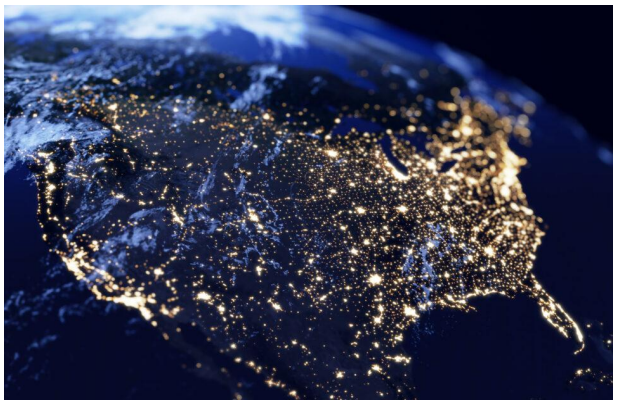
POWER

United States Power Systems Development, Technology & Financing Summit



U.S. NUCLEAR LEADERSHIP IN A CARBON-FREE GRID

A STRATEGIC SYNOPSIS OF THE U.S. *NUCLEAR* ENERGY TRACK AT POWER USA SUMMIT 2025

- Advancing Innovation in Microreactors & SMRs
- Reforming Licensing for Faster Deployment
- Fueling the Future with Domestic Supply & Security
- Grid-Integrated Nuclear for Digital & Industrial Loads
- Workforce & Supply Chain Readiness for the Nuclear Renaissance
- Global Collaboration for Market Expansion & Standardization
- Public Trust through Equity, Transparency & Engagement

FEATURING INSIGHTS FROM U.S. AND GLOBAL LEADERS IN ENERGY, POLICY, INNOVATION, AND REGULATION

Academic Expert

Utility Executive

Technology Developer

HELD AT POWER USA SUMMIT 2025 – THE PREMIER EXECUTIVE FORUM FOR NEXT-GENERATION POWER SYSTEMS

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Powering the Future: U.S. Nuclear Leadership in a Pursuing a Sustainable Grid

Lead – US Speakers & Advisory Board Members

M. Christopher Nolan, *VP New Nuclear Generation Strategy and Regulatory Engagement* |**Duke Energy**

Global Speakers & Advisory Board Members:

- Kenneth Peterson, *Regional Vice President of Testing and Commissioning*| ***Quanta Services***
- Clifford Franklin, *Director of Strategic Engineering Affairs* **| Sunflower Electric Power Corporation**
- Temitope Bankefa, *Energy Engineer | Research Scientist | Energy Markets Analyst,* | **Basin Electric Power Cooperative**
- Russell Pennington, *Technical Services SCADA, AMI, OMS & GIS* | **Northcentral Electric Cooperative**
- Shimiao Li, *Assistant Professor,* | ***University of Buffalo***
- Brent Wanner, *Head of the Power Sector Unit, World Energy Outlook* |**International Energy Agency (IEA)z**
- Jan Vorrink, *Head of Future Design System Operations & Senior Advisor for International Affairs* |**TenneT TSO**
- Luís Tiago Brandão Ferreira, *Head of Innovation, Smart Cities, & Open Data* | **E-REDES** (EDP)
- Marius Stefana, *Head of Law, Legal, Corporate, Regulatory – European Affairs*| ***Enel***
- Marius Flesch, *Head of Market Access Systems* | **Statkraft**
- Hubert Dupin, *Head of Flexibility Department, Smart Grids Program* | **ENEDIS**
- Director of Renewables & Innovations | **INA** | *Chairman* |**Croatian Energy Society** (HED)
- Luc Decoster, *Transition Leader,* **Fluvius**
- Paul de Wit, *Senior Advisor*, *Regulatory Affairs* | **Alliander**
- Mark Ossel, *Senior Vice President* | Networked Energy Services | *Member of the Board* | **OSGP Alliance**
- Joanna Hubbard, *CEO*, **ELECTRON**
- David Assaad, *Director Marketing & Customer Solutions*, | **EPEXSPOT**
- Michele Governatori, *Power & Gas Programme Lead* | **ECCO**
- Domenica Niewierska, *Director of Coordination and Settlements of Hydrogen Projects*, | **PKN Orlen**

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1. Microreactors & SMRs: Accelerating Deployment for Grid Flexibility and Resilience

How microreactors and SMRs support remote grids, critical infrastructure, and clean baseload energy.

