



2025 GENERATION PORTFOLIO

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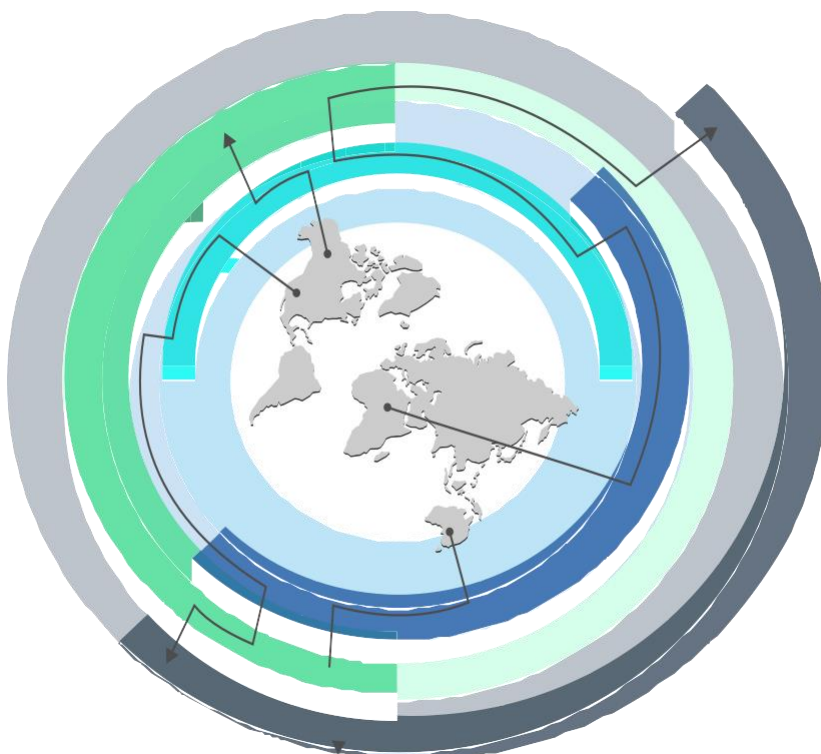
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RENEWABLE FLEET

Wind Generation

The program is focused on innovative and collaborative research for advancement of safe, economic, reliable, and flexible wind energy. Research is focused on siting and operations to address critical industry issues in technology innovations; asset management optimization; reliability/performance improvements; operational strategies for flexibility, reliability, and resiliency; condition-based monitoring; advanced nondestructive evaluation; and sensors.

Key Advisors: *Advisors should have responsibility for wind project development, asset management, operations and/or maintenance.*

Solar Generation

The program supports methods and technologies for the economic, reliable, and flexible operation of solar generation assets. The program adapts established generation asset management models to solar assets and collaboratively develops and demonstrates technologies to optimize costs and operating efficiency and improve reliability of large-scale solar generation. The work undertaken in this program enables power producers to most effectively integrate solar assets into their generation fleet and tackle the unique issues associated with solar O&M and asset management.

Key Advisors: *Advisors should have responsibility for solar project development, asset management, operations and/or maintenance.*

Hydropower Generation

The program is focused on research for conventional and pumped storage hydropower asset management, performance and valuation optimization, and technology development (advanced turbine development, variable speed pump storage, closed-loop pump storage, and non-power dams). This research helps develop balanced science- and technology-based strategies to support long-term management of hydropower assets; optimize performance, safety, and reliability; develop effective operations and maintenance strategies; and support new hydropower project developments. Additional research is

focused on assessing the value that hydropower provides to the power system, especially as flexibility, dispatchability, and storage are valued to support grid reliability.

Key Advisors: *Advisors should have responsibility for hydro project development, asset management, operations and/or maintenance.*

Offshore Wind Supplemental Program

This supplemental program aims to fill a critical knowledge gap by providing a collaborative, cross-cutting research platform to address offshore wind-specific research and development needs. Researchers will examine the life cycle of offshore wind farms, from early site development, through construction and operations, and into life-extension and decommissioning.

Key Advisors: *Advisors should have responsibility for offshore wind project development, asset management, operations and/or maintenance.*

Environmental Aspects of Wind Supplemental Program

This supplemental program proactively addresses potential environmental issues associated with wind deployment, operations, and decommissioning. Scope will address opportunities to sustain or enhance local ecosystems while considering lifetime costs of wind from project planning to end of life.

