

# Efficient Electrification: State and Utility Assessment



- Actionable research to the power sector on the impact of increased renewables on the system, air quality attainment, energy market reforms, and CO<sub>2</sub> mitigation
- Projections of electric demand and load shape changes by sector (2020 to 2050)
- Technology assessment on electric technologies, renewables integration, and distributed energy resources
- Strategic electrification guide for near-term action and long-term implementation

## Background

Economic and environmental factors will increasingly reward and drive the application of electric technologies to boost energy efficiency and grid flexibility, increase productivity, and improve product quality while supporting emissions reduction, water savings and safety. Keys to understanding the impact of efficient electrification include analyzing how a state's energy system could evolve over time under various policies; a comprehensive customer and societal assessment of electrification technologies; and developing and gaining stakeholders' support.

### U.S. National Electrification Assessment

This project builds upon EPRI's U.S. National Electrification Assessment (NEA) that evaluates the major drivers and feasibility of significantly greater electrification between 2020 and 2050. The NEA shows how energy demand—electricity demand in particular—evolves through 2050 across the residential, commercial, industrial, and transportation sectors. This is based on a careful analysis of the technological and economic potential for electric technologies combined with key market, policy, and technology drivers. For example, the assessment illustrates a case where total electricity load grows 32% from 2015 to 2050 based on consumer adoption of *economic electrification technologies* that displace direct use of fossil fuels.

## Objective and New Learnings

For this project, EPRI's efficient electrification assessment methodology will be applied in detailed state and electric utility service area studies yielding results of the potential economic and environmental benefits (greenhouse gas and

air quality impacts) of the electrification of energy services. The studies also will assess the technical and economic potential for deploying electric technologies and develop a roadmap for electric utilities to implement electrification plans.

## Benefits

This project will provide **state-of-the art analysis to inform utility decision making on the evolving power system under various market and policy scenarios related to system operations, capacity expansion, and the potential for efficient electrification**. Specific value to EPRI members from participation in this project include:

**Robust analysis on state policies, markets, and the potential for efficient electrification:** Analysis will focus on both near-term challenges and longer-term policies faced by members (e.g., renewable targets, air quality attainment, energy market reforms, and CO<sub>2</sub> mitigation). Project also will identify electric technologies with a high potential of adoption and their associated benefits.

**Actionable research for utilities from a business perspective:** Participants will receive state-specific analyses to inform their decision making including, but not limited to, capacity expansion investments, integration of renewables and their impact on the system, and electricity demand projections.

**Benefits identification and valuation:** Analysis will clearly identify the changes to emissions (CO<sub>2</sub>, air quality) at the state level and economic implications to the power sector and to customers in terms of energy expenditures and prices.

**Strategic electrification guide for near-term action and long-term implementation:** Electric utilities can play a pivotal role to help their customers better understand and adopt potentially beneficial technologies through direct engagement and programmatic efforts such as information services, technology transfer, and economic incentives.

### Project Approach and Schedule

EPRI will combine the details of electric technologies with its integrated energy-economy model and electrification program experience to provide a much more detailed examination of electrification opportunities, potential, challenges, and value than is currently available. Project duration is approximately 2 years.

#### *Task 1: Energy System Assessment (2020 to 2050)*

Analyses will examine the transition of the state energy sector, including the electric technology assessment and the corresponding composition of final energy demand across the industrial, residential, commercial, and transportation sectors. Energy production with an emphasis on the electric power sector will show electric capacity and generation by technology, power flows with adjacent states, and changes in electricity and natural gas prices. Results in 6 months after project start.

#### *Task 2: Environmental Assessment (2020 to 2050)*

Comprehensive analysis across the power generation, transportation, industrial, residential, and commercial sectors to assess reductions in greenhouse gas and air pollution emissions, and air quality. Results in 6 months for greenhouse gas and air pollution emissions, and 12 months for air quality results after project start.

#### *Task 3: Transmission Assessment (selected years)*

Building on the above energy system and technology analyses, a high-level assessment will be conducted to understand the qualitative impacts on transmission needs in the state. Results in 9 months after project start.

#### *Task 4: Utility-Level Assessment and Implementation Plan (selected years)*

Analysis will include: a utility-specific assessment of electric technologies, locationally-specific and across all customers; and a strategic vision and assessment for near- and long-term emerging technologies and their benefits and impacts. Results 12 to 18 months after project start.

### Who Should Join

Companies seeking insights for decision-making to comply with state policies, climate policies, and changes in the energy markets to gain a deeper understanding of the potential for electrification in their state and service territory and the associated customer, economic, energy, and environmental implications.

### Deliverables

#### Information Exchange/Webcasts

- In-person meetings to plan and implement research
- Monthly webcasts to review project status and results
- Public webcasts to share findings with stakeholders
- Technical workshops

#### State-Level Energy, Environmental and High-Level Transmission Assessments

- Energy System Assessment: Electric supply and final energy demand
- Environmental Assessment: GHG and air pollutant emissions; air quality impacts
- High-level Transmission Assessment: Ability to incorporate increased loads and operational implications

#### Utility-Level Electric Technology Assessment and Electrification Plan

- Utility-specific customer electrification potential models
- High-level customer benefit-cost assessment
- Strategic guidance technical report
- Assessment of transportation adoption scenarios

### Price of Project

The base price is \$225,000/year for 2 years for a single-company/single-state project. A tiered pricing structure is utilized for participants with different levels of assets. Price reductions are obtainable by expanding the collaborative with multiple participants in a single state project and/or a company's participation in multiple state projects.

### Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 ([askepri@epri.com](mailto:askepri@epri.com)).

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