

ABSTRACT

**Method to Set Up an R&D Roadmap
(EPRI Scenario-Based Technology R&D Strategic Planning Process)**

by

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In the last several years, EPRI has led a broad-based industry endeavor to develop and publish the *Electricity Technology Roadmap*, a high-level document that provides guidance on strategic technology planning over the next 40-50 years for the electricity industry. However, critical uncertainties over this timeframe – such as fuel prices, the economy, the environment, technology advances, and regulatory policies – complicate effective development of R&D priorities. To address these uncertainties and to develop a nearer-term technology-oriented action plan, EPRI undertook an *Electric Power Industry Technology Scenarios* project that uses scenario planning to explicitly incorporate uncertainty and focuses on a 20-year planning horizon. The first deliverable from this work effort, published in December 2005 (EPRI report 1013016), defined four carefully specified future scenarios. The purpose of the present paper is to describe the critical technology R&D needs of the electric power industry, and map them to the four scenarios. To obtain initial input to develop the technology needs, EPRI conducted a series of workshops with stakeholders from EPRI, utilities, and other organizations.

This paper is not intended to include an exhaustive list of technology R&D priorities; instead, it presents the approach used and presents R&D needs perceived to be particularly important. The paper describes U.S. technology R&D needs in the following seven areas: power generation, electric energy storage, environment, power delivery, end uses of electricity, power and fuel markets, and technology innovation/emerging technologies (e.g., biotechnology, nanotechnology, smart materials and sensors and advanced information technology).

EPRI plans to periodically update the approach used and results, as needed to reflect new technological advances, regulatory realities, market changes, and economic factors facing the

U.S. electric power industry. Additional recommended work includes developing a plan to prepare for, and react effectively to, scenario “wild cards” – additional institutional, political, financial, technical, or social changes not explicitly addressed in this paper – that could have a major impact on U.S. electric power industry R&D.