

Empowering LI Customers to Save with Opower Behavioral Efficiency

PPL Case Study

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Safe Harbor Statement

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Agenda

- 1 Introduction to Behavioral Energy Efficiency
- 2 PPL Low Income Program
- 3 Program Results
- 4 Recommendations
- 5 Q&A



Opower Behavioral Energy Efficiency



SAVE MONEY

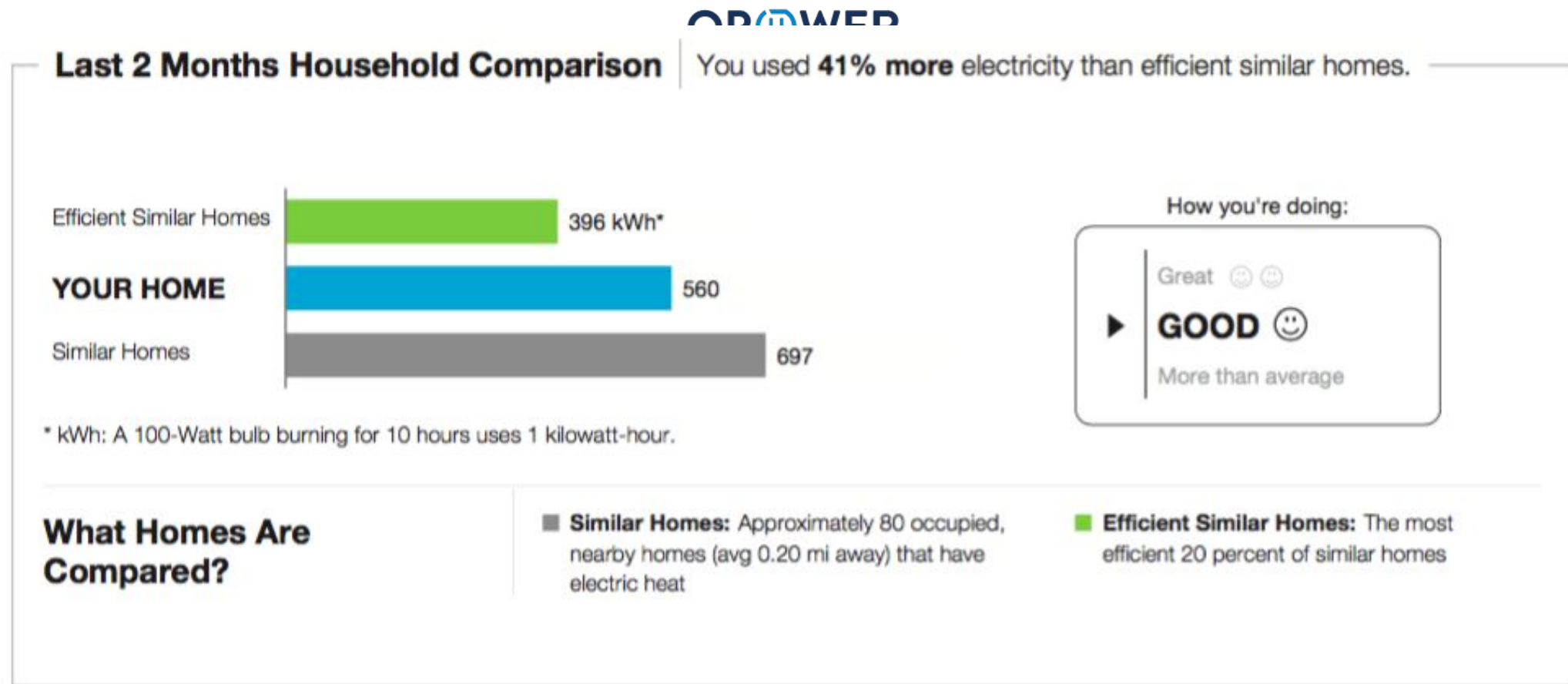


SAVE THE
PLANET



BE A GOOD
CITIZEN

Behavioral science + data analytics drives energy savings



60% average uplift in program participation



customer relationship metrics



8% increase in e-billing enrollments



5-15% increase in relationship metrics

\$27bTWh



1,366,126



homes' energy
use for one
year



2,709,141



Passenger
vehicles
driven for one
year



14,901,872



acres of U.S.
forests in one
year

A man with grey hair, wearing a pink button-down shirt, is seated at a desk in a professional office setting. He is looking down at a document he is holding in his left hand, while his right hand rests on a laptop. The laptop screen displays a complex data table or spreadsheet. A desk lamp is positioned behind him, casting a soft light. In the foreground, a white coffee cup sits on a saucer. The background is blurred, showing office shelves and windows.

PPL Opower Low Income Program

Oracle has spent time and resources to develop the expertise to better serve LI customers

“I feel like I’ve always been thrifty, but just haven’t been able to save”

“I didn’t like the process [of applying for assistance]...I didn’t like it because I know I was at their mercy because I needed help, because I’m in a financial bind.”

Key Research Findings from Low-Income Focus Groups:

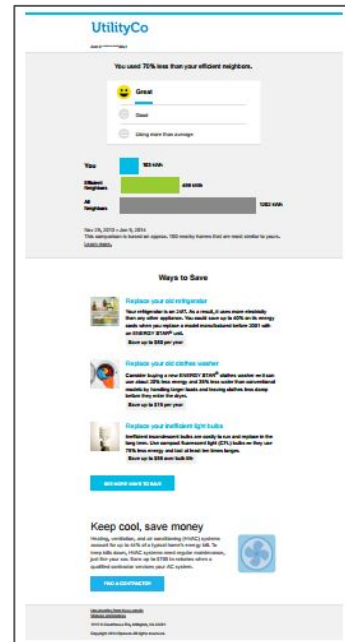
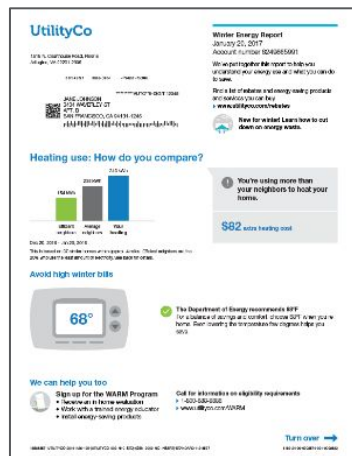
- Low-income may be a fluid or temporary state
- Time constraints may inhibit customers from taking full advantage of EE opportunities
- There’s a disconnect between low-income customers and their utilities
- Lacking money doesn’t always mean lacking access to technology

Opower programs are designed to combine efficiency and engagement

Standard program elements:

