Timing, Longevity, Depth: Investigating Customer Engagement in Residential Behavior Programs

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TIMING, LONGEVITY, DEPTH: INVESTIGATING CUSTOMER ENGAGEMENT IN RESIDENTIAL BEHAVIOR PROGRAMS

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Introduction

Introduction

Behavior-based energy efficiency programs are those that utilize strategies intended to affect consumer energy use behaviors in order to achieve energy and/or peak demand savings. Programs typically include outreach, education, competition, rewards, benchmarking and/or feedback elements.*

*State and Local Energy Efficiency Action Network. 2012. *Evaluation, Measurement, and Verification (EM&V) of Residential Behavior-based Energy Efficiency Programs.* Prepared by A. Todd, E. Stuart, S. Schiller, and C. Goldman, Lawrence Berkeley National Laboratory.

Introduction

What drives these savings?

2014 Evaluation Results

Utility	Total Residential Participants*	% of Population*	Number of Years Implemented (at time of evaluation)	Evaluation Period	Avg. Annual Residential Savings	
					% Reduction	Total kWh
Beltrami Electric Cooperative	2,522	13%	3+ years 5/2010-4/2013	05/10-05/13	2.80%	705,344 kWh
Lake Region Electric Cooperative	3,569	15%	~4 years 1/2010-4/2013	01/10-04/13	2.60%	857,849 kWh
Stearns Electric Association	2,169	9%	3+ years 5/2010-4/2013	05/10-04/13	1.80%	463,783 kWh
Wright Hennepin Electric Cooperative	6,718	16%	6+ years 7/2007-4/2013	04/07-06/13	2.20%	844,030 kWh

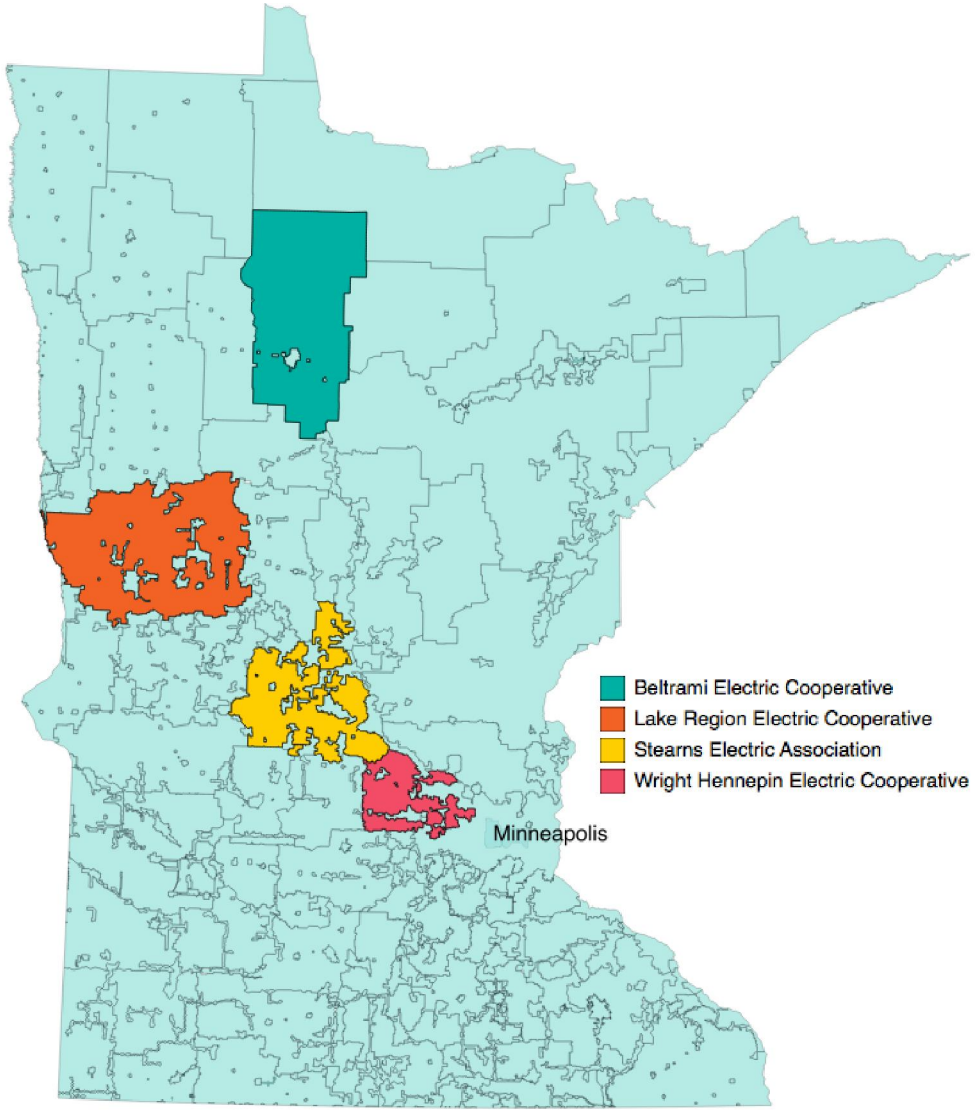
*Total participants at time of evaluation

