

## Maximizing Home Energy Report Savings: Who Saves the Most, the Least, and Why?

**Authors:** Olivia Patterson

**Research Categories:** Impacts, Residential, Findings

Home energy reports (HER) are by far the most common type of behavioral energy efficiency program used by utilities. These programs achieve savings by encouraging large numbers of customers (typically in the tens or even hundreds of thousands) to make small changes to reduce their energy consumption. As these programs mature and low-hanging energy savings grow scarcer, it is important to understand not just whether programs are achieving any savings at the aggregate level, but which customers are achieving the highest and lowest savings as a result of participation, and why. Such knowledge could enable utilities to target program expansion at customers likely to save the most, and develop different opportunities for customers who seem unlikely to benefit.

In this paper, we build on previous evaluations of an established HER program by conducting a survey (N = 2,898) to learn more about why, despite the program's overall success, some 40% of participants actually experience *negative* savings, and other customers experience much higher savings than average. Understanding what causes these differences in savings is critical to developing actionable recommendations to improve the HER program.

We assess three broad categories of potential explanations for why customers respond so differently to reports:

- Opinions about the home energy reports used in the program (e.g. do customers enjoy being given energy reduction targets or competing with their neighbors)
- General attitudes about energy use
- Circumstantial factors such as changes in household occupancy or health

In addition to traditional survey analysis, we may use machine learning techniques such as random forest or neural networks to build models that predict savings group based on survey responses. These models could help us understand which variables are most predictive of a customer's savings group after the potential for complex interactions among variables is taken into account. This is important given the complicated relationship between a participant's attitudes, personal circumstances, and ultimate response to the home energy reports.

Our presentation will focus on how we combined data from a wide range of methods (multilevel modeling, traditional survey analysis, and machine learning) to delve into what makes participants tick and create actionable recommendations for deepening HER program savings. Our findings are useful both to HER program implementers interested in our substantive results, as well as to evaluators eager to expand their analytic toolkit. The survey data and results are available now, and the machine learning modeling is currently underway.