Tailored Paper / Email Home Energy Reports

Targeted Modules and Campaigns



Additional program elements:

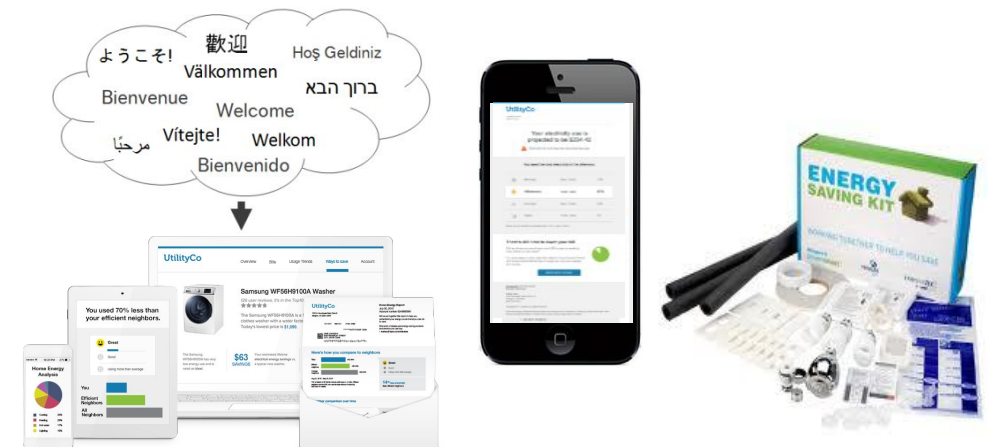
Low-Income Identification

High bill / Budget billing alerts

Rate and energy education reports

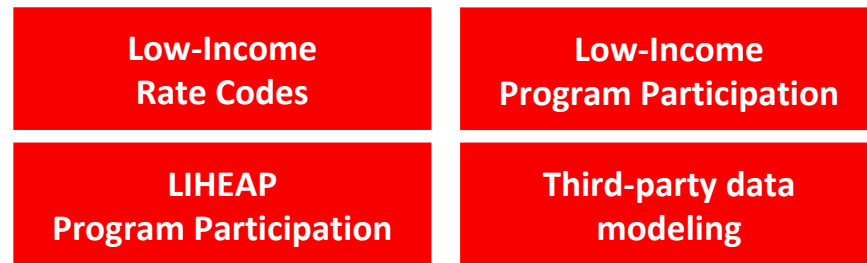
Energy Kit and Community Partners

Multi-lingual support

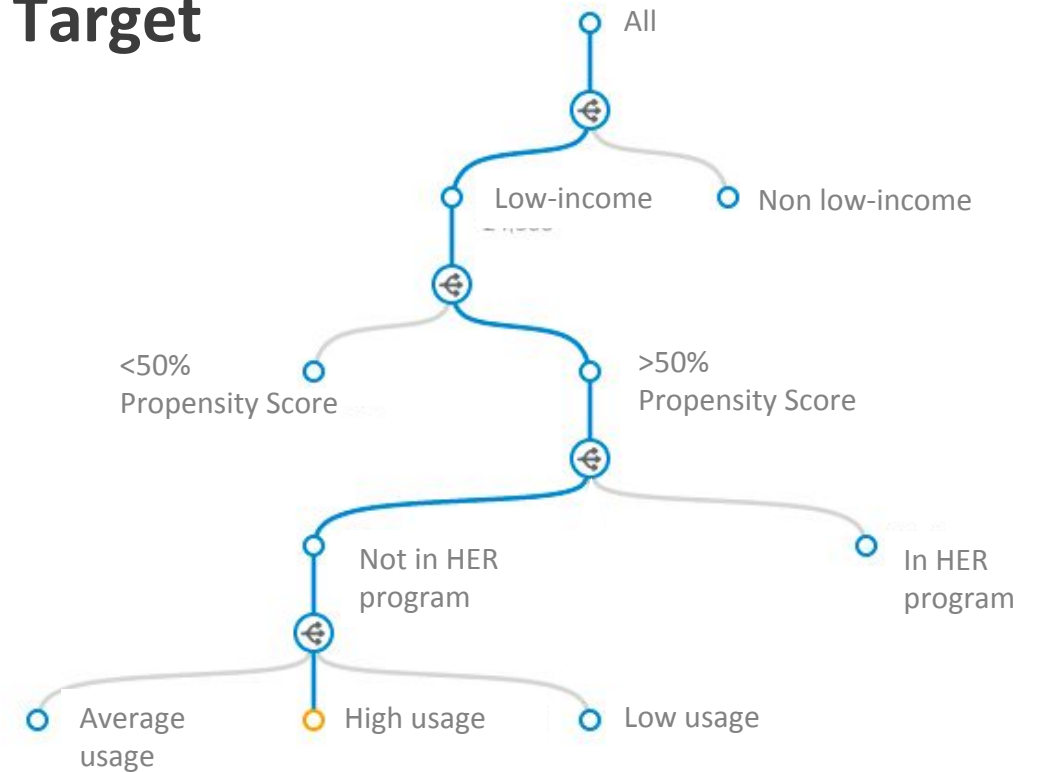


Leverage third-party data and Opower tools to identify most likely low-income customers