Deployment case studies and pre-licensing pathways across federal and commercial sites.

Enabling policies and NRC advancements that streamline design certification and site selection.

Session Overview: This session will delve into the pivotal role of microreactors and small modular reactors (SMRs) in enhancing grid flexibility, especially for remote locations and critical infrastructure. Discussions will encompass deployment case studies, regulatory advancements, and collaborative efforts between academia, industry, and government.

Key Discussion Points:

Deployment Strategies:

- Examination of microreactor and SMR deployments supporting remote grids and critical infrastructure.
- Case studies highlighting successful implementations and lessons learned.

Regulatory Frameworks:

- Insights into the Nuclear Regulatory Commission's (NRC) advancements in streamlining design certification and site selection.
- Discussion on policies facilitating the integration of nuclear solutions into the energy mix.

Academic and Industry Collaborations:

- Exploration of partnerships between universities and industry players in advancing microreactor technologies.
- Highlighting research initiatives and pilot projects contributing to the field.

Invited Speakers:

- Clay Sell, CEO, **X-energy**
- Jeffrey Lyash, **CEO, Tennessee Valley Authority**
- Chris Nolan, **VP – New Nuclear Generation Strategy and Regulatory Engagement, Duke Energy**
- Julie Kozeracki, **Director of Strategy, U.S. Department of Energy**

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2. Licensing Innovation & Regulatory Reform: Reducing Time-to-Market for Advanced Reactors

New licensing pathways (e.g., Part 53, Risk-Informed approaches) and pilot programs under NRC review.

Cross-sector collaboration on digital twin modeling, simulation, and adaptive licensing.

Addressing environmental permitting, public comment cycles, and federal-state coordination.

Session Overview:

This session will delve into the evolving regulatory landscape aimed at accelerating the licensing process for advanced nuclear reactors. Discussions will center on innovative licensing pathways, technological advancements aiding regulatory compliance, and collaborative efforts among stakeholders to streamline approvals.

Key Discussion Points:

Emerging Licensing Frameworks:

- Examination of the NRC's development of *Part 53*, a technology-inclusive, risk-informed regulatory framework designed to accommodate diverse advanced reactor designs.
- Insights into the *Nuclear Energy Innovation and Modernization Act (NEIMA)* and its impact on modernizing the NRC's licensing processes.

Technological Innovations in Licensing:

- The role of digital twin modeling and AI-driven compliance tools in enhancing the efficiency and accuracy of licensing applications.
- Case study: NANO Nuclear Energy's collaboration with Everstar to develop AI-driven regulatory solutions for the nuclear industry.

Collaborative Regulatory Efforts:

- Discussion on the trilateral agreement among the U.S., U.K., and Canada to expedite the licensing of advanced and small modular reactors through shared regulatory practices.
- Strategies for harmonizing international regulatory standards to facilitate global deployment of advanced nuclear technologies.

University-Led Licensing Initiatives:

- Highlighting the University of Illinois Urbana-Champaign's partnership with NANO Nuclear Energy to license and construct the KRONOS Micro Modular Reactor (MMR) on campus, serving as a model for integrating research and regulatory processes.
- Overview of other academic institutions, such as Penn State University and Abilene Christian University, engaging in licensing research reactors to advance nuclear education and innovation.

Invited Speakers:

- **William Orders**, Senior Licensing Project Manager, Office of Nuclear Reactor Regulation, U.S. NRC.
- **Caleb Brooks**, Principal Investigator, University of Illinois Urbana-Champaign, leading the KRONOS MMR project.
- **Brent Hamilton**, Director of Quality Assurance, NANO Nuclear Energy, overseeing regulatory compliance initiatives.

Representative from the Department of Energy – To discuss federal support programs for advanced reactor licensing.

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3. Scaling Domestic Fuel Supply: Enrichment, Recycling & Energy Security

The urgency of establishing U.S.-based HALEU enrichment for advanced reactor needs.

Public-private partnerships supporting domestic uranium production and conversion.

