Measuring the Energy Savings of a Behavior-Oriented Program Intervention

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Introduction

This poster presents the results of a study on whether, and to what extent, giving residential customers real-time feedback about their electricity use motivates them to change their behavior and save energy. This study is unique in that it is one of a few studies that show energy savings for a program that is information-only.

During the spring and summer of 2007, three Massachusetts utilities (National Grid, NSTAR, and Western Massachusetts Electric Company) provided some of their residential customers with Power Cost Monitors (PCMs) at low cost or no cost. PCMs provide instantaneous feedback on home electricity use and cost. No other incentives or information were provided to these customers, and none of the customers were on time-of-use electric rates.

Method

A two-phase panel study of participants was performed, with one survey 2-6 months after PCM distribution (n=478) and the second survey 8-12 months after distribution (n=348). These surveys asked about the use of the PCM as well as short and long term behavioral changes.

In order to quantify the energy savings that were due to the PCM, a billing analysis of monthly electricity use data was carried out on 243 customers who *installed and used* the PCM. We examined the difference between electricity use before and after the intervention, controlling for the effects of other variables expected to influence electricity usage (such as weather). A regression model was estimated using ordinary least squares; the final model was a fixed-effects model.

Results

Three quarters of the participants actually installed the PCM once received. Among those using the device, the percent dropped from 73% after first getting the PCM to 35% after 8 to 12 months. Some of the self-reported behavioral changes after first using the PCM included turning off lights when not in a room (41%), turning off the TV when not watching (23%), and increasing the thermostat temperature to reduce air conditioning (14%). Three percent indicated making efficient equipment purchases after using the PCM.

The billing analysis found that the annual electricity savings due to the PCM was 317.6 kWh (or 2.9% of annual usage) per PCM *used*. Across all PCMs distributed (regardless of use), the savings were 202 kWh (or 1.9% of annual usage). The total savings for all participants in the pilot program was estimated to be 790 MWh per year. Though reasonable, this may be the first time that this issue has been examined in a residential billing analysis, and this study has implications for better billing analysis methodology as well as potential issues for the promotion of programs.