Identify



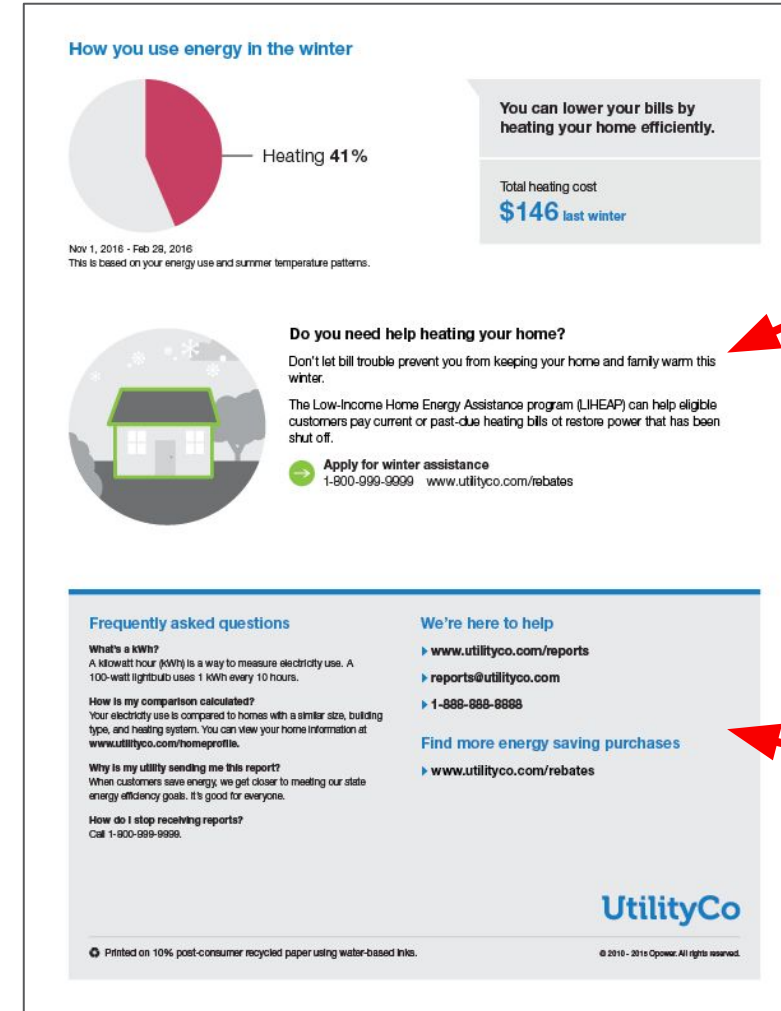
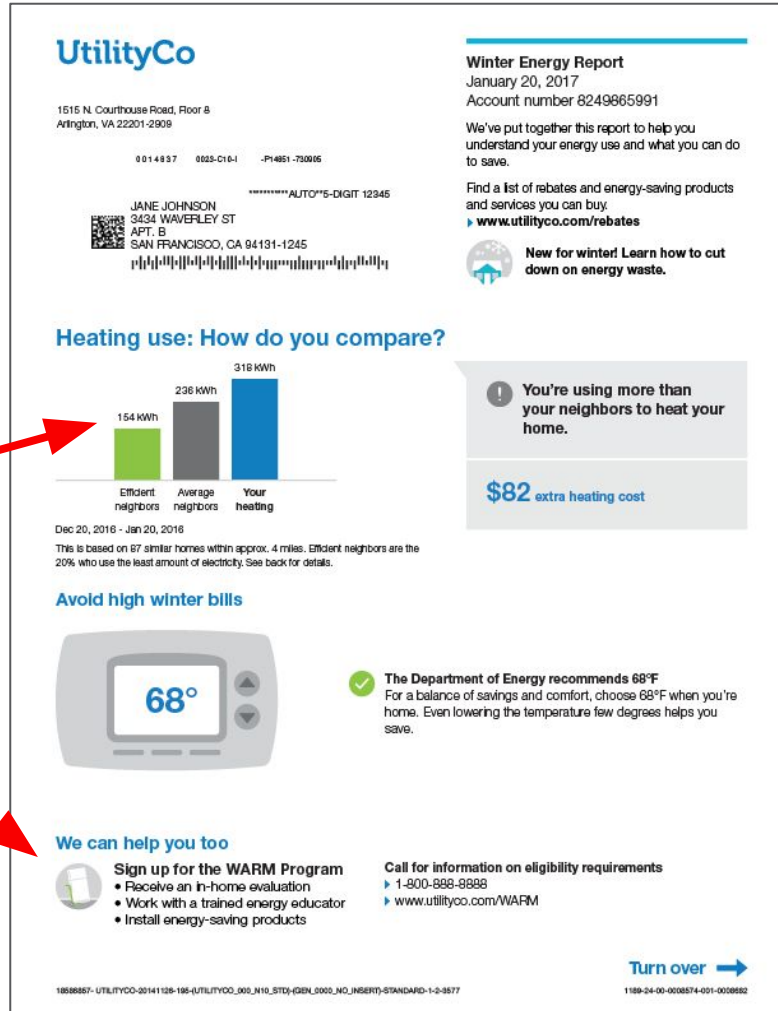
And Target



Opower Home Energy Reports are tailored for low-income

Normative
messaging and
usage analysis

Low-cost,
high-impact
targeted tips



Low-income program
promotion

FAQs and contact
info

Targeted modules and campaigns promote low-income programs

Cut energy costs with the touch of a button

It's simple: set your thermostat to 68°F this winter. You can save up to 5% on heating costs for each degree you lower the thermostat.



For a full season of savings, remember: **68 is great!**

Don't get left in the cold this winter. Help is available.

Apply for \$100 to \$1,000 to help towards your heating bill with LIHEAP (Low-Income Home Energy Assistance Program).

You may qualify if you meet the following guidelines:

Household size	Max yearly income
1	\$17,655
2	\$23,895
3	\$30,135
4	\$36,375

Add \$6,240 for each additional person.

There are two types of grants:

Cash Grants: Direct payments to your account for current and past-due bills

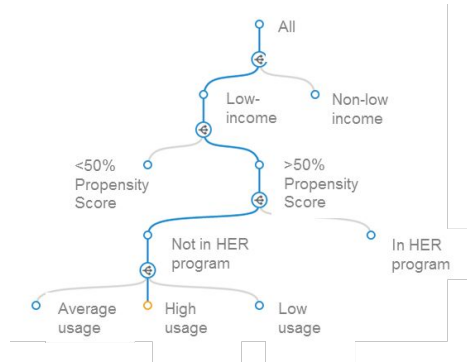
Crisis Grants: Help with a shutoff notice, broken equipment, or lack of fuel

Note that this program is only available in winter.



Funds are limited! Start your application today by visiting pplelectric.com/heatinghelp, or call 1-800-342-5775 to learn more.

Opower communications complement existing efforts for low-income programs and services

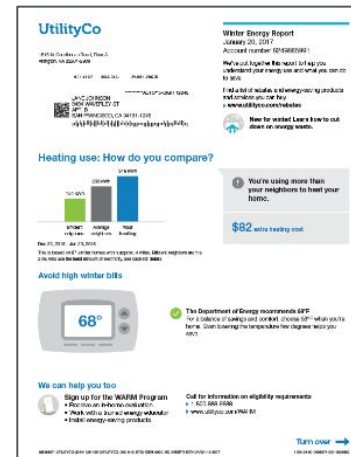


During program participation

- Habituate energy-saving actions and purchases through **low-cost/no-cost tips**
- Promote additional low-income **programs and services that may be relevant**

Before program enrollment

- Leverage **segmentation and targeted marketing** to design campaigns
- Build **awareness** and drive **enrollment** in low-income programs



After program is complete

- Maximize value of weatherization and other retrofit programs by **continuing to drive EE savings** after installation is complete
- Solidify **positive perception** of utility

CADMUS

Program Results

Low-Income Program Evaluation

PPL Electric Utilities is located in **eastern PA**, and offers a portfolio of energy efficiency and DR programs