Introduction to the Behavioral Program

MyMeter features:

- Comparative usage
- Property profiles
- Bill threshold alerts
- Energy markers
- Energy challenges
- Peak time alerts
- Outage alerts

Introduction to the Utilities



Four member-owned cooperatives in Minnesota:

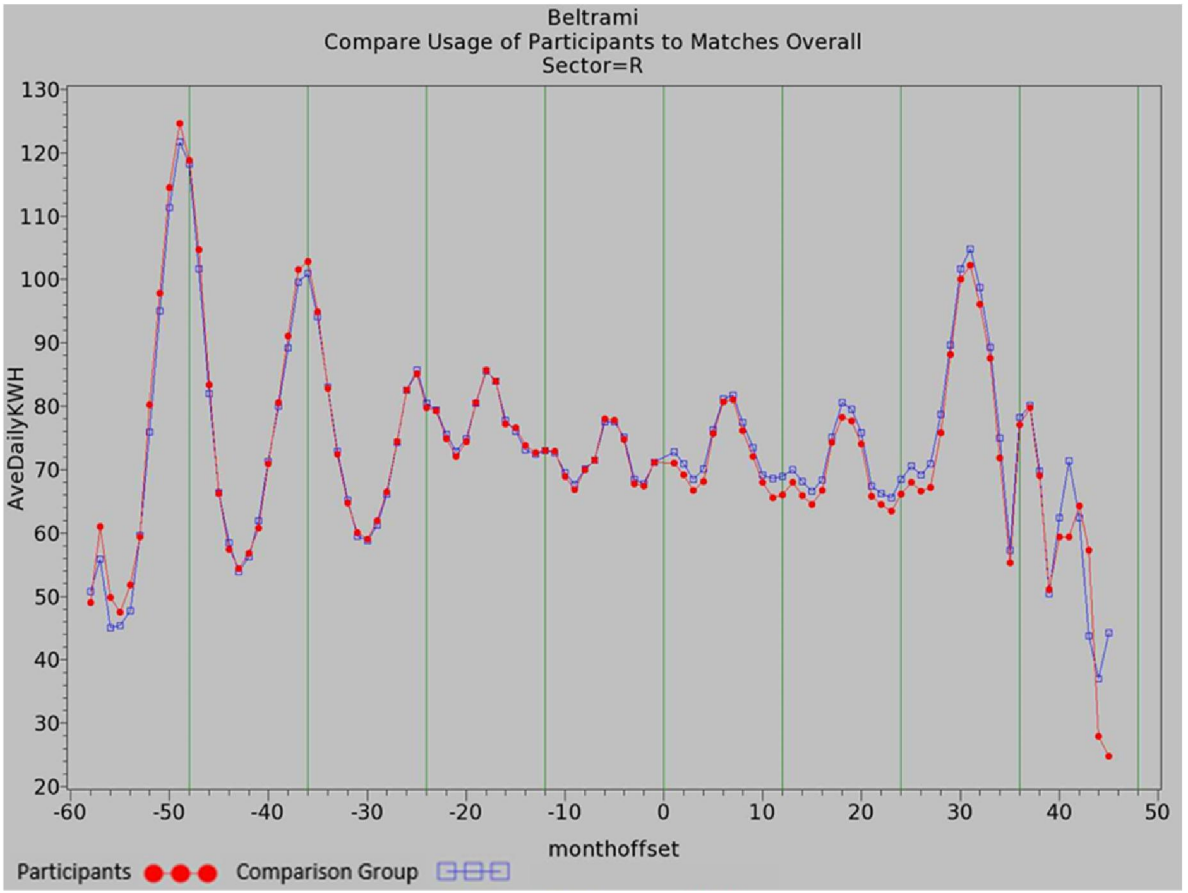
* Beltrami Electric Cooperative
* Lake Region Electric Cooperative
* Stearns Electric Cooperative
* Wright Hennepin Cooperative Electric Association