Fuel cycle modernization to support fleet deployment and reduce foreign dependency.

Session Overview:

As the U.S. advances towards deploying next-generation nuclear reactors, establishing a robust domestic supply of High-Assay Low-Enriched Uranium (HALEU) is paramount. This session will delve into the current landscape, challenges, and collaborative efforts shaping the future of HALEU production and supply.

Key Discussion Points:

Urgency of Establishing U.S.-Based HALEU Enrichment:

- The Department of Energy (DOE) projects a need for 50 metric tons of HALEU annually by 2035 to support advanced reactors, yet current domestic production is significantly lower.
- Centrus Energy's American Centrifuge Plant in Piketon, Ohio, has initiated HALEU production, marking a significant step towards domestic supply.

Public-Private Partnerships Enhancing Domestic Uranium Production:

- The DOE has awarded contracts to six companies, including Centrus Energy, Urenco USA, Orano Federal Services, and General Matter, to bolster the U.S. HALEU supply chain.
- These partnerships aim to reduce reliance on foreign sources, particularly in light of recent geopolitical tensions affecting uranium imports.

Modernizing the Fuel Cycle for Fleet Deployment:

- Efforts are underway to develop advanced fuel fabrication techniques and recycling methods to support the efficient deployment of SMRs and microreactors.

- The Idaho National Laboratory (INL) leads DOE's research and development initiatives to ensure a sustainable and secure domestic fuel cycle.

Leading U.S. Universities in HALEU Research:

Idaho State University (ISU): Engaged in DOE-funded projects focusing on advanced reactor research and HALEU fuel development.

University of Illinois: Participating in initiatives to innovate the HALEU nuclear fuel supply chain.

Pennsylvania State University: Involved in research addressing technological advancements across the nuclear fuel cycle.

Invited Speakers:

- **Andrew Griffith:** Leader of the DOE's Office of Nuclear Energy's efforts to establish a commercial HALEU supply.
- **Ben Jordan:** Manager at Centrus Energy, with expertise in nuclear fuel enrichment processes.

Representatives from INL and participating universities: To provide insights into ongoing research and development in HALEU fuel technologies.

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4. Grid-Integrated Nuclear: Meeting the Needs of Data Centers, Hydrogen & Industrial Loads

Using nuclear for off-grid or behind-the-meter solutions (e.g., hydrogen production, steel, ammonia).

Co-location of microreactors with hyperscale data centers for zero-carbon power continuity.

Hybrid energy systems combining nuclear, renewables, and storage technologies.

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Session Overview:

This theme explores the pivotal role of nuclear power in supporting advanced industrial processes and the growing demands of modern energy systems, including hydrogen production, data center power supply, and hybrid energy solutions. As the world moves toward carbon-neutral energy solutions, integrating nuclear energy into diverse energy systems will be key to achieving zero-carbon industrial operations and grid resilience.

Key Discussion Points:

1. Using Nuclear for Off-Grid and Behind-the-Meter Solutions (Hydrogen Production, Steel, Ammonia)

- **Unlocking Hydrogen Economy with Nuclear:**
    - Harnessing nuclear energy to produce clean hydrogen via high-temperature gas reactors (HTGRs) or electrolyzers powered by nuclear plants.
    - The role of nuclear in supporting large-scale hydrogen production for decarbonizing sectors like steel manufacturing, ammonia production, and heavy transport.
    - **Key Stakeholders:**
        - **DOE's Hydrogen and Fuel Cell Technologies Office** (H2@Scale Initiative)
        - **U.S. Department of Energy's Nuclear Energy Division**
    - **Relevant Organizations and Technologies:**
        - **X-energy**, working on small modular reactors (SMRs) for hydrogen production.
        - **NuScale Power**, developing scalable reactors that integrate with clean hydrogen production.

2. Co-Location of Microreactors with Hyperscale Data Centers for Zero-Carbon Power Continuity

Micro-Reactors for Critical Infrastructure:

- **The role of nuclear microreactors in providing reliable, clean, and continuous energy for hyperscale data centers**, which require uninterrupted power for data storage and processing.

- **Integrating nuclear with renewable energy** to meet the evolving demand for data processing while ensuring grid stability.