Key Advisors: *Wind operators and owners with environmental issues associated with project siting and permitting, wildlife, and end-of-life processes will benefit from participation.*

Environmental Aspects of Solar Supplemental Program

This supplemental program proactively addresses potential environmental issues associated with solar deployment. Scope will address opportunities to sustain or enhance local ecosystems while considering lifetime costs of PV from project planning to end of life. Potential improvements to PV plant site functionality will be investigated along with how to manage rising PV module waste volumes.

Key Advisors: Solar operators and owners with interest in understanding environmental issues associated with PV project siting and permitting, vegetation management,

wildlife, and end-of-life processes will benefit from participation.

THERMAL FLEET

Boiler Life and Availability Improvement

The program focuses on integrity and life of generation boilers (including coal, oil and gas). Develops technology and guidance on safe management of boiler component life to increase reliability and reduce operation and maintenance costs. Efforts focus on advanced inspection techniques for early and accurate identification of component damage; analytical tools to predict remaining life and risk of in-service failure; and decision-support tools to help balance risk and benefit under a variety of operating scenarios.

Key Advisors: Pressure vessel engineer, subject matter expert, or program lead. Ideally the advisor would have overall technical responsibility for boilers.

Power Plant Piping

The program research primarily focuses on high-energy piping, which includes all power plant piping systems. Research is conducted on low-temperature, high-pressure, and buried piping. Efforts focus on advanced inspection techniques for early and accurate identification of piping damage; analytical tools to predict remaining life and risk of in-service failure; and decision-support tools to help balance risk and benefit under a variety of operating scenarios.

Key Advisors: Piping engineer, subject matter expert, or program lead. Ideally this advisor would have overall technical responsibility for piping.

Gas Turbine Life Cycle Management

The program delivers research and tools to address issues and challenges for cost-effective operation and maintenance of gas turbines. This includes simple-cycle, combined-cycle, and co-generation configurations. The program creates tools to reduce maintenance costs, improve operations, and assess component life, as well as field applications and engineering support.

Key Advisors: Gas turbine engineer, subject matter expert, or program lead. Ideally this person would have overall technical responsibility for gas turbine life cycle management.

Gas Turbine Advanced Components and Technologies

The program delivers research and tools to address issues and challenges associated with gas turbine advanced components and technologies. The program covers simple-cycle, combined-cycle, and co-generation configurations. The program focuses on understanding and assessing risk reduction through embracing new and future concepts of component design, material composition, and system configurations, as well as addressing quality assurance, and engine monitoring enhancements.

Key Advisors: Gas turbine engineer, subject matter expert, program lead. Ideally this advisor would have overall technical responsibility for gas turbine technical advances and upgrades.

Heat Recovery Steam Generators

The program delivers research and tools to improve the performance, safety, and reliability of heat recovery steam generators used in combined-cycle generation. Efforts focus on damage mitigation and advanced inspection techniques for early and accurate identification of component damage. Tools developed include prediction of remaining life, risk of in-service failure, and decision-support tools to help balance risk and benefit under a variety of operating scenarios.

Key Advisors: Heat recovery steam generator engineer, subject matter expert, or program lead. Ideally this advisor would have overall technical responsibility for HRSGs.

Steam Turbines and Auxiliary Systems

The program supports continuous improvement in the safety and availability of steam turbines and auxiliary systems in nuclear and fossil applications. Research and

development in this program support all aspects of steam turbine asset management through applied research in component life management, preventive maintenance, condition assessment, advanced monitoring, and control strategies.

Key Advisors: *Turbine system owners and those with technical responsibility for steam turbines and/or those who have fleet engineering responsibilities.*

Generators and Auxiliary Systems

The program supports continuous improvement in the

safety and availability of generators and auxiliary systems in nuclear, fossil, and hydro applications. Research and development in this program support all aspects of generator asset management through applied research in component life management, preventive maintenance, condition assessment, advanced monitoring, and diagnostic strategies.

Key Advisors: *Generator system owners with responsibility for fossil, nuclear, and/or hydro generators and/or those who have fleet engineering responsibilities.*

FLEET MANAGEMENT AND OPERATIONS

Integrated Asset Management

The program supports development, implementation, and improvement for an integrated reliability strategy with research that enhances best practices in asset management. The program provides a risk-based asset management and equipment reliability process that is integrated into an overall fleet strategy. The program further develops the effective and efficient maintenance strategies within risk-based asset management that consider real-time equipment condition to minimize intrusive tasks, enhancing industry best practices.

