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**Title:** Customer Barriers to Residential Building Electrification as a Means to Reduce Greenhouse Gas Emissions

**Abstract:** One electric utility is prioritizing building electrification coupled with grid modernization as a way to reduce greenhouse gas emissions. The utility is interested in helping residential customers convert their appliances from natural gas to electric fuel sources while converting the utility's electricity supply to clean sources such as solar and wind. This study examined customer receptiveness to residential home electrification opportunities including electric space heating, water heating, and induction cooktops, specifically:

- 1.) Customers' current understanding and perceptions of electrification opportunities, including awareness, perceived benefits, and perceived drawbacks.
- 2.) Customers' decision-making process and drivers, including what and who most influences those decisions.
- 3.) Potential interventions the utility could promote to influence customers' decision-making process and accelerate electrification. To address these research objectives, we completed surveys with 513 residential customers and in-depth interviews with 30 market actors (e.g., contractors, plumbers, distributors).

Results showed that most customers currently have gas water heating and space heating equipment, and have never considered switching to electric they were not even aware it was an option. Both customers and plumbers have low awareness of heat pump water heaters, although there is greater awareness of electric heat pumps. Furthermore, customers believe that gas equipment functions better and is more reliable. On the other hand, electric equipment is seen as safer and less likely to pollute the air inside the home.

With some education (within the customer survey) that explained the benefits and drawbacks of efficient electric technologies, about 25% of customers were interested in adopting efficient electric technologies. About 6% had already adopted one of these technologies, while the remainder were not interested in electrification.

While customers often turn to contractors and plumbers for information when replacing equipment, this study found that these market actors are reluctant to advocate for electric over gas. Therefore, to drive adoption, the utility will need to focus on creating demand among customers; however, the utility will also need to increase awareness of heat pump water heater options among plumbers so they can be prepared to assist customers with their requests for this lesser known technology. Explaining the benefits and misconceptions of efficient electric appliances while also providing assistance with fuel switching costs will be necessary to increase customer demand. This represents an opportunity for the utility to serve as a trusted advisor, provide accurate information, and drive the discussion with both customers and target market actors.