



Meeting R&D Needs of the Electric Utility Industry: EPRI's Portfolio Process

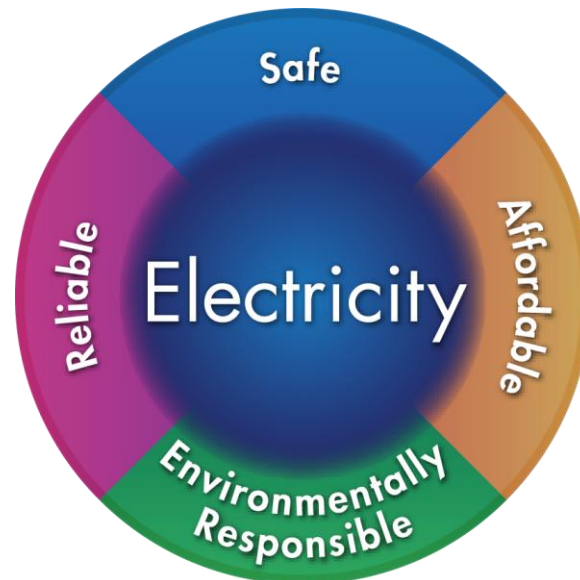
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EPRI's Mission

*Advancing safe, reliable, affordable and environmentally responsible electricity for society through global collaboration, **thought leadership and science & technology innovation***



EPRI Overview

- Members represent more than 90% of generation in the US, as well as public agencies and 40 countries worldwide
- In 2012, around \$380 million was invested with EPRI (25% int'l)
- Technical programs are organized into sectors: (2012 share)



Environment and Renewables (13%)



Generation (i.e. fossil) (17%)



Power Delivery and Utilization (24%)



Nuclear (38%)



Technology Innovation (cross-cutting) (8%)

Multi-tiered Advisory Structure

Board of Directors

(industry executives + external stakeholders)



Advisory Council

(external stakeholders)



Research Advisory Committee (RAC)

(member representatives)



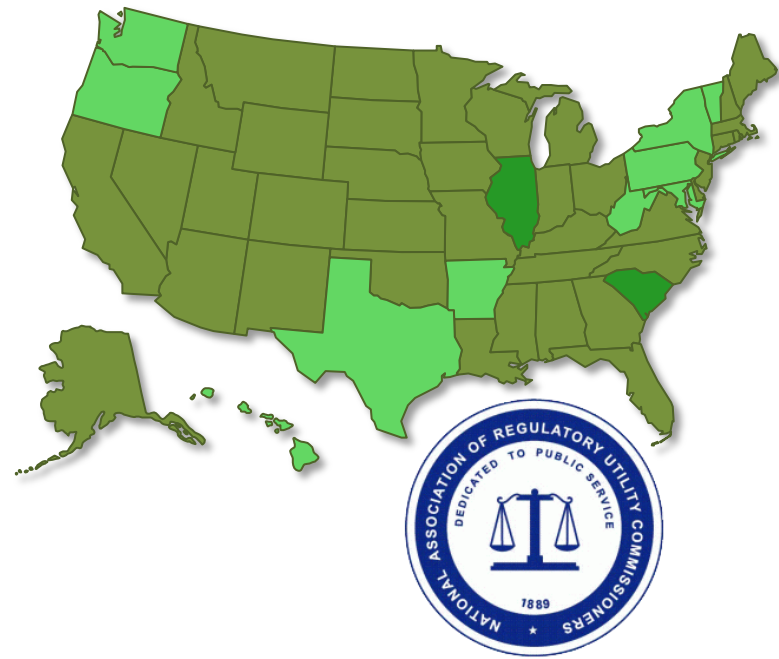
Research Advisory Committee (RAC)

- Provides guidance on EPRI's technology strategy
- Identifies major science and technology needs and priorities of the electricity industry
- Serves as the integrating advisory group on industry issues for EPRI's four Sector Councils



Advisory Council

- Includes leaders from regulatory, academic, environmental, and scientific organizations, along with the finance and business sectors
- Advises EPRI management on trends in political, economic and social issues
- Ensures research relevance and balance in serving the public interest