Key Advisors: *The advisor may be at the fleet level or at specific sites in engineering, maintenance, or reliability and those in charge of equipment reliability and/or asset management processes and improvements.*

Plant Management Essentials

The program delivers research and guidance for power plant management in organizational and plant operational excellence which is beneficial to overall plant performance in all phases of the plant lifecycle. The program develops processes and integrates developing technology for improving human performance aspects, along with best practices guidelines for O&M to support safety, reduce O&M costs, and improve plant performance. The research is focused on plant continuous improvement through people, processes, and technology.

Key Advisors: *Managers of sites, operations, or maintenance or those in corporate who manage plant processes.*

Boiler and Turbine Steam and Cycle Chemistry

The program focuses on the key corrosion and deposition damage mechanisms for power plants with the aim of providing practical solutions to mitigate risks. The program offers guidelines, technology solutions and demonstrations, and training materials to help plant operators better manage water-steam cycle chemistry to reduce unplanned outages and O&M costs and address the impact of flexible operation on cycle chemistry. The program also offers guidance on proper selection, application, and optimization of unit cycle chemistry.

Key Advisors: *Chemical engineer, chemist, subject matter expert, or program lead for cycle chemistry. Ideally with overall technical responsibility for cycle chemistry.*

Plant Decommissioning and Site Redevelopment Supplemental Program

The supplemental program provides a foundation for fossil-fueled power plants undergoing decommissioning and redevelopment. This foundational collaborative is designed to position funders for improved project outcomes, using systematic and scientifically backed approaches.

Key Advisors: *Plant decommissioning and site redevelopment program and project managers as well as subject matter experts.*

DIGITALIZATION

Cyber Security for Generation Assets

The Program Delivers research and tools focused on generation and utility-scale renewable generation assets, and their interdependencies. The research will support operating fleets by ensuring secure generation while maintaining reliability and efficiency. The program will support a defense-in-depth approach to protect, detect, and respond and recover from cyber-attacks and compromises.

Key Advisors: Generation OT cyber security manager or practitioner with responsibility for the cyber security program at generation plants, applying cyber security controls, and/or interfacing with utility stakeholders.

Process Control and Automation

The program delivers research around advanced process control and automation techniques to enable optimized operations of the plant and fleet. The program provides guidance around improved and integrated process control, as well as automation techniques, to meet the industry needs of reducing damage, improving plant performance, and enabling consistent operations during flexible operations.

Key Advisors: Controls engineer responsible for maintaining DCSs and other controls systems at the plant and/or fleet level.

Monitoring and Advanced Data Analytics

The program delivers research and tools that focus on integrated sensing, monitoring, diagnostics, and applied analytics research focusing around a stakeholders power generating fleet. This research provides a basis for intentional data collection using sensors for asset monitoring, diagnostics and prognostics leveraging data analytics, and machine learning approaches to develop a sound and efficient approach at the fleet level. The program conducts research and investigations in the areas of digital infrastructure platforms to support data integration and management as well.

Key Advisors: Individuals at a company that are working with Monitoring & Diagnostics for equipment performance and reliability. Individuals researching AI/machine learning capabilities for their companies.

MATERIALS

Materials

The program provides integrated materials selection guidance, repair and welding technologies, and corrosion mitigation strategies to improve equipment performance, reliability, and safety. The program assists stakeholders in the power generation industry to balance the risks of

the largest, most costly equipment, and focuses on using new technologies to create solutions with a clear and quantifiable benefit.

Key Advisors: Engineers experienced in failure analysis, metallurgy, welding, corrosion and/or other related aspects of component specification, fabrication or repair.

NEXT-GENERATION FLEET

Bulk Energy Storage

The program will perform research on bulk energy storage technologies. The program focuses on the entire arena of larger-scale, longer-duration energy storage, including chemical, mechanical, and thermal energy storage. The program provides detailed design, cost, and performance data that can be used for portfolio planning and potential end use. Research is designed to accelerate bulk energy storage

technologies so that they can be ready for implementation in both the near term and future.

