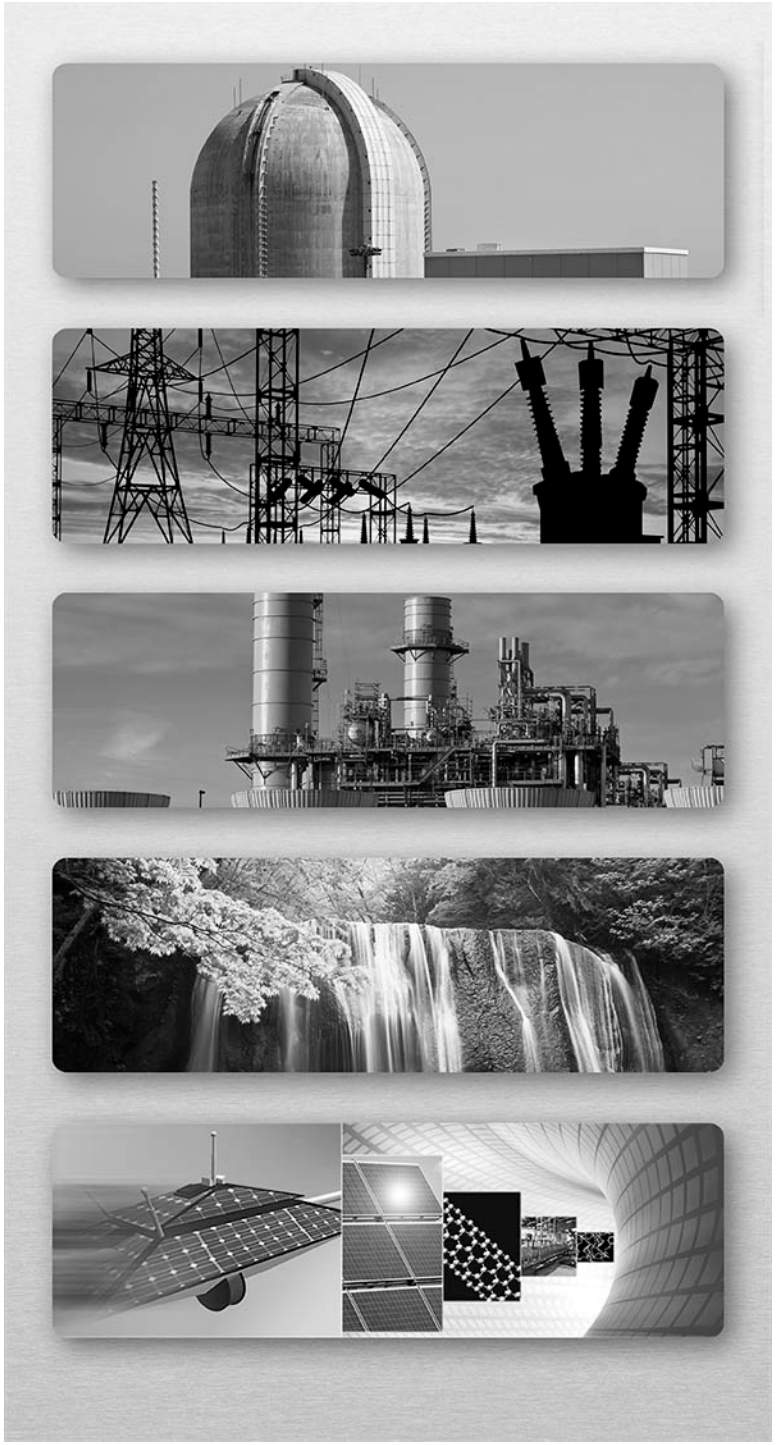


ELECTRIC POWER RESEARCH INSTITUTE

Benefits of Energy Research

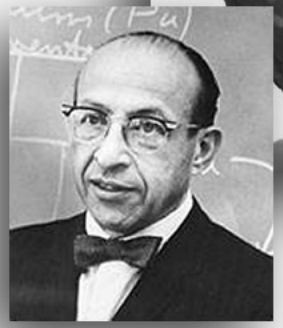
Jeffrey D. Roark
Sr. Project Manager

Benefits Assessment
Energy Research and Development Division
California Energy Commission

May 19, 2011

Our History…

- Founded in 1973
- Independent, nonprofit center for public interest energy and environmental research
- **Collaborative** resource for the electricity sector
- Major offices in Palo Alto, CA; Charlotte, NC; Knoxville, TN
  - Laboratories in Knoxville, Charlotte and Lenox, MA



Chauncey Starr
EPRI Founder

Our Mission…

To conduct research on key issues facing the electricity sector…on behalf of its members, energy stakeholders, and society.