Cadmus is the independent evaluator of all PPL's energy efficiency and DR programs

We **verify energy savings** for regulatory compliance, conduct **process evaluations**, and **provide insights** and recommendations to help PPL enhance program design and delivery

General residential behavioral savings program was first offered in **2010**

The **low-income** behavior program offered in 2014 **complimented other programs** that provided free weatherization, education, energy conservation kits

Cadmus is a strategic and technical consultancy compelled to help solve the world's most challenging problems

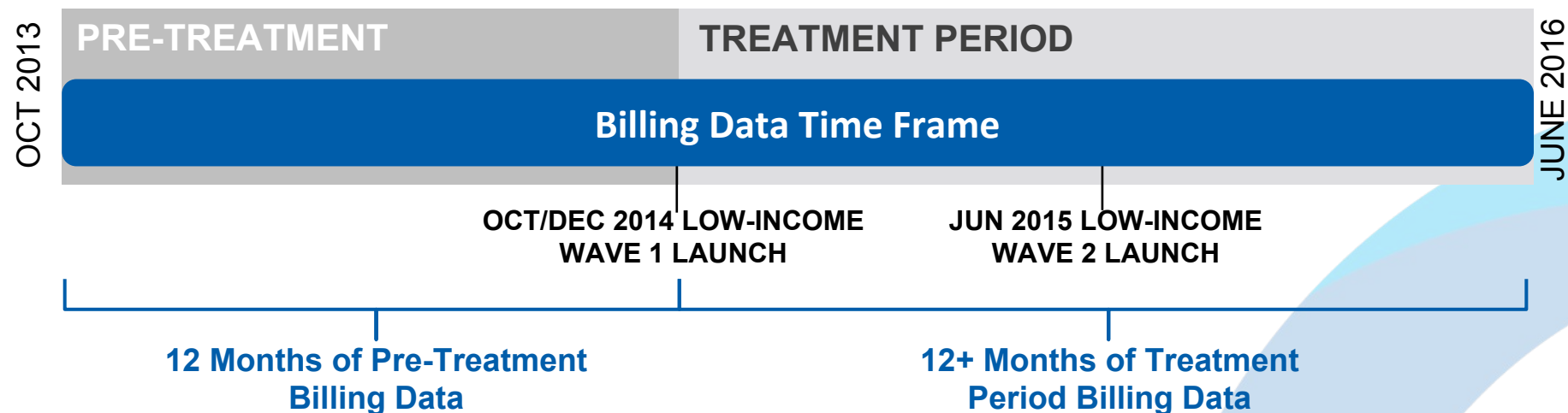
Evaluation Approach

A **randomized control trial (RCT)** randomly selects some into a treatment group (receiving HERs) and some into a control group (did not receive HER)

An **RCT** is expected to yield unbiased estimates of the program savings

We **analyzed energy use** in homes treatment and control groups

We conducted **surveys** with a random sample of 150 who received the home energy report (treatment) and 150 who did not (control)



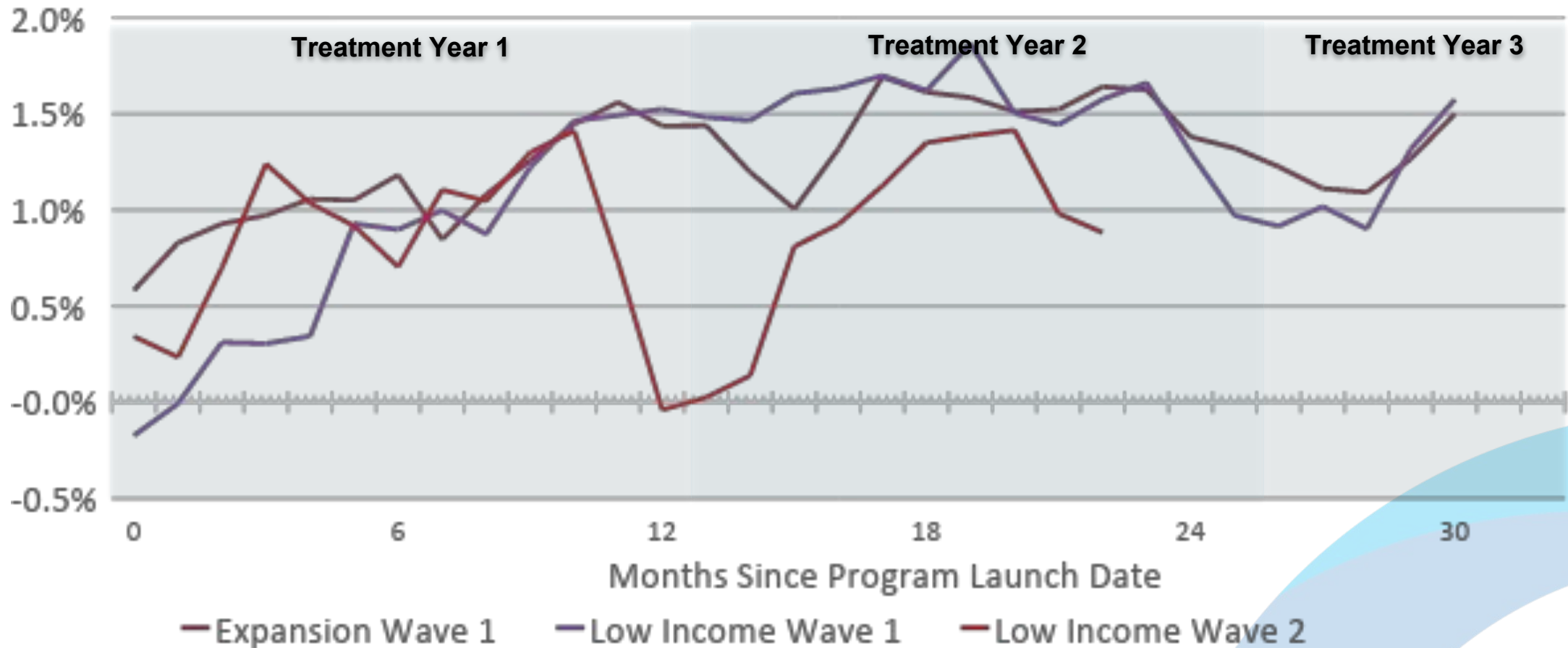
Savings of Groups Receiving Home Energy Reports

Savings in each group ramp up and reach about 1.5% savings from use before reports



