NATIONAL ACADEMIES Sciences Engineering Medicine

BOARD ON ENERGY AND ENVIRONMENTAL SYSTEMS

Pathways for New Nuclear Development

A Workshop

The recent completion of Plant Vogtle, the largest nuclear energy plant in the United States, has sparked new opportunities for building next-generation nuclear reactors to produce reliable, clean energy. However, significant barriers remain to nuclear deployment, including technical challenges, regulatory hurdles, and investment risks that complicate decision-making timelines. Building on recommendations from the consensus report, *Laying the Foundation for New and Advanced Nuclear Reactors in the United States*, this workshop seeks to explore pathways for new nuclear development in the United States. The event will facilitate in-depth discussions among policymakers, regulators, community leaders, and technical experts regarding the challenges of deploying nuclear power, including ways to improve construction, financing, decision-making, and public engagement.

WEDNESDAY, JANUARY 29, 2025

Objectives

- Determine the readiness of new nuclear designs and of the nuclear ecosystem to enable and support new deployment at scale
- Better understand the challenges surrounding construction of new nuclear power plants and how to develop resilient and agile supply chains necessary to support deployment
- Better understand the market for the range of nuclear reactor technologies and end user expectations of nuclear energy deployment to meet their needs
- Explore efforts to improve options for sustained financial backing that will alleviate risks of abandonment, regulatory complications, and public perception
- Consider how existing host communities are already supporting advanced nuclear projects and how partnerships drive alignment, address risks, and ensure shared benefits for all

8:00 AM[1] BREAKFAST

9:00 AM Welcome and Opening Remarks

Kasia Kornecki, National Academies Board on Energy and Environmental Systems
David Petti, *Workshop Planning Committee Chair*

[1] All times in ET

9:10 AM **Laying the Foundation for New and Advanced Nuclear**

The National Academies' report *Laying the Foundation for New and Advanced Nuclear Reactors in the United States* (2023) identified how the United States could support the successful commercialization of advanced nuclear reactors through a set of near-term policies and practices. The report included recommendations to close technology research gaps; improve project management and construction; explore new business use cases; develop competitive financing options; prioritize community engagement; strengthen the skilled workforce; and update regulations and security requirements. To set some context, the chair of this study, Dr. Richard A. Meserve, will reflect on the changing landscape nearly two years after the report's publication.

9:20 AM **Technical Challenges to Deployment**

The White House's report Safely and Responsibly Expanding U.S. Nuclear Energy: Deployment Targets and a Framework for Action (2024) "outline[d] pathways to responsibly expand domestic nuclear energy production," including action that "adhere[s] to the highest safety, security, nonproliferation, and environmental protection standards." This session will facilitate a discussion between authors of the National Academies and White House reports to elevate the important challenges to nuclear deployment and assess if the nuclear energy ecosystem is prepared to support new deployment at scale. An interview-style discussion will identify the challenges any new nuclear development will face in the current landscape and what solutions can be implemented in the future.

Moderator: David Petti, *Planning Committee Chair*

Panel:

- Jonathan Barr, (former) White House Office of Science and Technology Policy
- Michael Corradini, University of Wisconsin
- Richard A. Meserve, Covington & Burling LLP

10:00 AM **Construction Timelines**

Unforeseen technical challenges, adequate workforce, regulatory hurdles, capital costs, and supply chain bottlenecks are all barriers that have led to delays in construction, especially for first-of-a-kind facilities. This session will address construction timeline risk, optimism bias, management, ownership, and what is needed for nuclear plant construction to stay on time and budget. Panelists will speak to recent experiences in recent Advanced Passive 1000 (AP1000) Vogtle 3 and 4 builds and supply chain experience in naval nuclear systems to raise awareness of the challenges surrounding the construction of new nuclear power plants, including the magnitude of the human capital necessary to meet 200 gigawatts of nuclear power by 2050. A moderated discussion will highlight potential solutions to develop resilient and agile supply chains and minimize construction costs, schedule overruns, and supply chain issues. A Q&A session with the audience will follow.

Moderator: Aditi Verma, University of Michigan

Panel:

- Abdalla Abou-Jaoude, Idaho National Laboratory
- Barry Fletcher, Newport News Shipbuilding (retired)
- Erik Nygaard, BWXT Advanced Technologies, LLC
- Giorgio Locatelli, Politecnico di Milano
- Stephen Kuczynski, The Nuclear Company

11:40 AM **End User Timelines and Decision-making**

From traditional light water reactors (LWRs) to advanced small modular reactors (SMRs), each technology type has different benefits and risks. Selecting the most suitable technology will depend on the end user and how they value different technology attributes. This session will explore the market for the range of nuclear reactor technologies and end-user expectations of nuclear energy deployment. A moderated discussion will highlight early movers' challenges and needs to overcome. A Q&A session with the audience will follow.

