warner L. Baxter, Executive Chairman, Ameren Corporation (ret.)
- Calvin Butler, President & CEO, Exelon
- David Campbell, Chairman & CEO, Evergy
- Theodore F. Craver, President & CEO, Edison international (ret.)
- Thomas A. Fanning, Chairman, President & CEO, Southern Company (ret.)
- Benjamin Fowke, Executive Chairman, Xcel Energy (ret.)
- Lynn Good, Chair, President, & CEO, Duke Energy
- Thomas R. Kuhn, President, Edison Electric Institute (ret.)
- Maria Pope, President & CEO, Portland General Electric
- Patricia Vincent-Collawn, Interim President & CEO, EEI

About the Institute for the Energy Transition

The Institute for the Energy Transition (IET) is a program that assesses key 24/7 zero-emitting and other technologies necessary to achieving carbon emissions reduction goals reliably and affordably. IET explores the demonstration of several key technologies, adding a new focus on the current economics of each technology, expected future cost curves and potential timelines for adoption. IET also focuses on identifying and proposing solutions to the legal, regulatory, and policy issues that must be addressed to ensure that these technologies can be deployed as soon as they are demonstrated and economically scalable.

About the Edison Foundation

The Edison Foundation is a 501(c)(3) charitable organization dedicated to bringing the benefits of electricity to families, businesses, and industries worldwide. Furthering Thomas Alva Edison's spirit of invention, the Foundation works to encourage a greater understanding of the production, delivery, and use of electric power to foster economic progress; to ensure a safe and clean environment; and to improve the quality of life for all people. The Edison Foundation provides knowledge, insight, and leadership to achieve its goals through research, conferences, grants, and other outreach activities.

The Edison Foundation

Institute for
The Energy Transition

The Institute for the Energy Transition
701 Pennsylvania Avenue, NW
Washington, DC 20004
202-508-5000