Savings Exploration

- Baseline energy usage
- Timing
  - Length of time between first and last login
  - Enrollment timing
- Longevity
  - Number of years customers participated in the program
- Depth
  - Number of times they logged into the program
  - Use of additional features including energy markers, property profiles and threshold alerts

Methodology - Matching

- Quasi-experimental matching method
- MyMeter data didn't meet requirements of VIA
- Long billing history available
- Participants were matched to non-participants with similar seasonal usage pattern



Methodology – Savings Estimates

Linear fixed effects regression

$$kWH_{kt} = \alpha_{0t} + \alpha_1 Partic_{kt} + \alpha_2 PrekWh_{kt} + \varepsilon_{kt}$$

kWH_{kt} is the average daily electricity use by household k in month t

α_{0t} is a monthly fixed effect

$Partic_{kt}$ is an indicator variable with a value of 1 for participants and 0 for matched non-participants

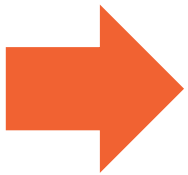
$PrekWh_{kt}$ is the average daily pre-participation electricity use by household k that is also the same calendar month as month t

ε_{kt} is the error term

Baseline Energy Usage

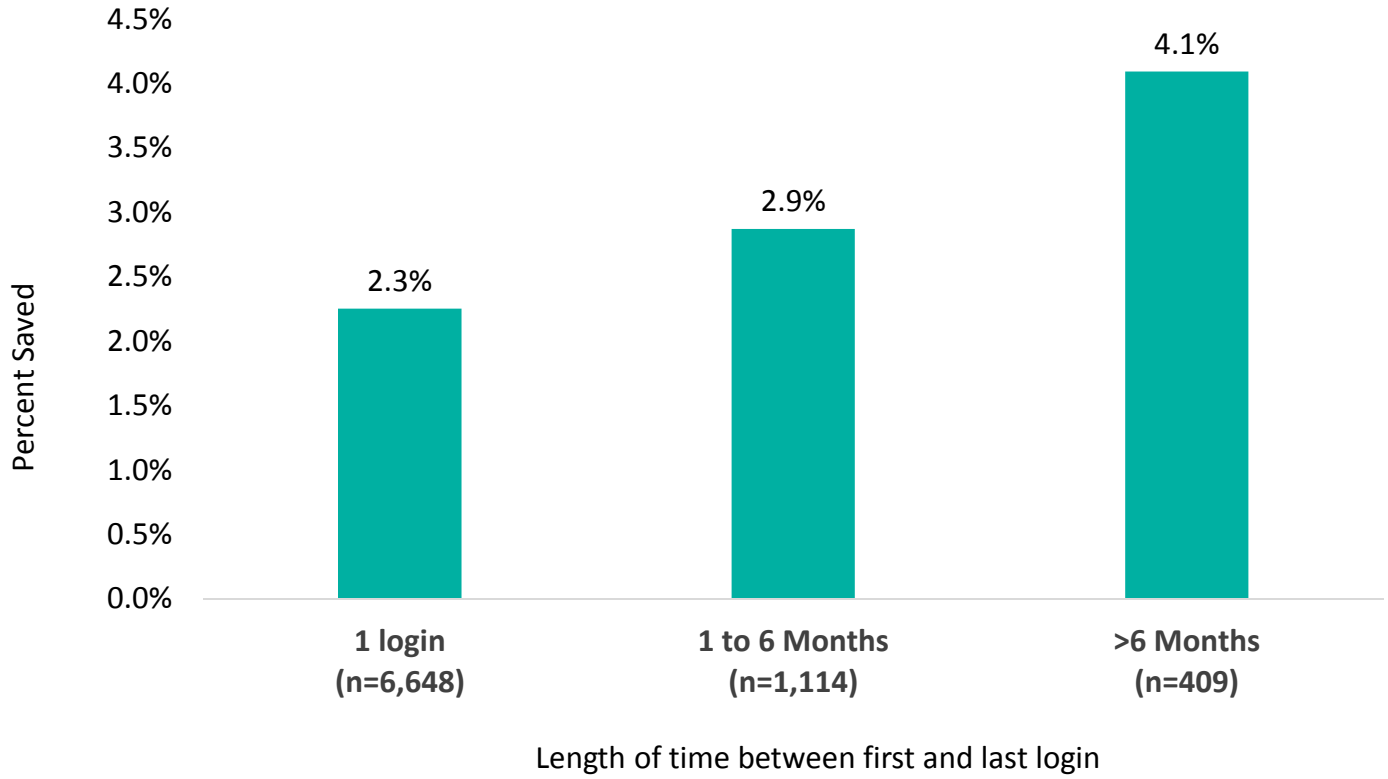
Baseline Monthly Energy Usage	% of Participants	Energy Savings
<1,000 kWh	39%	0.34%
1,000 - 2,000 kWh	30%	1.54%
2,000 - 3,000 kWh	14%	1.31%
>3,000 kWh	17%	3.16%