Moderator: Laura Hermann, Potentiary

Panel:

- Chad Eaton, Nucor Corporation
- Chris Nolan, Duke Energy
- Faraz Ahmad, Amazon
- Lucia Tian, Google
- Wayne Blaylock, Dow Chemical Company

1:10 PM **LUNCH**

2:10 PM **Financing Timelines**

Financing–whether looking for long-term revenue or facilitating ways for investors to recover costs during construction–has been a focal point for capital-intensive nuclear plants for many years. This session will explore efforts to improve options for sustained financial backing that will alleviate risks of abandonments, regulatory complications, and public perception. Panelists will introduce how today's timeline for scaled deployment reflects thoughtful types of contracts shaping investment strategies. A moderated discussion will elevate essential mechanisms for attracting diverse investors with distinct risk profiles and incentives for their nuclear pursuits. A Q&A session with the audience will follow.

Moderator: Julie Kozeracki, U.S. Department of Energy – Loan Programs Office

Panel:

- Aaron Abramovitz, Georgia Power
- Allen Otto, Guggenheim Partners
- James Krellenstein, Alva Energy
- Ryan Nielson, Citi
- Stephen Comello, Energy Futures Initiative Foundation

3:50 PM **Host Community Perspectives**

Building trust around new nuclear energy projects and aligning consent across multiple scales of community are key for success, particularly since nuclear energy technologies built over the next decades may be smaller, have many potential use cases, and may be sited in much greater proximity to communities. Host communities must be engaged early and often by project developers and state policymakers to ensure they are informed of and can communicate clearly on safety, security risks, and long-term socioeconomic, environmental, and aesthetic impacts. This session will consider how existing host communities support advanced nuclear projects and work with state, Tribal, and regional partners to drive alignment, address risks, and ensure shared benefits for all parties. A Q&A session with the audience will follow.

Moderator: Kara Colton, Kaco Group, LLC

Panel:

- Christi Bell, University of Alaska
- Diahann Howard, Port of Benton
- Jesus Núñez, The Nuclear Alternative Project
- Richard Arnold, Consolidated Group of Tribes and Organizations
- Tracy Boatner, East Tennessee Economic Council

5:20 PM **Closing Remarks**

5:25 PM **ADJOURN DAY 1**

5:30 PM **RECEPTION**

THURSDAY, JANUARY 30, 2025

Objectives

- Determine what needs to be changed in order to expand the nuclear workforce
- Explore the changing regulatory landscape and how it impacts near-term and subsequent deployments of new nuclear reactors
- Summarize the workshop and identify overarching themes, challenges, and solutions from each session

8:00 AM **BREAKFAST**

9:00 AM **Welcome and Opening Remarks**

Kasia Kornecki, National Academies Board on Energy and Environmental Systems

9:10 AM **Workforce Development Considerations**

Over the last 30 years, workforce development in the energy sector has evolved from a localized employer-driven effort to a broad, multi-stakeholder collaboration. New energy realities demand innovative approaches to nuclear employment. This session will elevate why and how certification and reskilling programs must pace themselves with advances in everything from predictive maintenance and energy management to new manufacturing and construction techniques to achieve a seamless transition. A moderated discussion will focus on how policy frameworks, in parallel with partnerships that enable the development of scalable strategies benefiting energy companies, labor organizations, and the communities they serve, can accelerate the transition. A Q&A session with the audience will follow.

Moderator: Steven Arndt, University of Tennessee

Panel:

- Lisa Marshall, American Nuclear Society & North Carolina State University
- Matthew Warren, International Brotherhood of Electrical Workers
- Nickolas Bumpaous, UA Local Union 598 - Plumbers and Steamfitters
- Olivia Blackmon, Oak Ridge Associated Universities
- Trevor Falk, North America's Building Trades Unions

10:50 AM **The Elements of Regulatory Risk**

Regulation is often used as a scapegoat for time and budget deviations, but work is being done to improve regulatory efficiency. This session will explore how the Nuclear Regulatory Commission (NRC) is implementing the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act (2024), how they are preparing for the early non-LWR license applications, and what remains to be done. A moderated panel discussion will explore the changing regulatory landscape and the expected near-term impacts on the deployment of new nuclear reactors. A Q&A session with the audience will follow.

Moderator: Adam Stein, Breakthrough Institute

Panel:

- Marcus Nichol, Nuclear Energy Institute
- Mark Shaver, NuScale Power
- Michael King, U.S. Nuclear Regulatory Commission
- Peter Hastings, Kairos Power LLC

12:30 PM **Workshop Summary**

This concluding session will take a solutions-based approach to the nuclear development challenges raised throughout the workshop. Members of the workshop planning committee will discuss their perspectives on the discussions and the role of key stakeholders in contributing to the solution space.

Panel:

- David Petti, *Workshop Planning Committee Chair*
- Aditi Verma, University of Michigan
- Laura Hermann, Potentiary
- Julie Kozeracki, U.S. Department of Energy – Loan Programs Office
- Kara Colton, Kaco Group, LLC
- Steven Arndt, University of Tennessee
- Adam Stein, Breakthrough Institute

1:50 PM **Closing Remarks**

Kasia Kornecki, National Academies Board on Energy and Environmental Systems

2:00 PM **WORKSHOP ADJOURNS**

2:15 PM **LUNCHEON**