3. Hybrid Energy Systems Combining Nuclear, Renewables, and Storage Technologies

Creating Reliable, Zero-Carbon Hybrid Systems:

- Integrating nuclear energy with renewable sources (e.g., wind, solar) and energy storage systems (batteries, pumped storage) to ensure stable, flexible, and clean energy generation for grid stability and decarbonization.
- Examining case studies where nuclear power can complement intermittent renewable energy generation, filling gaps during peak demand and low renewable generation periods.

Relevant Technologies and Policies:

- **Advanced Reactor Concepts** integrating renewable sources for grid flexibility.

- **DOE's Grid Modernization Initiative** promoting hybrid systems and energy storage for grid stability.

Relevant US Universities and Research Institutions Working on Nuclear and Hybrid Energy Systems:

Massachusetts Institute of Technology (MIT) – Nuclear Science and Engineering:

MIT's **Nuclear Reactor Laboratory** has several ongoing projects focusing on nuclear energy for industrial decarbonization, including hydrogen production and data center applications.

MIT's **Energy Initiative** focuses on hybrid energy systems that integrate nuclear with renewables and storage technologies.

University of California, Berkeley – Nuclear Engineering: Focused on small modular reactors (SMRs) and their application in industrial applications like hydrogen production and carbon-free energy for data centers.

University of Michigan – Nuclear Engineering and Radiological Sciences:

The **Michigan Institute for Plasma Science and Engineering** (MIPSE) works on clean nuclear energy solutions, including advanced reactors and their integration with renewable sources.

Pennsylvania State University – Department of Nuclear Engineering:

Research on advanced nuclear reactors, hybrid power systems, and the use of nuclear for industrial heat and clean hydrogen production.

The Power USA Summit 2025 presents a unique opportunity for companies involved in nuclear, clean energy, and hybrid systems to showcase their cutting-edge technologies and align themselves with leaders in the energy industry. Potential sponsors could include:

Invited Speakers:

Chris Levesque – **President & CEO, TerraPower** : Industry leader in the development of advanced nuclear reactors, particularly focused on integrating nuclear with renewables for clean, reliable energy.

Joseph T. McClelland – **Director, Office of Nuclear Reactor Regulation, NRC** | Expert on nuclear reactor regulation and licensing, with insights on evolving regulatory frameworks for nuclear integration with renewable systems.

Dr. Kristen Stephens – **Executive Director, Clean Energy Program, Environmental Defense Fund** |Expert on hybrid energy systems and policies to integrate nuclear and renewable energy for a carbon-free grid.

Dr. John Stauff – **Director of the Institute for Energy Systems, University of Michigan** | Academic leader in advanced nuclear reactor design and hybrid systems integrating renewables and energy storage.

5. Supply Chain Readiness & Workforce Development for the Nuclear Renaissance

Revitalizing domestic manufacturing capacity for key components and reactors.

Scaling training programs through DOE and EPRI-aligned university and labor partnerships.

Innovations in modular construction and AI-enhanced plant operations.

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Session Overview:

As the U.S. embarks on a nuclear renaissance, ensuring a robust supply chain and a skilled workforce is paramount. This session will delve into strategies to revitalize domestic manufacturing, enhance training programs, and integrate innovative technologies to support the next generation of nuclear energy deployment.

Key Discussion Points:

Revitalizing Domestic Manufacturing:

- Assess current capabilities and identify gaps in the U.S. nuclear supply chain.
- Explore initiatives to boost domestic production of critical components.
- Discuss partnerships between government and industry to strengthen manufacturing infrastructure.

Scaling Training Programs:

- Highlight successful collaborations between the Department of Energy (DOE), Electric Power Research Institute (EPRI), and academic institutions.
- Share best practices in curriculum development and hands-on training.
- Address strategies to attract and retain talent in the nuclear sector.

Innovations in Modular Construction & AI Integration:

- Examine the role of modular construction techniques in reducing project timelines and costs.
- Discuss the integration of artificial intelligence in plant operations for enhanced safety and efficiency.
- Explore case studies showcasing successful implementation of these technologies.

Featured Institutions & Programs:

North Carolina State University & EPRI:

Awarded a $500,000 grant to assess advanced reactor workforce needs in the Southeast U.S.