* Largest customers experienced the greatest percentage savings
* All groups had savings in shoulder months and none showed savings in summer
* Largest users experienced savings in winter



Seasonal patterns suggest customers are reducing energy use from year-round sources such as lighting

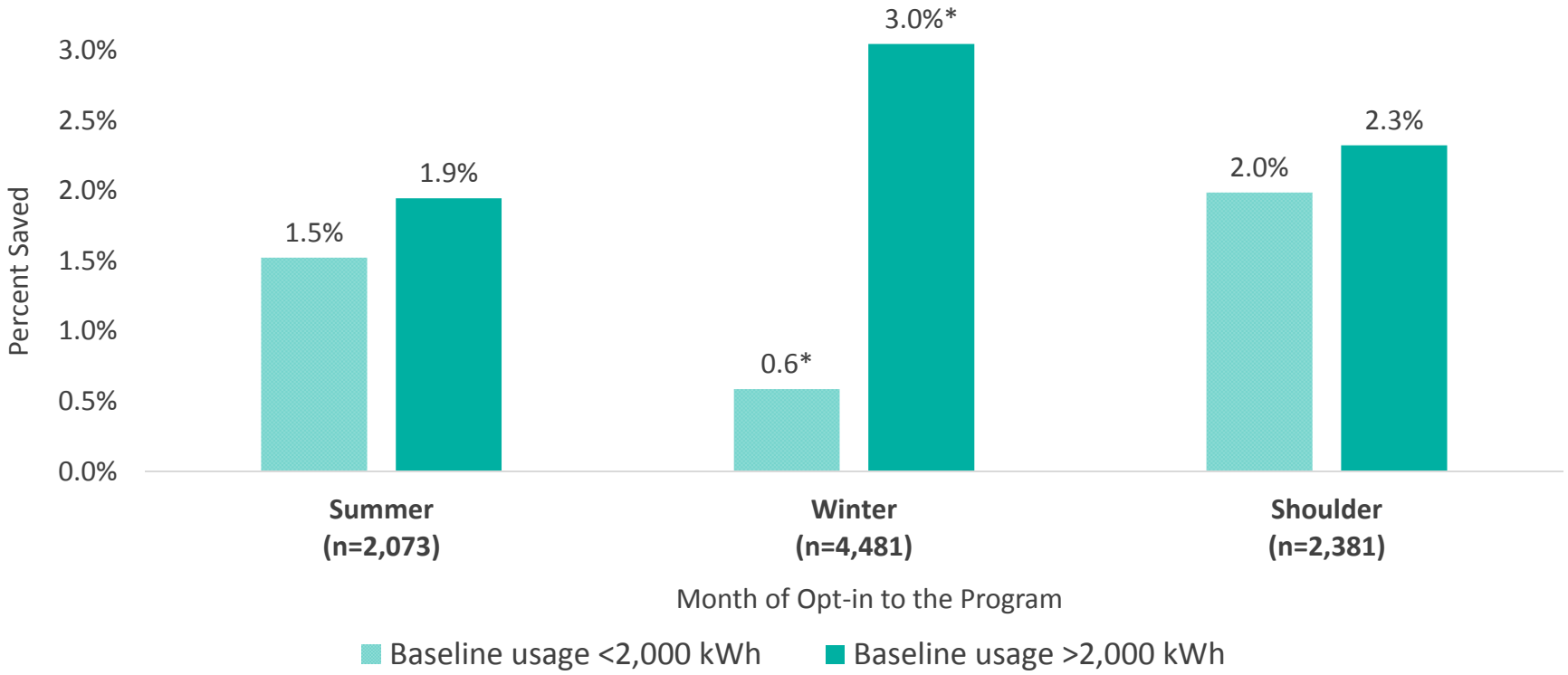
Timing – Length of Time Between First and Last Login



