

Localized Residential Electrical Panel Survey

- Gain insight into how many homes in your specific territory or state may require an electrical service upgrade to accommodate whole home electrification
- Understand how much electrification could be achieved on existing electrical services without having to upgrade
- Obtain knowledge of demographics of homes by main breaker capacity

With the growing interest in electrification, one of the primary perceived barriers in the U.S. residential sector is limited electrical panel capacity. There have been many anecdotal claims of undersized panels, particularly in states where natural gas appliances are prevalent. To begin to address this information gap, in 2022, EPRI conducted the first national survey of residential electrical panels by collecting 3,000 surveys where residents filled out information about their home's electrical panel and major appliances. The results were presented at the national and regional level (Northeast, Midwest, South, and West) in EPRI report [3002024056](#).

In 2023, EPRI conducted follow-on research to model the effects of various electrification scenarios on each of the surveyed single-family homes. This follow-on project aimed to understand the scale of this problem more objectively by using the survey responses to build a computational model. The model calculates if main breakers will be undersized, based on NEC load

calculation requirements, in a variety of partial and complete electrification scenarios. The initial findings ([3002026736](#)) indicate that the electrical service will be a significant barrier to electrification that will likely delay electrification. However, these findings were based on a national survey and will likely vary substantially at the state level.

The goal of this project is to conduct individual state or utility electrical panel surveying and modeling, using the established procedures EPRI developed in 2022 and 2023. By conducting the survey at a more local level, the survey and modeling work will yield actionable insights to help the utility better forecast and plan their decarbonization roadmap. The participating company will decide the specific scope of the survey, whether it be by service territory by zip codes, individual state, or group of states. Additionally, a group of utilities could collaboratively fund a single survey for a state.

Benefits

- Insight into how many homes in a specific territory or state may require an electrical service upgrade to accommodate whole home electrification.
- Understanding of how much electrification could be achieved on existing electrical service without having to upgrade.
- Knowledge of demographics of homes by main breaker capacity, including income level, age of the home, size of the home, and other respondent attributes.
- Updated data on electric load adoption for major appliances in homes. This data may exist at a regional level or through other surveys, but not with the granularity needed to model home electrification.
- Benefit the public by enabling utility incentive programs to help prepare homes for efficient electrification.

Approach

The project team will discuss and determine the scope of the survey to be conducted, whether it is at the state level, utility service territory level, or some other custom area.

EPRI has a pre-established questionnaire that will serve as a starting point for the survey. Survey questions include asking main breaker (or service disconnect) rating, which major appliances/loads are present (including HVAC, dryer, cooktop, oven, electric vehicle (EV), and solar PV), and what is the fuel source the major appliances. The survey will also require the resident to take a picture of the electrical panel to allow EPRI to verify responses to the best of its ability. Through a third-party vendor, EPRI will initiate the survey.

Upon receipt of the initial survey data, EPRI will analyze the data and pictures to guarantee good responses before finalizing the dataset. Once finalized, EPRI will compare each survey response with their submitted picture in order to verify attributes such as main breaker rating, number of open breaker slots, and number of double-pole breakers currently in use.

With the finalized and clean survey data, EPRI will present the initial survey results before conducting any modeling. This will provide an interim update on the demographics of the responses and some preliminary learnings about main breaker ratings and load adoption within the specified territory.

The next step will be to model the capacity of the home to add more electric loads as well as estimate the size of the electric service required to fully electrify the home depending on the individual survey responses. With all of the load information gathered, EPRI will be able to model the amount of the amount of remaining electrical capacity per NEC guidelines. EPRI has various electrification scenarios that will be modeled including scenarios such as: adding only an EV, adding only a heat pump, replacing all existing natural gas appliances with electric, implementing an amp/watt diet with 120-volt appliances, and more.

At completion of modeling efforts, EPRI will prepare a final report, documenting all of the processes and findings from the project. The report will provide statistically significant data in order to make informed customer program decisions.

Deliverables

1. Monthly webcasts (as needed, primarily for the second half of the project once data is received)
2. Survey Questionnaire
3. Raw Survey Results Presentation
4. Final Report

Price

\$100,000. This project qualifies for the use of Self-Directed Funds (SDF). Funding can be split over two calendar years.

Schedule

The project's duration is expected to be approximately twelve months, subject to contract execution.

Who Should Join?

Utilities that are concerned about barriers to electrification in their service territory and are unsure about how many resources to commit to addressing those barriers.

Contact Information

Doug Lindsey, Sr. Project Manager
dlindsey@epri.com | 865.218.8164

For other information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).