Texas A&M University – ReCENT Program:

Offers professional development for educators in renewable and nuclear technologies.

University of Illinois Urbana-Champaign:

Home to the Department of Nuclear, Plasma & Radiological Engineering, contributing to workforce development.

Invited Speakers:

- **Bo Pham:** Acting Deputy Director, RES/NRC, with insights into regulatory perspectives on workforce development.
- **Rizwan Uddin:** Professor at University of Illinois Urbana-Champaign, specializing in nuclear engineering education.
- **David DeLong:** Expert in addressing critical skill shortages and knowledge transfer in organizations.

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6. International Collaboration & Regulatory Harmonization for Global Market Leadership

Aligning with IAEA, Canada's CNSC, and UK's ONR for reactor export and design acceptance.

Opportunities for joint ventures and technology transfer in emerging markets.

Strategies to compete with state-backed global suppliers (e.g., China, Russia).

Key Discussion Points:

Aligning with International Regulatory Bodies:

- **Explore collaborative efforts** between the U.S. Nuclear Regulatory Commission (NRC), the Canadian Nuclear Safety Commission (CNSC), and the UK's Office for Nuclear Regulation (ONR) to streamline reactor export and design acceptance processes.
- **Discuss the Memorandum of Understanding (MOU) between the NRC and CNSC**, focusing on regulatory cooperation for new technologies like advanced reactors and SMRs.

Joint Ventures and Technology Transfer:

- Identify opportunities for joint ventures and technology transfer in emerging markets, emphasizing the role of international cooperation in expanding nuclear energy deployment.
- Examine the role of the International Atomic Energy Agency (IAEA) in facilitating global nuclear collaboration and safety standards.

Competing with State-Backed Global Suppliers:

- Develop strategies to enhance the competitiveness of U.S. nuclear technology providers against state-backed entities from countries like China and Russia.
- Discuss the implications of the International Nuclear Energy Act (INEA) of 2023, which promotes U.S. engagement with ally and partner nations to develop a civil nuclear export strategy.

Relevant U.S. Universities:

Idaho National Laboratory (INL): Hosts international researchers and promotes cross-cultural exchange through its International Researcher and Visitor Program.

Universities Participating in the International Nuclear Management Academy (INMA): Collaborate to provide sustainable nuclear technology management programs, reflecting industry best practices.

Invited Speakers:

- **Aleshia Duncan:** Deputy Assistant Secretary, International Cooperation, Office of Nuclear Energy, U.S. Department of Energy.
- **William D. Magwood, IV:** Director General, Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD-NEA).
- **Michael Shellenberger:** President, Environmental Progress, known for advocacy on nuclear energy and environmental issues.

7. Building Public Trust: Equity, Community Engagement & Transparent Communication

Effective communication strategies for community-informed project development.

Case studies in tribal lands, energy justice zones, and brownfield nuclear redevelopment.

Expanding stakeholder involvement in early-stage nuclear siting and investment decisions.

Session Overview:

This session will explore strategies and best practices for fostering public trust in nuclear energy projects, emphasizing equitable community engagement and transparent communication.

Key Discussion Points:

Effective Communication Strategies:

- Developing clear, transparent messaging to educate communities about nuclear energy benefits and risks.
- Utilizing various platforms, including social media and public forums, to reach diverse audiences.

Community Engagement Case Studies:

- Examining successful engagement initiatives in tribal lands, energy justice zones, and areas undergoing nuclear redevelopment.
- Lessons learned from past projects and how they inform future community relations.

Stakeholder Involvement:

- Strategies for involving local stakeholders early in the nuclear project lifecycle.
- Building partnerships with community leaders, NGOs, and educational institutions to foster trust and collaboration.

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Invited Speakers:

- **Natalia Saraeva:** Team Lead for Consent-Based Siting at the U.S. Department of Energy's Office of Nuclear Energy, specializing in community and stakeholder engagement.
- **Brian Muir:** City Administrator of Kemmerer, Wyoming, involved in local nuclear energy initiatives and community engagement efforts.
- **Isabelle Boemeke (Isodope):** Nuclear energy influencer using social media platforms to educate the public about the benefits of nuclear energy and counter negative perceptions.

To propose a session or confirm as a speaker please contact:

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