* Savings increased as the length of time between first and last logins increased from just one login to 12 months between first and last log in

→ Give customers reminders to log in again

Timing – Enrollment Timing



* Higher baseline energy users who enroll in winter save significantly more than lower baseline users who enroll in winter

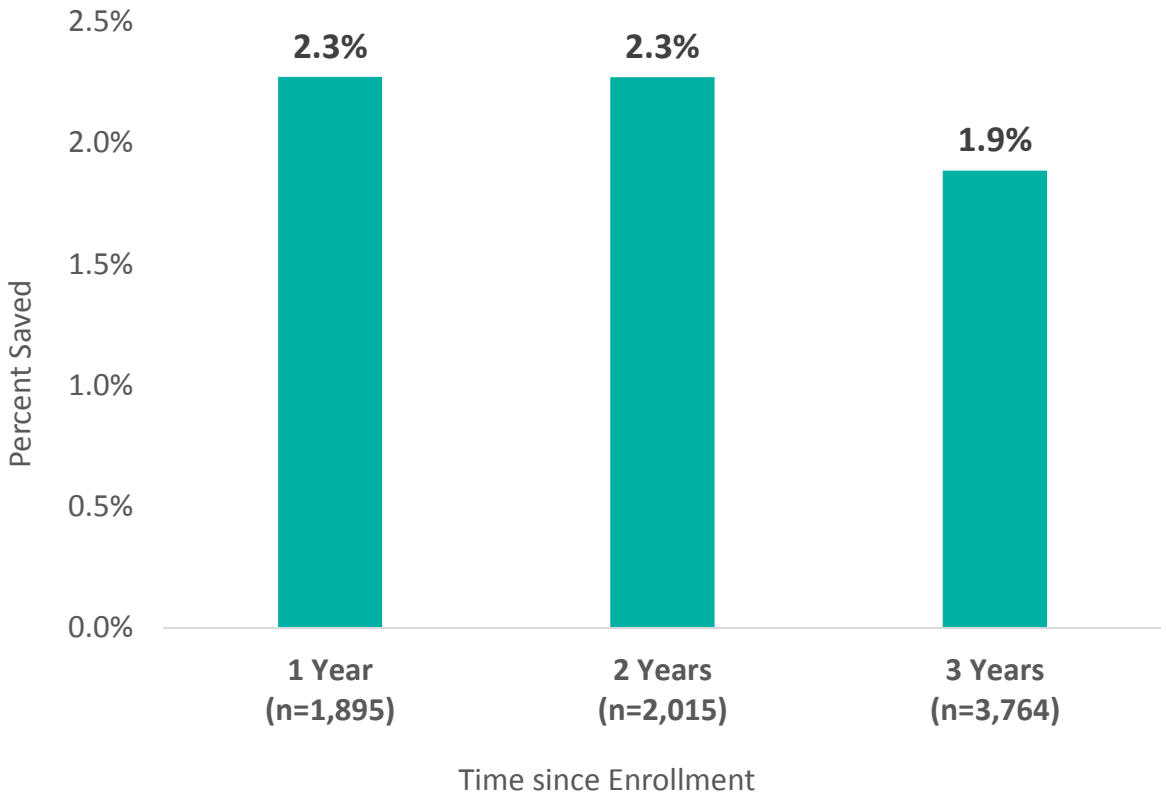
* Lower baseline energy users who sign up during the winter have significantly lower savings than those who sign up during other times of the year