Low-Income Savings Results

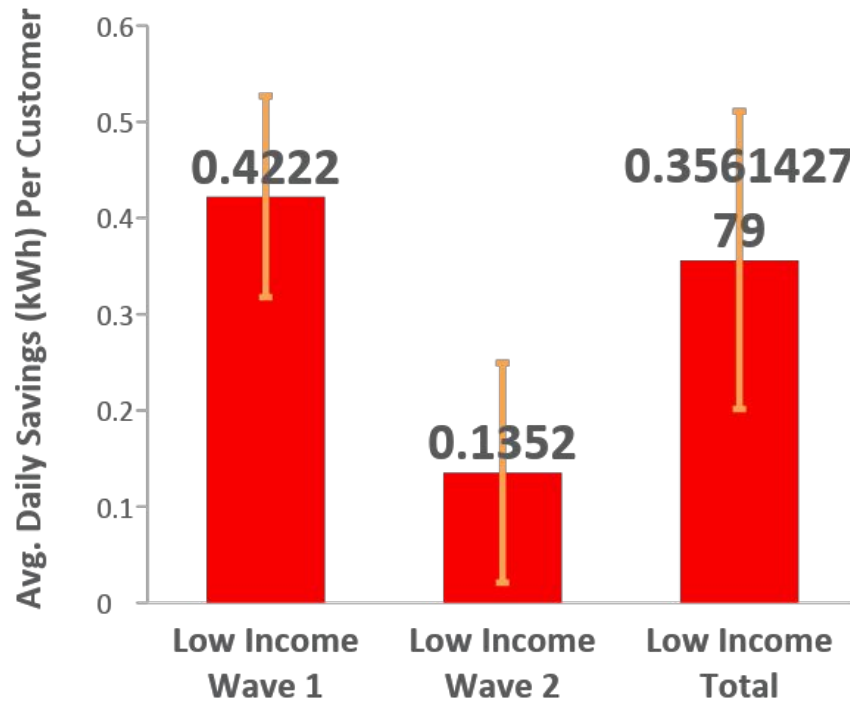
Low-Income Waves had a slower ramp up, but reached about same savings as General Residential Expansion Wave



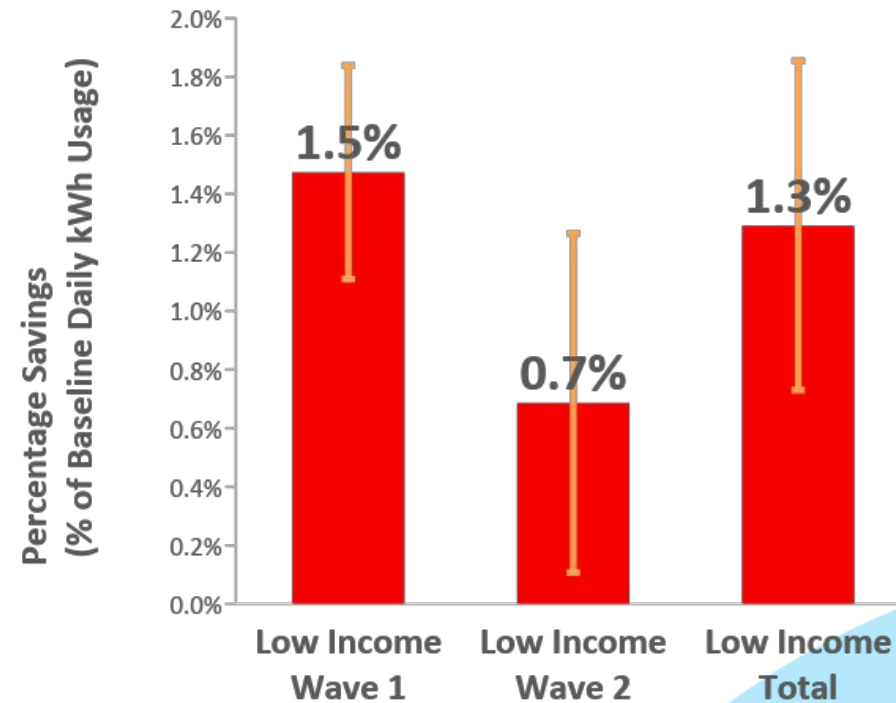
Low-Income Program Savings Per Customer

Opower LI Program saved 10,622 MWh

Statistically significant savings during evaluation period June 2015 – May 2016



Compare to 0.69 Gen. Res. Expansion Wave



Compare to 1.3% Gen. Res. Expansion Wave

Note: Error bar indicates 85% confidence intervals.

Participation Uplift

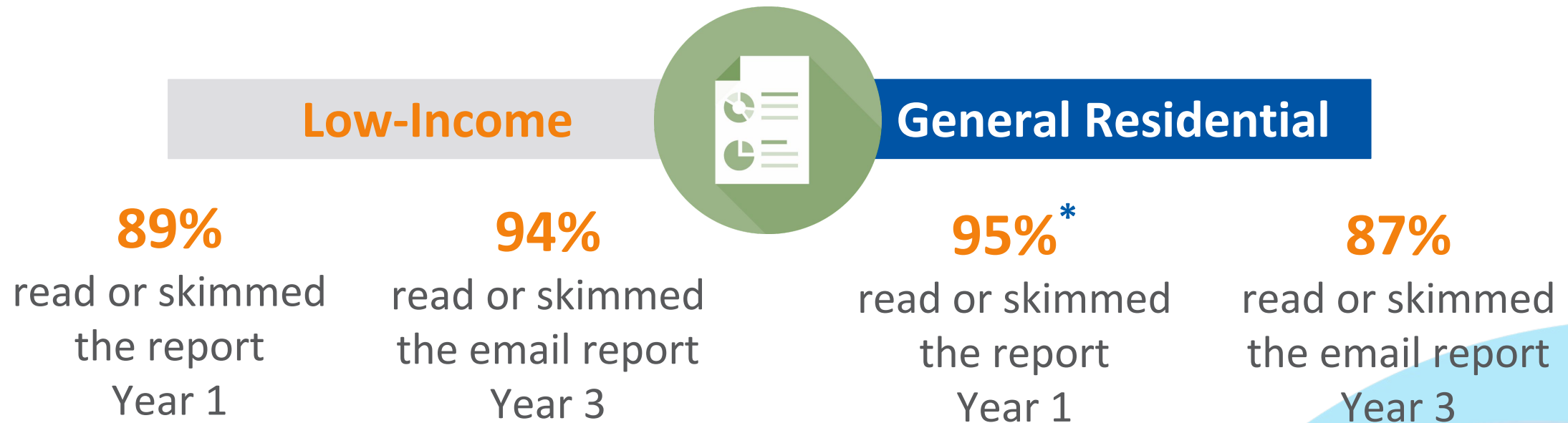
Low-income behavior program saw participation uplift from Wave 1 while all three waves from general residential saw uplift

