



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



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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

↑ Energy Savings



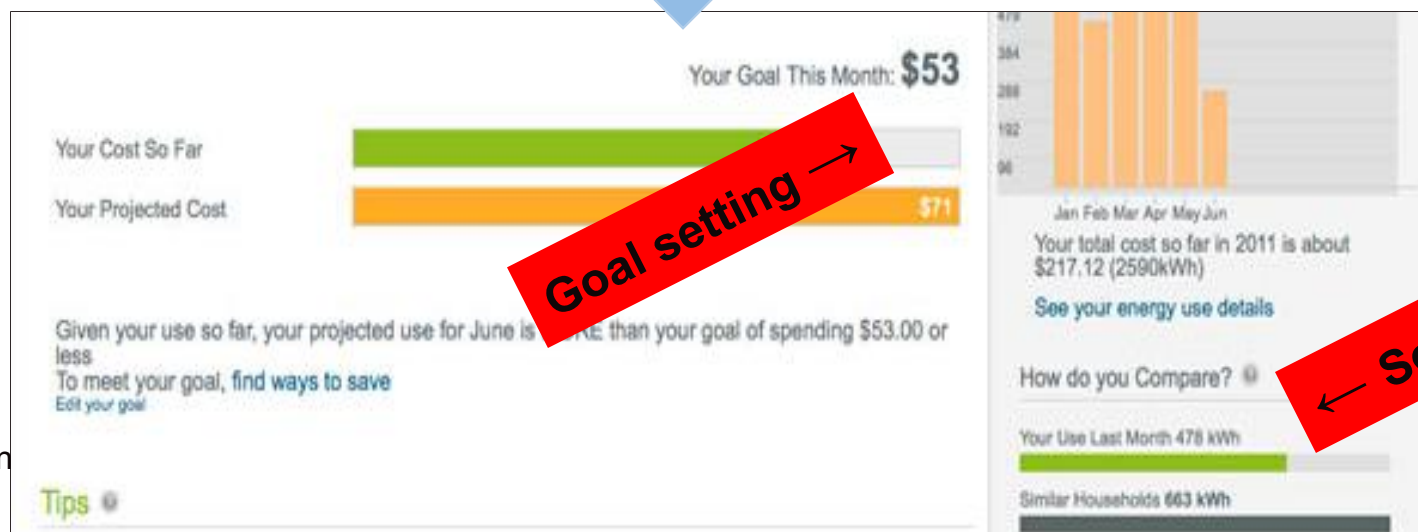
Demonstrate savings



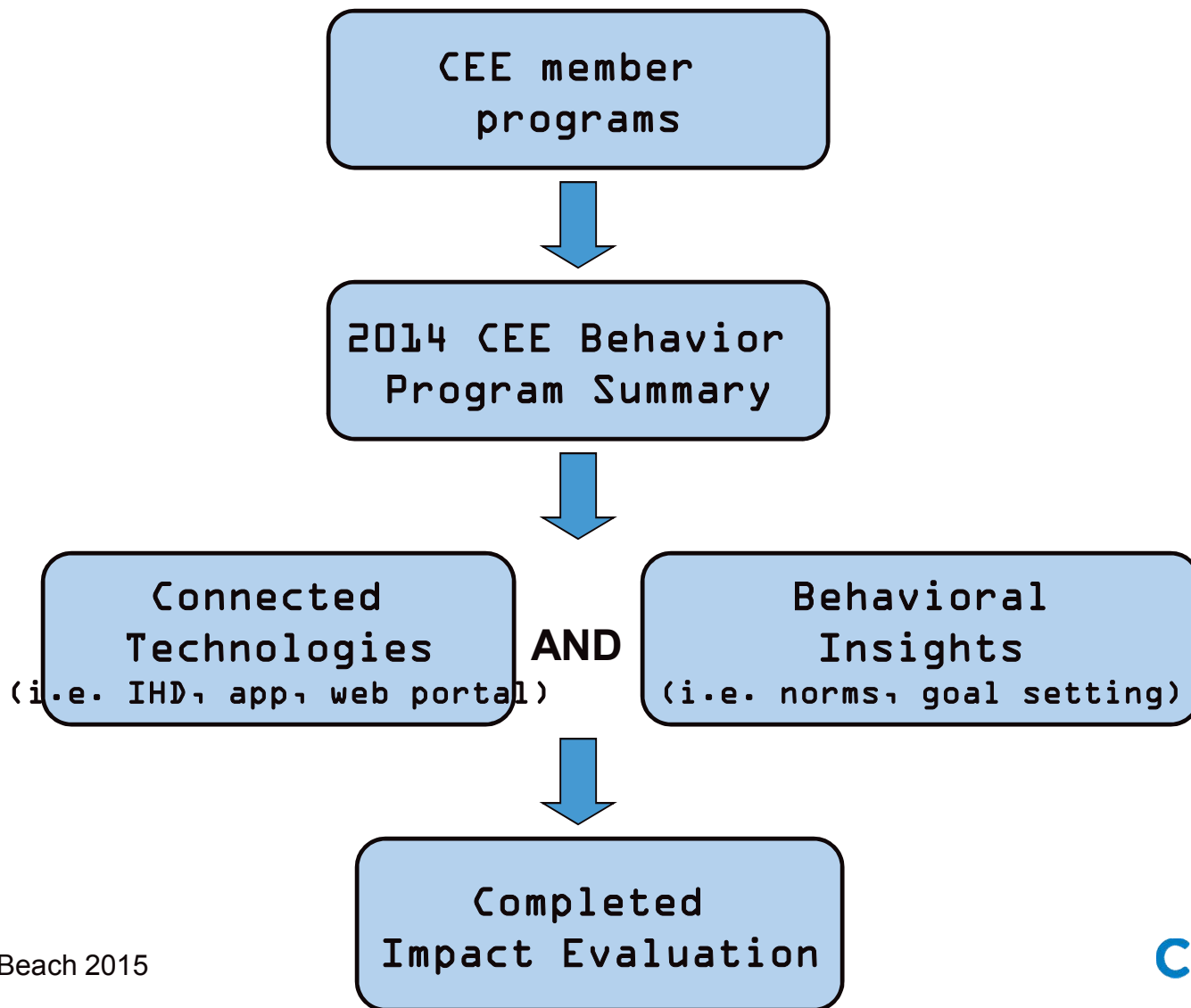
Behavior Insights and Tools



- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> •social norms •public commitment •reciprocity •anchor bias •single action bias | <ul style="list-style-type: none"> •modeling •confirmation bias •goal setting •feedback •loss aversion | <ul style="list-style-type: none"> •cognitive dissonance self-efficacy •sunk costs •discounting the future •In kind gifts | <ul style="list-style-type: none"> • prompts •rewards •above average effect •status quo bias •heuristics |
|--|---|--|---|



Secondary Research Approach



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

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



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*



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

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 → \uparrow/\downarrow savings?
- ▼ Which messages change
(which) behaviors
- ▼ Persistence



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