Consider segmenting recruitment strategies

*Significant at p<.10

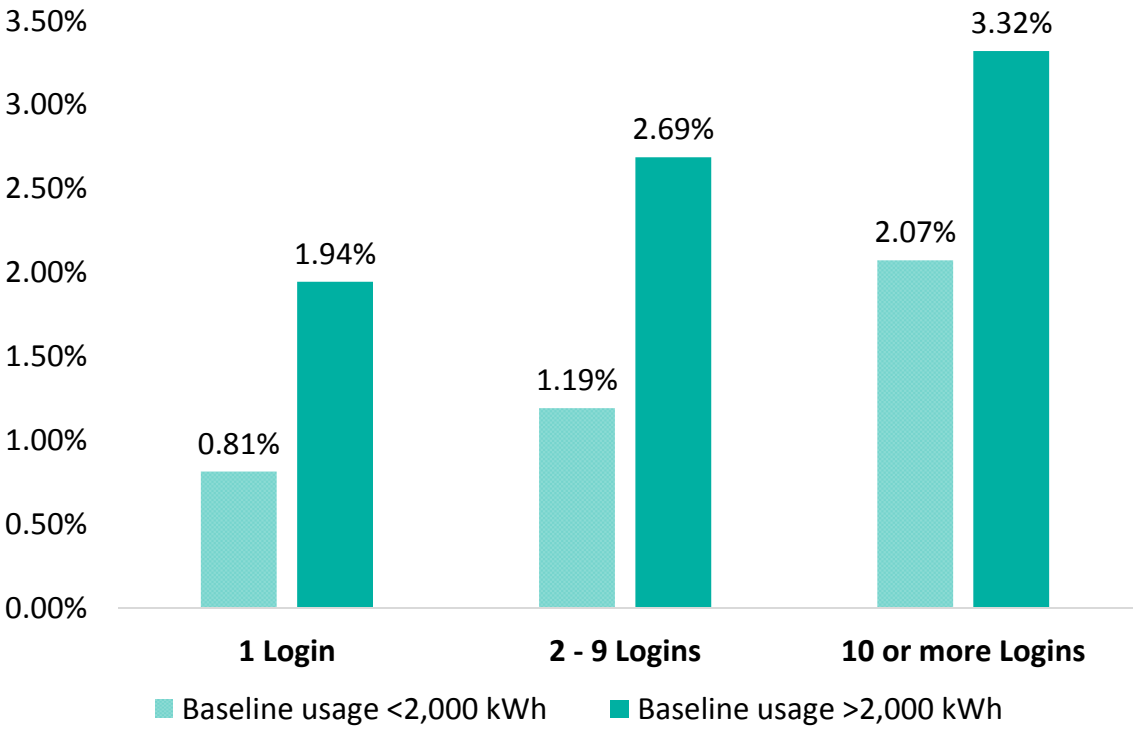
Longevity

* Savings persist at same level over first two years in the program
* There is a slight, though not statistically significant, drop in the third year

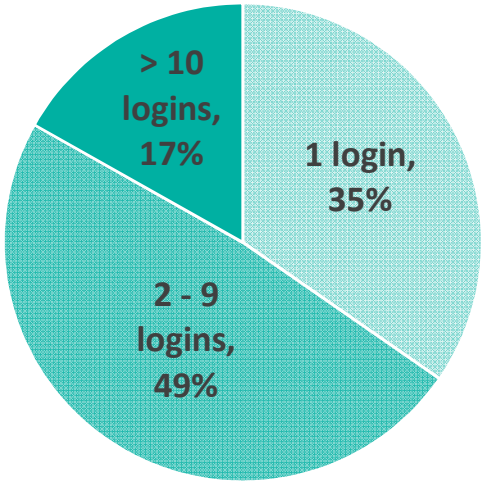


Find ways to re-engage customers who have been enrolled for longer periods of time