Low-Income	Baseline Participation Rate (per 1,000 Customers)	Participation Uplift (Treatment Effect on Participation Rate)	Percentage of Participation Uplift
Low-Income Wave 1	32.4	3.2	9.9%
Low-Income Wave 2	33.2	-1.4	-4.1%
Program Total	32.7	2.0	6.2%
General Residential	Baseline Participation Rate (per 1,000 Customers)	Participation Uplift (Treatment Effect on Participation Rate)	Percentage Participation Uplift
Legacy Wave 1	26.0	1.5	5.7%
Legacy Wave 2	34.1	4.0	11.6%
Expansion Wave	26.6	3.1	11.7%
Program Total	28.3	3.5	12.4%

Report Readership

Low-income behavior program showed a lower readership level than general residential behavior program, but still high readership levels overall

Readership levels showed reversal in the next survey



*Low-Income and Gen. Res. difference is statistically significant, $p \leq 0.05$.

Low-Income Savings Tips

Respondents recalled seeing Winter of 68 module more often than LIHEAP module



59% ($n_w=231$)
remembered
seeing module

29% ($n_w=130$) of
remembered **turned**
down thermostat
after seeing module

40% did
not change
thermostat
temperature



47% ($n_w=231$)
remembered
seeing module

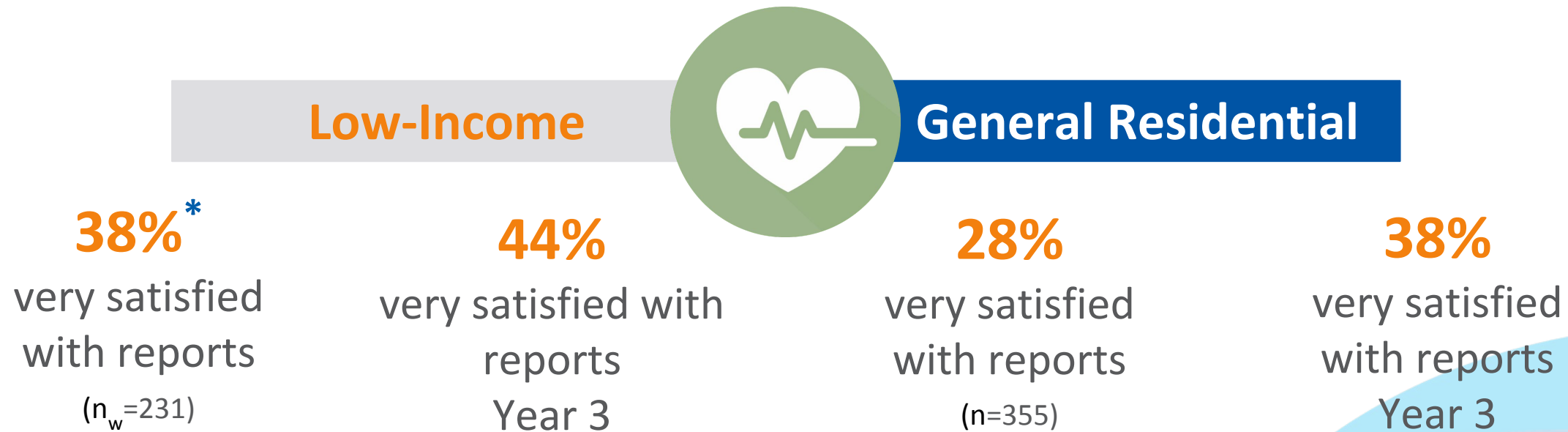
40% ($n_w=231$)
heard about
LIHEAP for the
first time through
reports

11% ($n_w=94$)*
applied to
LIHEAP due to
module

* The survey asked respondents if they had already applied to LIHEAP. 94 treatment respondents applied to LIHEAP. Of these 94 respondents, 11% attributed their LIHEAP application to the report module.

Program Satisfaction

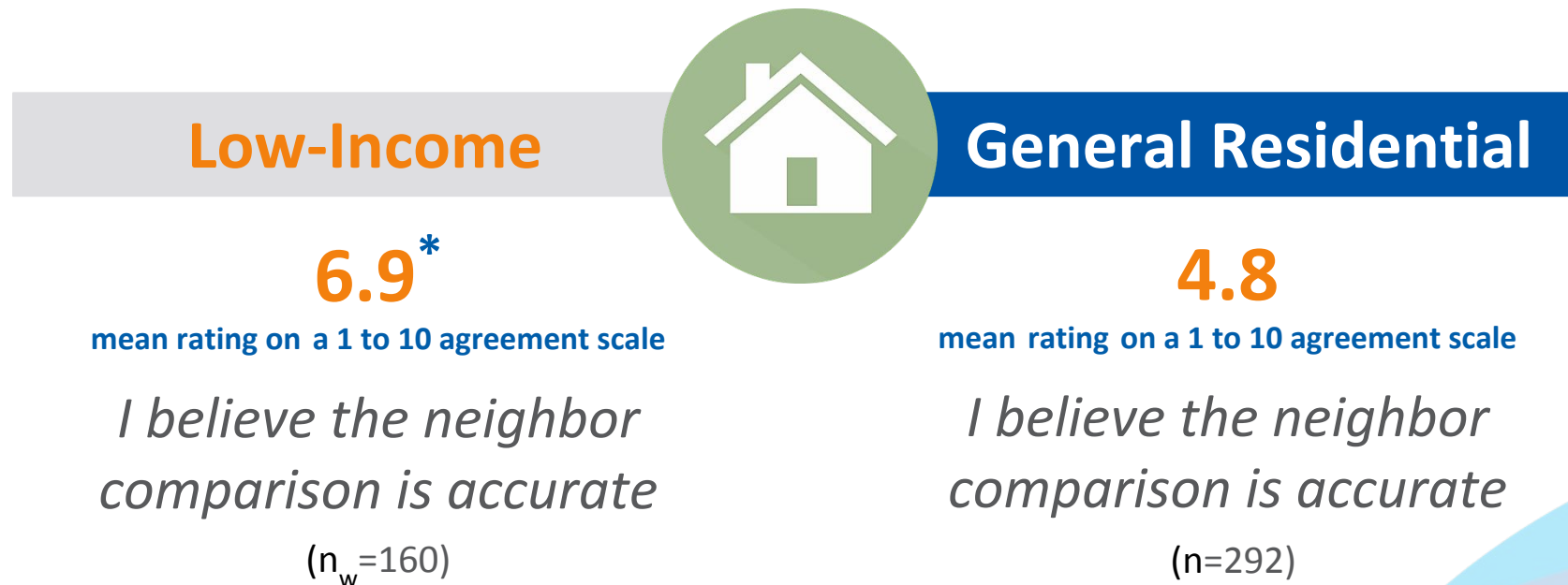
More low-income customers were very satisfied with Home Energy Reports compared to general residential customers



*Low-Income and Gen. Res. difference is statistically significant, $p \leq 0.05$.

