Getting Energy Use Down to a (Social) Science: Combining Behavior Insights and Connected Technologies

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2015 IEPEC Conference — Long Beach, California
Presentation Overview

- Overview of CEE
- Introduction to Connected and Behavior
- Behavior Insights
- Program Examples
- Challenges and Successes
- Areas for Future Research
OUR MISSION

CEE increases the effectiveness of energy efficiency programs by enhancing communications and harmonizing approaches across programs to advance energy efficiency for the public benefit.
Connected Technology

Demonstrate savings

↑ Energy Savings

IEPEC Long Beach 2015
Behavior Insights and Tools

- Social norms
- Public commitment
- Reciprocity
- Anchor bias
- Single action bias
- Modeling
- Confirmation bias
- Goal setting
- Feedback
- Loss aversion
- Cognitive dissonance
- Self-efficacy
- Sunk costs
- Discounting the future
- In kind gifts
- Prompts
- Rewards
- Above average effect
- Status quo bias
- Heuristics

Goal setting

Social Norms
Secondary Research Approach

- CEE member programs
- 2014 CEE Behavior Program Summary
- Connected Technologies (i.e. IHD, app, web portal)
- Behavioral Insights (i.e. norms, goal setting)
- Completed Impact Evaluation
Program Examples

iCanConserve
Focus on Energy

In-Home Display Check Out Pilot
Sacramento Municipal Utility District

Home and Business Area Network Pilot
Pacific Gas and Electric
# Program Details

<table>
<thead>
<tr>
<th>Pilot/Program</th>
<th>Location</th>
<th>Dates</th>
<th>Participants</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>iCanConserve Wisconsin Focus on Energy</td>
<td>3 communities: Allouez, WI Brillion, WI Plover, WI</td>
<td>2010-2013</td>
<td>Residential and Commercial customers</td>
<td>Smart tstats, IHDs, home energy management</td>
</tr>
<tr>
<td>In-Home Display Check Out Pilot SMUD</td>
<td>Sacramento, CA</td>
<td>2012-2013</td>
<td>1,155 residential customers</td>
<td>IHD</td>
</tr>
<tr>
<td>Home and Business Area Network Pilot PG&amp;E</td>
<td>CA</td>
<td>Aug 2014 – Nov 2014</td>
<td>1,685 residential/commercial customers</td>
<td>Aztech IHD or Bidgely gateway (via tablet, app, computer)</td>
</tr>
</tbody>
</table>
Application of Behavior Insights

- **Prompts** → IHD (SMUD, PG&E)
- **Default Bias** → Opt-out
design: 3% → 57% participation (Focus on Energy)
- **Discounting the future** →
Cumulative $$ via IHDs (SMUD); projected monthly
costs (PG&E)
- **Competition** → Community-
level rewards (Focus on Energy)
## Evaluation Results*

<table>
<thead>
<tr>
<th>Pilot/Program</th>
<th>Evaluation Design and Methods</th>
<th>Results</th>
<th>Statistical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>iCanConserve Wisconsin Focus on Energy</td>
<td>Quasi-experimental (no randomization)</td>
<td>Savings of 4% from technology only and 2% from TOU only, but 9% when combined</td>
<td>Not statistically significant due to small sample size</td>
</tr>
<tr>
<td>In-Home Display Check Out Pilot SMUD</td>
<td>Quasi-experimental (no randomization); difference-in-differences</td>
<td>Average electricity savings of 2.6%, peak savings of 3.4%</td>
<td>Savings were statistically significant, but only for the period after the IHDs</td>
</tr>
<tr>
<td>Home and Business Area Network Pilot PG&amp;E</td>
<td>Quasi-experimental (no randomization); propensity score matching, difference-in-differences</td>
<td>7.7% energy savings from one of the TOU groups</td>
<td>Statistically significant savings from one group but not from others</td>
</tr>
</tbody>
</table>

*see detailed version of this table in paper*
Challenges & Successes

- Small sample sizes
- Technology used < possible (e.g. peak notifications)
- Insufficient time to apply learnings to new rollouts

- Interaction: TOU/technology 2 + 4 = 9?
- Commercial sector
- Customer engagement, knowledge, and attitudes
Areas for Future Research

- Cost-Effectiveness
- Device usability/appeal $\rightarrow \uparrow/\downarrow$ savings?
- Which messages change (which) behaviors
- Persistence
Acknowledgments

Kimberly Conley, PG&E
Amber Steeves, SMUD
Lupe Jimenez, SMUD
Paul Grimyser, CB&I

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