

Energy Impact from Gamification-Induced Behavior Change

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2015 IEPEC Conference — Long Beach, California

Overview

What to expect from this presentation

Results from two separate applications of the Cool Choices game

- > What the game is
- Methodology
- Results
- > Evaluation implications







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Cool Choices

It's a game





It's a sustainability program

It's a behavioral intervention





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Game #2 Fox Valley Schools

- Implemented in Menasha and Kaukauna classrooms in 2013
- 224 players, 4,743 unique Cool Choices actions, 41% new
- Expected reduced impact due to implementation
- Opportunity for comparison group due to muni participation

Billing analysis with control group Fox Valley Schools

	Households	Pre-game electric consumption	Savings *
Participants	75	11,820 kWh	248 kWh (2.1%)

*post-game year vs. pre-game year

Billing analysis with control group Fox Valley Schools

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Participants	75	11,820 kWh	248 kWh (2.1%)**

*post-game year vs. pre-game year **95% confidence interval: -0.9% to 5.1%

Billing analysis with control group Fox Valley Schools

	Households	Pre-game electric consumption	Savings *
Participants	75	11,820 kWh	248 kWh (2.1%)**
Kaukauna population	13,106	9,193 kWh	-30 kWh (- 0.3%)
Menasha population	8,249	7,385 kWh	25 kWh (0.3%)

*post-game year vs. pre-game year **95% confidence interval: -0.9% to 5.1%

Game #1 Miron Construction

- Implemented in a construction firm with multiple Wisconsin offices in 2011
- 220 players, 3,500 unique Cool Choices actions, 52% new
- Inaugural game
- Multi-faceted evaluation

Evaluation approach



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Two approaches to impact estimate

[>]re-game Savings

estimates for actions as stated

(e.g., 1,000 kWh for refrigerator turn-in)

In-game reporting Selfreported actions (e.g., 10 people claimed a

refrigerator action)

Post-game Savings true-up interview and savings adjustment

(e.g., adjusted refrigerator savings estimate to 500 kWh)

Adjusted savings calculations

	Claimed new	Verified as new	Action fit assumptions
Replace 85% of incandescent bulbs with CFLs	13	13	10
Remove or unplug second refrigerator	17	17	7
Turn off game console when not in use	18	12	1
Replace water heater with more efficient model	6	6	0
Switch furnace fan setting from continuous to automatic	15	10	4
Air seal and insulate to recommended levels	8	7	4

Two approaches to impact estimate

"Population" billing analysis

Billing analysis

12-month pre/post weather normalized Household consumption

Review of household consumption patterns

Comparison to expected signatures

Results* compared

	Pre-eval	Post-eval
Savings calculations	2,100 kWh	900 kWh
Billing analysis – mean	n/a	400 kWh*
Billing analysis – median	n/a	600 kWh

*Little impact for natural gas by either approach.

**Billing analysis range of savings at 95% confidence: 100-800 kWh

Difficulty linking actions to usage signatures



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What about persistence?

Action	Estimated one-year persistence
Replacing 85 percent of incandescent light bulbs with CFLs	complete (100%)
Air sealing and insulating to recommended levels	complete (100%)
Switching furnace fan setting from continuous to automatic	complete (100%)
Replacing water heater with more efficient model	complete (100%)
Removing or unplugging second refrigerator	high (80-99%)
Turning off game console when not in use	moderately high (60-79%)

Value to the program

- Savings estimates without RCT
 - □ Useful indicator now
 - □ Greater confidence from triangulation
 - Building toward a tighter case for energy savings
 - Data on persistence
- Program improvements
 - □ Understanding the mechanism
 - □ Improved savings assumptions
 - Implications for action points
 - Implications for in-game messaging
 - □ Input about the game experience



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