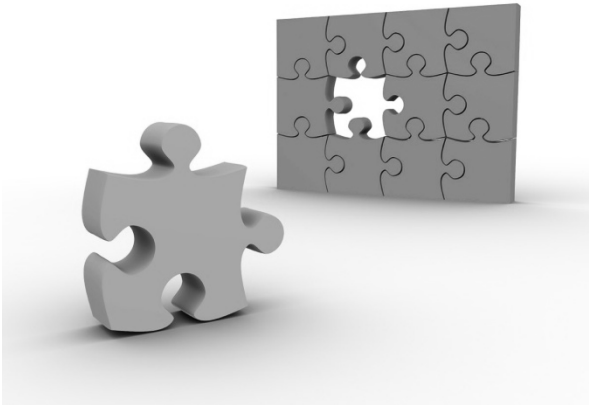
Our Role…

Help Move Technologies to the Commercialization Stage…

Technology Accelerator!

Our Value…

Providing the public, our members and the electricity sector…



Thought Leadership

Industry Expertise

Collaborative Value

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Our Members…

- 450+ participants in more than 40 countries
- EPRI members generate more than 90% of the electricity in the United States
- International funding of more than 18% of EPRI's research, development and demonstrations
- Programs funded by more than 1,000 energy organizations

Benefits Assessment Activities

What benefits assessment activities has EPRI undertaken?

- Value of EPRI's research emerges from its recursive, collaborative process involving researchers and members.
- The result is a portfolio of research in the public interest that members are willing to jointly and voluntarily fund.
- Ability of members to customize their research priorities fine-tunes the matching of research to funders.
- Benefits assessment need not occur at a corporate level; it takes place at the project level, within the many areas of technological development within EPRI's major divisions.

EPRI Portfolio Spans the Entire Electricity Sector

Generation

- Advanced Coal Plants, Carbon Capture and Storage
- Combustion Turbines
- Environmental Controls
- Generation Planning
- Major Component Reliability
- Operations and Maintenance
- Renewables

Nuclear Power

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

Power Delivery & Utilization

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

Environment

- Air Quality
- Environmental Aspects of Renewables
- Global Climate Change
- Land and Groundwater
- Occupational Health and Safety
- T&D Environmental Issues
- Water and Ecosystems

Benefits Measurements

What does EPRI measure?

- By nature, economic benefits resist "measurement" and may not be highly visible to the public.
  - Benefits of today's research occur in the future.
  - Benefits may be avoided costs, avoided problems; may be "maintaining business as usual."
  - Benefits assessments compare two scenarios:
    - "What current and/or future benefits are we getting from the research?"
    - "What would have happened without the research?"
- Despite estimation difficulties, economic benefits are real.
- For EPRI these assessments occur at the project level, decentralized among the experts in various areas, in the collaborative process that produces the research portfolio.

Example: Categories of Benefits

(of Smart Grid Investments)

Benefits		
Economic	Improved Asset Utilization	Optimized Generator Operation
		Deferred Generation Capacity Investments
		Reduced Ancillary Service Cost
		Reduced Congestion Cost
	Capital Savings	Deferred Transmission Capacity Investments
		Deferred Distribution Capacity Investments
		Reduced Equipment Failures
	T&D O&M Savings	Reduced Distribution Equipment Maintenance Cost
		Reduced Distribution Operations Cost
		Reduced Meter Reading Cost
	Theft Reduction	Reduced Electricity Theft
	Energy Efficiency	Reduced Electricity Losses
	Electricity Cost Savings	Reduced Electricity Cost
Reliability	Power Interruptions	Reduced Sustained Outages
		Reduced Major Outages
		Reduced Restoration Cost
	Power Quality	Reduced Momentary Outages
		Reduced Sags and Swells
Environ-mental	Air Emissions	Reduced CO_2 Emissions
		Reduced SOx, NOx and PM-10 Emissions
Security	Energy Security	Reduced Oil Usage (not monetized)
		Reduced Wide scale Blackouts

From *Methodological Approach for Estimating the Benefits and Costs of Smart Grid Demonstration Projects.* EPRI, Palo Alto, CA: 2010 1020342 (Adapted from Table 4-8.)

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Additional Questions

- How has EPRI addressed attribution (public and private sector)?
  - EPRI research is in the public interest, and is available to the public on a non-discriminatory basis.
- What are your future plans for benefits assessment?
  - EPRI's business model currently incorporates decentralized, project-specific benefits assessment in its collaborative process that drives its research portfolio.
  - Details of benefits assessments are fluid, driven by the changing technologies and industry needs.

EPRI…

Working to…

…know the industry challenges…

…understand our members' needs…

…to help provide the best solution!

"Together…Shaping the Future of Electricity"

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