Key Advisors: Advisors responsible for planning and implementation of grid-scale energy storage processes. Advisors should have a level of expertise in portfolio planning and/or energy storage concepts. Ideally, staff should have a background in understanding the challenge variable renewable energy generation brings to the grid

and how energy storage can effectively address these challenges.

Advanced Generation and Carbon Capture and Storage

The program focuses on low-carbon, fossil-based power generation. The program conducts research and development on conventional cycles with carbon capture and storage, as well as novel cycles that lead to lower carbon emissions.

Key Advisors: Strategy teams, R&D staff and/or technology teams responsible for technology to enable a low-carbon future while keeping a diverse generation mix that includes carbon-based fuels.

Generation Transitions Supplemental Program

This supplemental program draws on EPRI's technical expertise to minimize uncertainty and reduce risk surrounding the energy supply transformation by identifying viable technology pathways and bringing much-needed clarity to decision-making. This research aims to deliver fact-based insights related to technology maturity,

deployment time-lines, scaling, and economics, along with considerations to help balance diverse stakeholder interests and ensure energy supply reliability and resilience. The supplemental program informs the development and operation of a generation fleet purpose-built for a net-zero future, with deliverables expected to include white papers, case studies, frameworks, and guidelines to help design and optimize generation fleets.

Key Advisors: Generation executives, strategy leads, and other stakeholders whose decisions will impact the development and operation of energy supply resources through the transition.

Net-Zero Industrial Clusters

Net-Zero Industrial Clusters (NZICs) can amplify the impact of carbon reduction activity and investments by leveraging solutions across a broad, multi-stakeholder system. The Transitioning Industrial Clusters to Net-Zero initiative, a collaboration between EPRI, World Economic Forum and Accenture, is an international effort that is supported through the Generation sector.

THERMAL OPTIMIZATION AND EMISSIONS CONTROLS

SCR Performance Issues

The program conducts research focused on performance optimization of catalytic emission control systems for coal- and gas-fired applications. It includes issues pertaining to operations and maintenance best practices, flexible operations, catalyst management strategies, improved catalyst formulations, testing protocols, and incorporation of advanced instrumentation.

Key Advisors: Engineers, R&D staff members, and/or operators whose responsibilities are associated with SCR and CO reduction catalysts for both coal and gas applications.

Continuous Emissions Monitoring and Measurements

The program conducts research focused on the development, evaluation, and implementation of continuous emissions monitoring (CEM) equipment and auditing methods for fossil-fuel power plants. The program also covers measurements needed for environmental

control processes and environmental measurements impacting ambient air quality and environmental health.

Key Advisors: Engineers, R&D staff members, and/or operators whose responsibilities include environmental controls process-related instrumentation and/or environmental monitoring, and those with responsibility for CEMs-related equipment and auditing methods for fossil-fuel power plants.

Combustion and Carbon Control Issues Supplemental Program

The supplemental program conducts projects that assess combustion and fuel quality impacts on emissions, performance, reliability, and CO₂ control for all fuels and fuel combinations. The program develops tools, technologies, and best practices to both quantify the negative impacts of specific fuel attributes and minimize impacts on boiler operations.

Key Advisors: Engineers, R&D staff members, fuel purchasers, and/or operators whose responsibilities pertain to combustion and fuel quality related issues impacting emissions, performance, and reliability.

Emissions Controls Supplemental Program

The supplemental program provides participants with information, tools, and technologies needed to optimize the performance and reliability of post-combustion environmental controls systems, such as FGD and chemical injection equipment, for control of mercury/air toxics, SO₂, and other pollutants.

Key Advisors: Engineers, R&D staff members, and/or operators whose responsibilities pertain to FGDs, sorbents, and

other emissions control devices pertinent to coal and other fuels, for the control of mercury, sulfur dioxides, and other air pollutants.

Heat Rate and Flexibility: Generation Fleet Optimization

The program research focuses on increased flexibility and efficiency of conventional steam and combined-cycle power plants. The program aims to develop solutions that can be applied to solve a variety of flexibility and efficiency needs to deliver an optimized generation fleet.

Key Advisors: Plant and/or corporate performance and test engineer, subject matter expert, or program lead for flexibility and/or performance.

