

Advancing Residential Decarbonization: A User-Centered Approach to Understanding Occupant Values, Perceptions, and Motivations for Electrification

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Background/Objectives. In the United States, residential buildings account for 20% of primary energy consumption, and fossil fuel combustion in buildings leads to roughly 30% of total greenhouse gas emissions. Decarbonizing the electricity grid will not be enough to meet emission targets; electrification of residences will be a key factor in realizing decarbonization goals. However, not all residents are willing or able to make changes to lower their fossil fuel use due to a myriad of economic, social, and cultural factors. The U.S. Department of Energy is funding research to investigate how residents make decisions that affect home energy use and to explore how those decisions can help meet decarbonization goals.

Approach/Activities. This study is led by the Pacific Northwest National Laboratory, with support from Illume Advising. The research team takes a social-science research approach to determining home occupant preferences for energy-related technologies. Primary research questions focus on motivations and key decision points for energy-related home upgrades, purchasing decisions, and using technologies relevant for residential electrification. Additionally, the research team assembled an advisory committee comprised of experts from industry, research, and academia to inform study methods. The team conducted 125 semi-structured interviews with homeowners and renters in four U.S. climate zones. The results of these interviews were used to develop a national survey distributed to 10,000 households. The final dataset (125 interview transcripts and 10,000 survey responses) was analyzed quantitatively and qualitatively to identify primary decision points in households and to explore how technology identities inform decision making. Opportunities and barriers for residential electrification were identified.

Results/Lessons Learned. This presentation will highlight key findings from interviews and surveys, data from which are currently being analyzed. Included will be specific narratives that walk through resident decision-making processes and household technology identities. Information gathered will help identify opportunities for household electrification and recognize barriers that impede decarbonization across a variety of socio-economic communities. Outcomes of the study will help determine links between resident preferences, values, and decision-making processes related to home energy use, and help inform policy mechanisms aimed at electrification in the residential building sector. This presentation will provide a project overview and will discuss findings to date, including results and primary takeaways from the household interviews and surveys.