Interactive Decision-making

- Most allocation decisions occur at the sector/program level
 - Members elect to join specific programs
 - Semiannual advisory meetings on research direction
 - Supplemental projects address emerging issues
- At the same time, EPRI seeks to tailor its program offerings to align with both tactical and strategic member concerns
- Technology Innovation (TI) program complements “bottom-up” sectoral programs with a strategic, “top-down” allocation to cross-cutting and/or early-stage research
- Overall portfolio, especially TI, is reviewed by high-level advisors

Program Areas in Four Research Sectors

Power Delivery and Utilization

- Transmission Lines and Substations
- Grid Operations and Planning
- Distribution
- Energy Utilization
- Cross-Cutting Technologies
- Information and Communication Technologies

Nuclear

- Advanced Nuclear Technology
- Chemistry, Low-Level Waste, and Radiation Management
- Equipment Reliability
- Fuel Reliability
- Long-Term Operations
- Materials Degradation/Aging
- Nondestructive Evaluation and Material Characterization
- Risk and Safety Management
- Used Fuel and High-level Waste Management

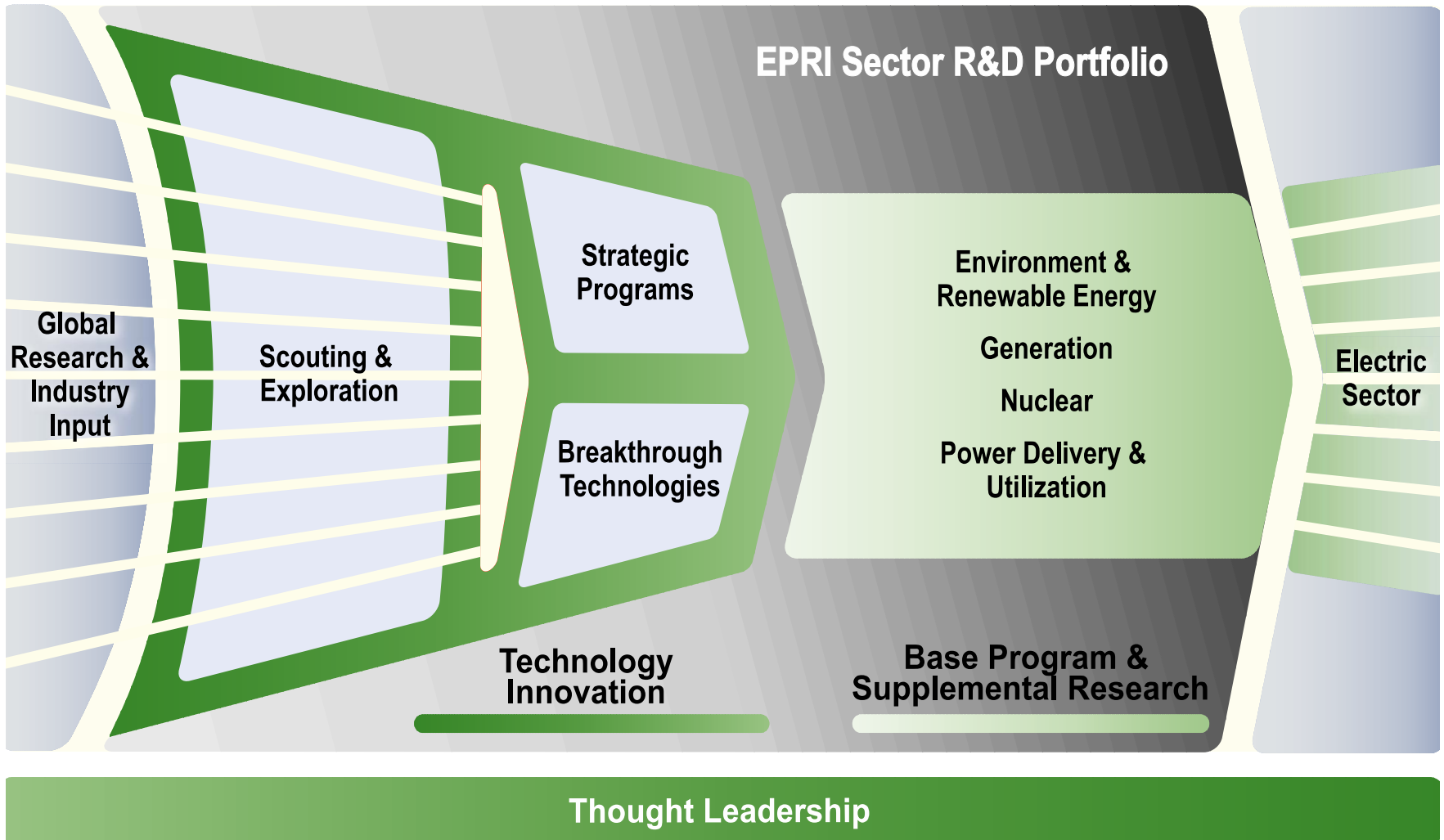
Generation

- Advanced Fossil, Carbon Capture, Utilization and Storage
- Combined Cycle
- Environmental Controls
- Major Component Reliability
- Materials and Chemistry
- Operations and Maintenance
- Power Plant Water Management

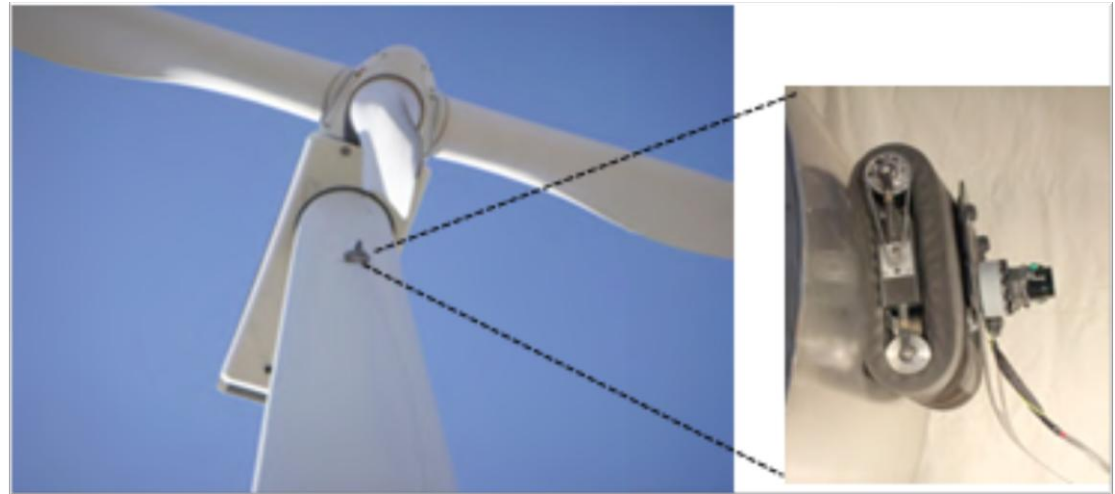
Environment

- Air Quality
- Energy and Environmental Analysis
- Land and Groundwater
- Occupational Health and Safety
- Renewable Energy
- T&D Environmental Issues
- Water and Ecosystems

Technology Innovation Program



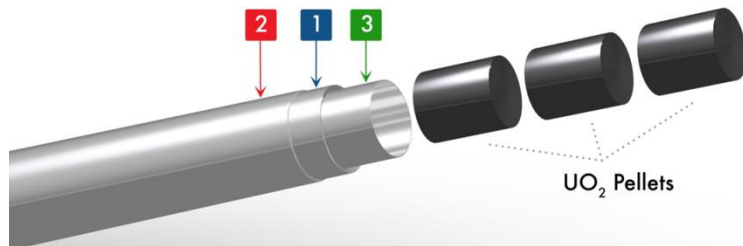
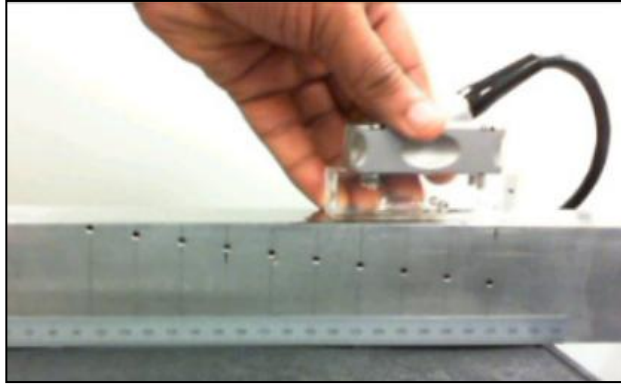
Scouting and Exploration