Perception of Neighbor Comparison

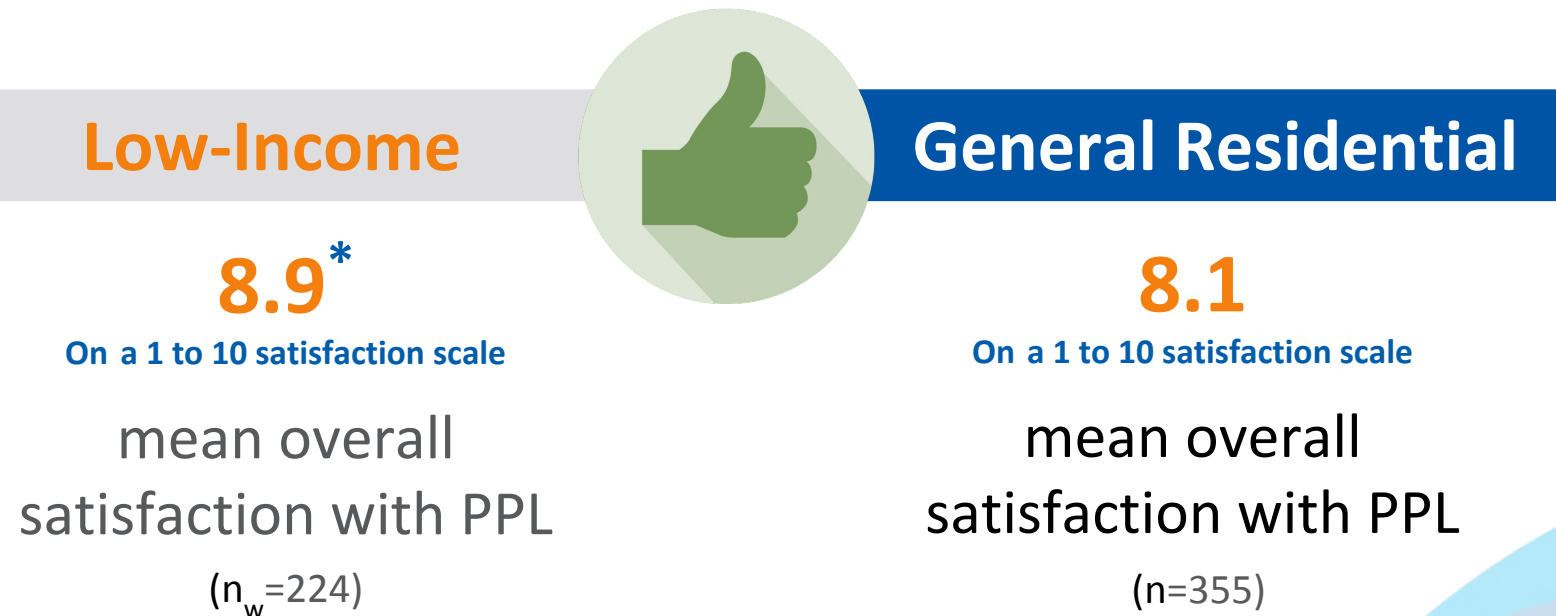
Low-income behavior program customers exhibited a stronger belief in the accuracy of the neighbor comparison than residential behavior program customers



*Low-Income and Gen. Res. difference is statistically significant, $p \leq 0.05$.

Satisfaction with PPL Electric

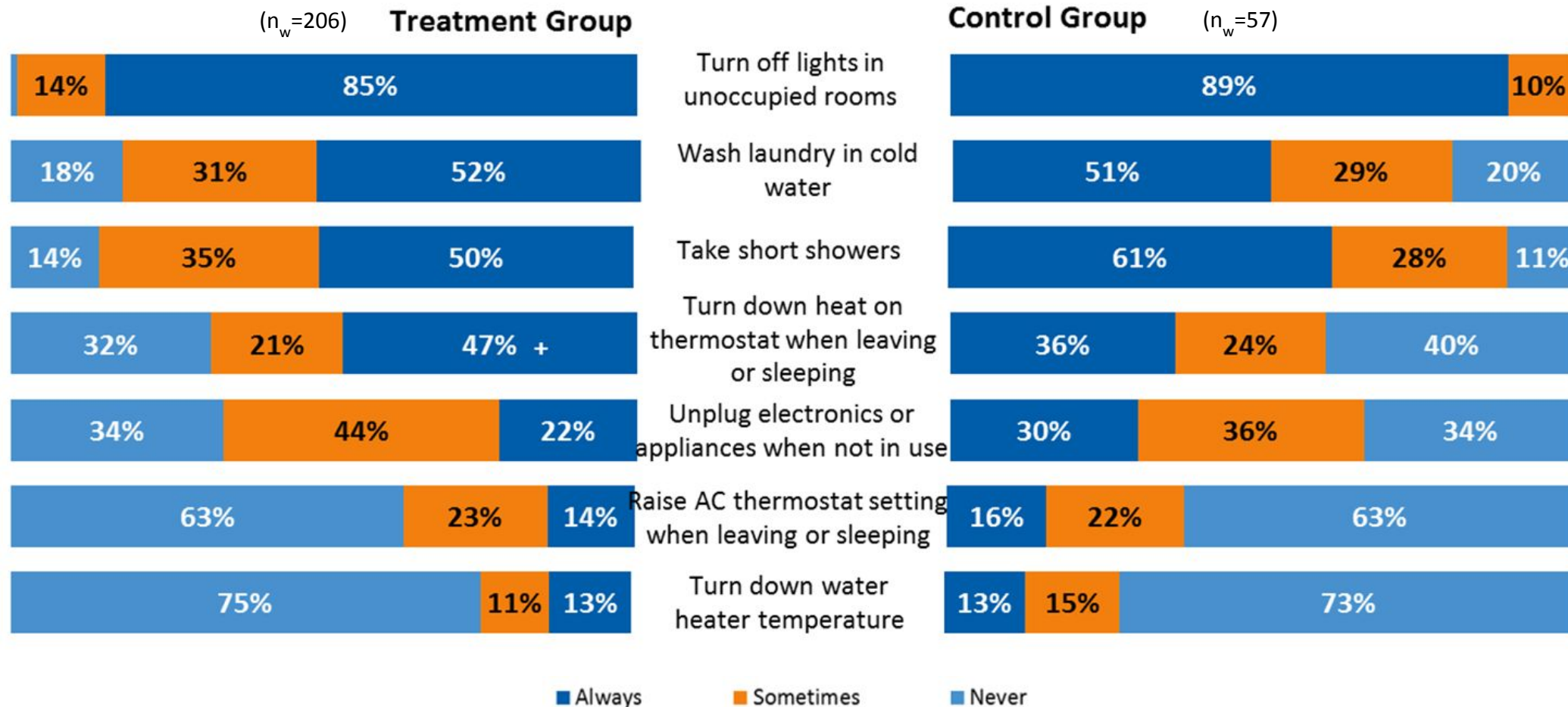
Low-income behavior program generated greater overall customer satisfaction with PPL Electric than general residential behavior program