AIR QUALITY AND HEALTH

Air Quality Assessments and Multimedia Characterization

The program research conducts detailed assessments of air quality and air quality standards by applying a variety of different analytical techniques, including air quality models, ambient measurements, data analysis, and risk assessment tools. These assessments and applications help inform the implementation and development of air quality standards and provide context to the role of power plant emissions on air quality and risk. This program also characterizes multimedia emissions and releases from power plants, with a strong focus on emerging pollutants. The program collects and generates data on fleet-wide emissions and releases that help inform environmental applications and plant-wide multimedia release assessments, including support for databases and tools such as the Toxics Release Inventory.

Key Advisors: Engineer, scientist, and manager who is responsible for air quality and multimedia compliance, reporting, policy, strategy, and communications. This includes utility staff who address day-to-day operational concerns and utility staff who manage long-term corporate environmental strategy.

Air Quality, Health, and Communities

The program addresses key uncertainties related to the health effects of particulate matter (PM), ozone, nitrogen dioxide (NO₂) and sulfur dioxide (SO₂). These include the long-term effects of air pollution; the shape of concentration-response functions, including the existence of minimum threshold concentrations below which adverse health effects do not occur; the presence of confounding and other biases in air pollution epidemiology studies; and more robust evaluation of air quality health benefits and their associated uncertainties. The program employs epidemiological, toxicological, and applied risk assessment approaches to inform the National Ambient Air Quality Standard (NAAQS)-setting process as well as other domestic and international rulemaking activities.

Key Advisors: Engineer, scientist, and manager who is responsible for air quality and multimedia compliance, reporting, policy, strategy, and communications. This includes utility staff who address day-to-day operational concerns and utility staff who manage long-term corporate environmental strategy.

WATER AND LAND MANAGEMENT

Water Treatment Technologies

The program provides overall technology development and operations support for water and wastewater treatment applications. Key aspects of the overall research portfolio include water treatment and quality management, along with wastewater reduction and recovery. Research pertains to flue gas desulfurization wastewater, cooling tower blow-down, landfill leachate, and other power plant applications.

Key Advisors: *Individuals responsible for design and operation of water and wastewater treatment systems. This includes engineering, chemistry, and environmental personnel who evaluate new technologies and process improvements.*

Aquatic Resource Protection

The program delivers research focused on regulatory information and data gap evaluations, biological monitoring and data analysis, fish protection technology evaluations, resource economics for facility and regulatory decision-making, and thermal ecology, thermal tolerance, and cumulative temperature impacts. The program supports utilities in the aquatic organism protection at cooling water intakes and thermal discharges.

Key Advisors: *Subject matter experts or compliance specialists who are responsible for the Clean Water Act. The advisors may also work in plant operations with interest in the impacts of fish protection and also the safe and reliable water intake and discharge.*

Byproducts Management and Market Development

The program focuses its research on beneficial use and disposal of coal combustion products (CCPs). This includes CCP characterization, beneficiation technologies for fresh and harvested CCPs, and beneficial uses of CCPs, as well as CCP handling, landfill operations, and pond closure operations.

Key Advisors: *Managers, subject matter experts, and those with responsibility for any of CCP landfill and pond engineering, operation, or beneficial use.*

Water Quality and Effluent Guidelines

The program supports management of environmental and human health risks associated with point and non-point source discharges from electric power utilities to surface waters. The program informs rulemaking, assesses the performance and costs for wastewater management, evaluates water quality monitors for treatment operation and compliance, and supports water management options for plant wastewater streams such as FGD wastewater, bottom ash transport water, and landfill leachate.

Key Advisors: *Environmental specialist/manager responsible for negotiating permit limits and the monitoring requirements related to National Pollution Discharge Elimination System and Effluent Limitations Guidelines*

Groundwater and Land Management

Coal combustion products (CCPs) contain a unique suite of constituents, many of which are highly mobile and difficult to treat if released to groundwater. The research provides information and techniques to characterize groundwater transport and risk for these constituents and implement remediation strategies when needed, with a focus on in-situ remediation technologies.

Key Advisors: *Environmental manager and/or subject matter expert with responsibility for compliance with state and federal groundwater regulation and/or groundwater remediation.*

About EPRI

Founded in 1972, EPRI is the world's preeminent independent, non-profit energy research and development organization, with offices around the world. EPRI's trusted experts collaborate with more than 450 companies in 45 countries, driving innovation to ensure the public has clean, safe, reliable, affordable, and equitable access to electricity across the globe. Together...shaping the future of energy.

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