Depth of Engagement – Number of Logins



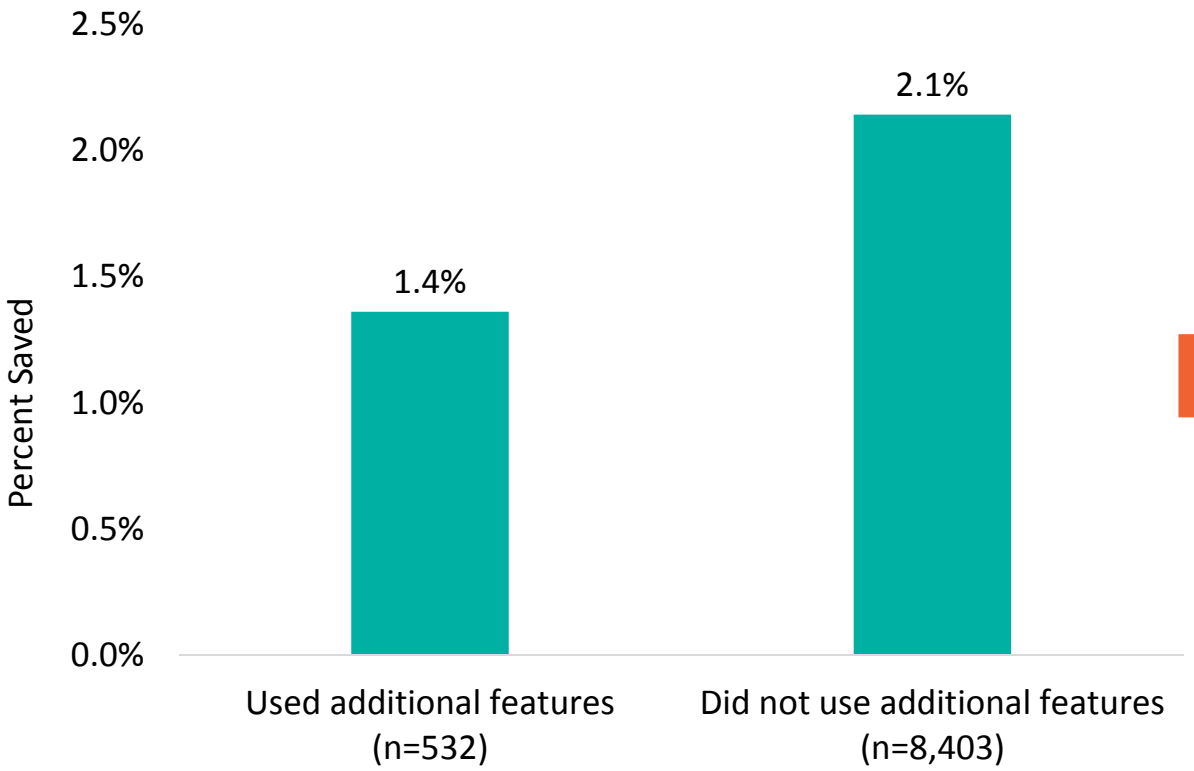
Encourage customers to keep logging in

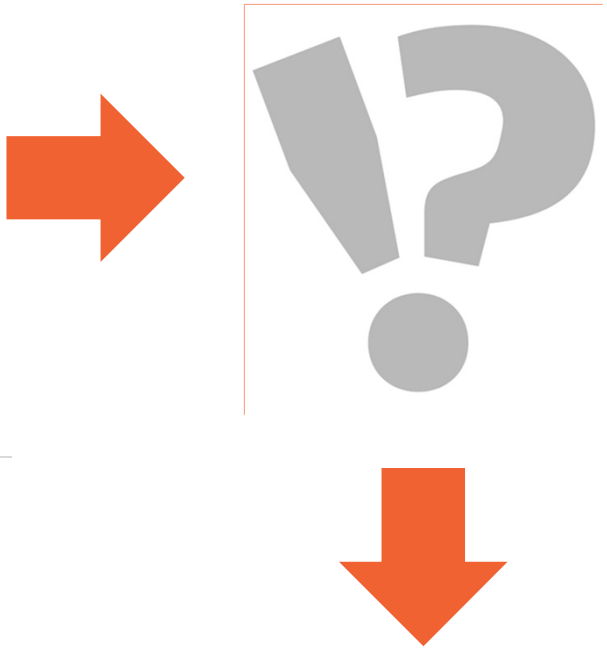


n = 8,935

* Customers at all engagement levels saved energy with customers at the highest levels saving the most
* Customers who log in more save more regardless of baseline usage

Depth of Engagement – Additional Features





Opportunity for more research

* Customers who **used** additional program features did not save more than those who **did not**

Conclusion

What have we accomplished?

Confirmed assumptions:

* Higher baseline usage = more savings
* More logins = more savings
* Longer active period = more savings
* Trend toward lower savings after longer participation

Identified strategies for increasing savings:

* Understand where savings are being generated
* Give customers reminders to log in and encourage them to keep logging in
* Consider segmenting recruitment and/or messaging strategies
* Engage customers who have been with the program for longer periods of time or customers of mature programs

What else have we accomplished?

Identified opportunities for more research:

* Additional program features
* More comprehensive multivariate analysis
* Qualitative research
* Behavioral programs becoming more mature
* Other types of behavior programs

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