*Low-Income and Gen. Res. difference is statistically significant, $p \leq 0.05$.

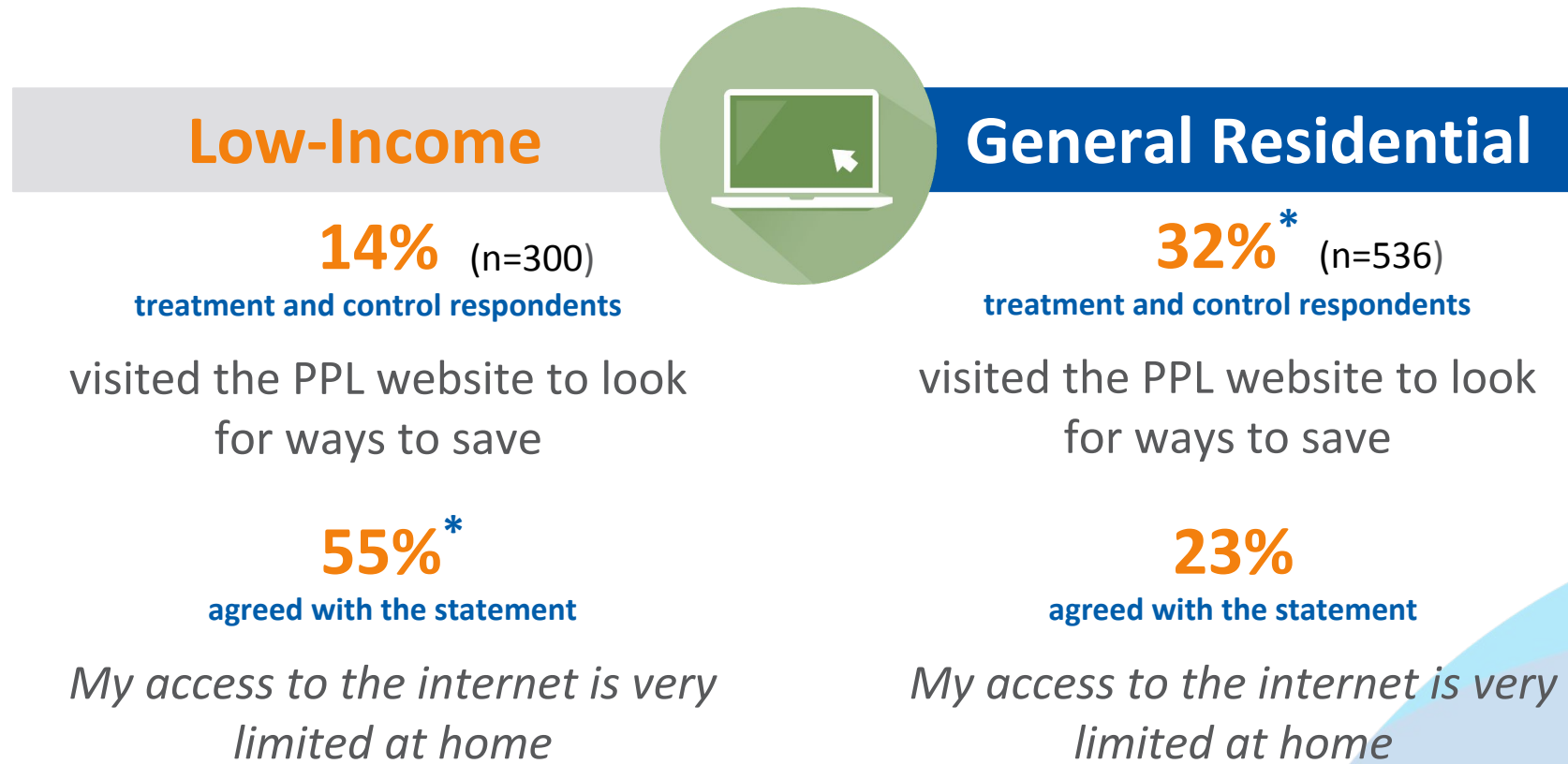
Low-Income Self-Reported Energy-Saving Behaviors

Treatment and control group respondents reported similar frequencies, with only one statistically significant difference (*turning down the thermostat*)



Online Engagement

Fewer low-income treatment and control respondents reported visiting the utility website than general residential respondents, possibly due to internet access barrier



Outcomes and Key Comparisons

Low-Income		General Residential
1.3%	PERCENTAGE ELECTRICITY SAVINGS	1.6%
6.2% Uplift for only Wave 1	PARTICIPATION UPLIFT	12.4% Uplift for all three waves
0.65 including start-up year 2.65 in second year	TRC	2.50 across last three years
38% very satisfied	SATISFACTION WITH REPORT	28% very satisfied
Mean 6.9 (out of 10)	NEIGHBOR COMPARISON	Mean 4.8 (out of 10)
Mean 8.9 (out of 10)	SATISFACTION WITH PPL	Mean 8.1 (out of 10)

Recommendations



Conclusions

Low-income program exceeded its planned savings, but ramp-up was slower than the general residential program

Reports appeared to have had some influence on engaging low-income customers in a specific thermostat behavior

Reports were positively received, boosted low-income customer satisfaction with PPL, and engaged some to apply for LIHEAP

Fewer low-income customers than general residential customers may be visiting PPL's website because lack of internet access

Recommendations

Allow more time for a low income program to reveal its value in energy savings. It may take time to ramp up and become cost effective, but there are still customer satisfaction benefits.

Consider alternative non-digital outreach, such as sending additional print reports and/or developing print versions of digital content; consider a monthly or seasonal letter that compiles digital content not found in the print reports.



Thank you!

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