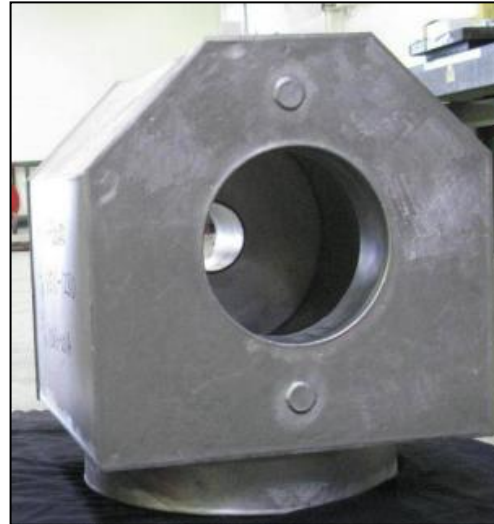
Exploratory Research in High Risk/High Reward Areas

2014 Technology Innovation Program

Breakthrough Technologies



- 1 ...Mo-alloy
- 2 ...Zr-alloy or Al-containing stainless steel or alternate
- 3 ...Soft liner of Zr-alloy or alternate



Accelerate Development for Potentially Transformative Innovations

2014 Technology Innovation Program

Strategic Programs

Power Generation

Materials

Nondestructive Evaluation

Nuclear Fuel Technology

Renewable Energy and Integration

Power Delivery and Utilization

Distributed Energy Resources & Integration

Energy Efficiency

Grid Transformation

Power Electronics

Environmental

Carbon Capture

Env. Impacts of the Future Power System

Near Zero Emissions

Water Use and Availability

Cross-Cutting R&D

Concrete

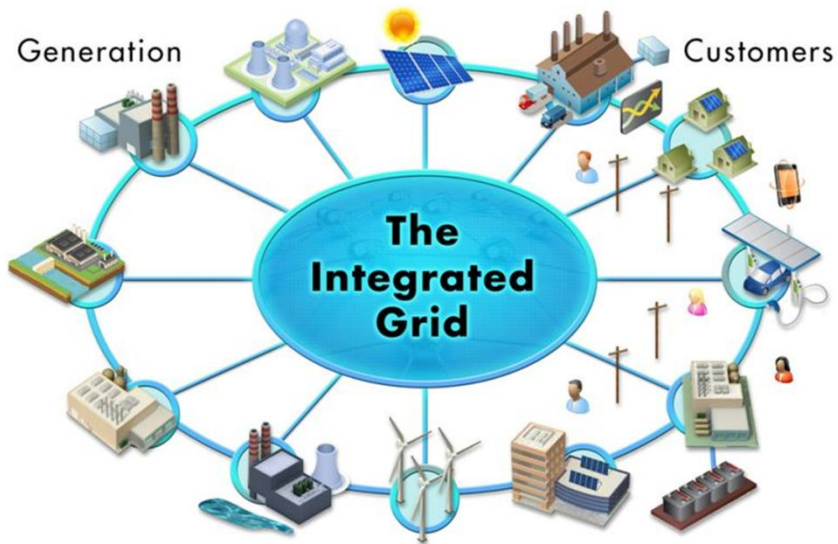
Cyber Security

Sensors & Operations

Thought Leadership

Examples - Power System Transformation

The Integrated Grid



Distributed Energy Resources



Phase One studies designed to support Portfolio research

Trade-offs

- From its inception in 1972 until deregulation in the 1990's, EPRI's portfolio was allocated almost entirely top-down
- In current model, members “vote with dollars” for most programming; only around 10% is allocated top-down
- Decentralized portfolio build has market efficiency
- On the other hand, it risks missing longer-term issues
- Key challenges:
 - Objective function: what is the goal of R&D planning?
 - How well does market-based allocation perform?
 - How can top-down allocation best complement?



Together...Shaping the Future of Electricity