



# A Randomized Control Trial to Evaluate the Value of Information

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# Study Goals

1. Do households adjust consumption levels in response to real-time feedback?
2. Is there significant heterogeneity in response and if so, what characteristics are associated with those who reduce energy use the most?
3. How do users feel the technology can be improved and what do they wish to get out of it?



# PowerMeter Interface

## Track energy over time

See how much energy you have used by the day, week or month.

## Always on power

The darker shaded portion of the graph shows power that is always on, such as any appliance that goes on standby mode. Many appliances are always on; you just don't know it. Discovering these is one of the easiest and fastest ways to reduce energy use and save money.

## Customize your experience

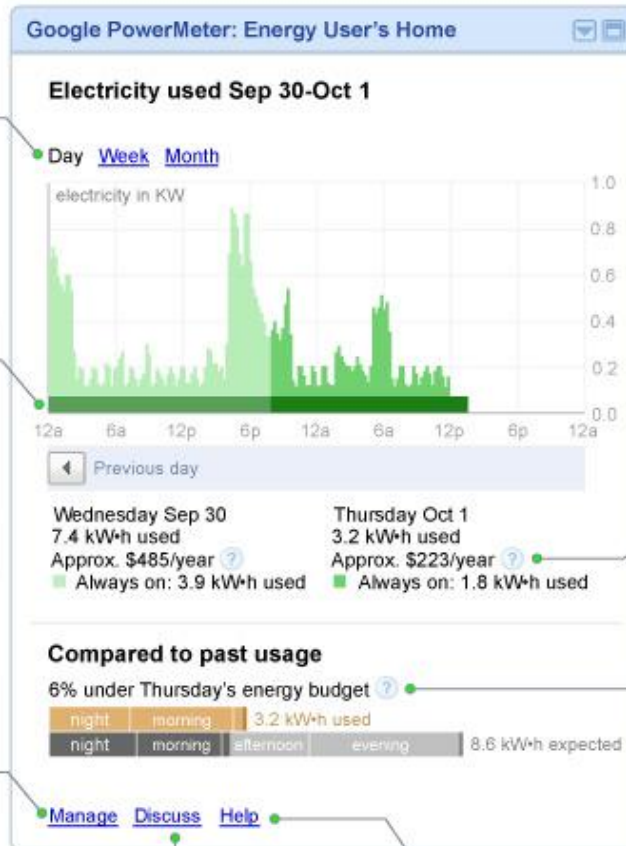
Add your estimated cost per kWh, sign up for weekly emails, and share your usage with family and friends.

## Join the community

Get tips on how to save from other Google PowerMeter users and share what has worked for you.

## Have a question?

Learn more about Google PowerMeter from our online help center.



## Predict your costs

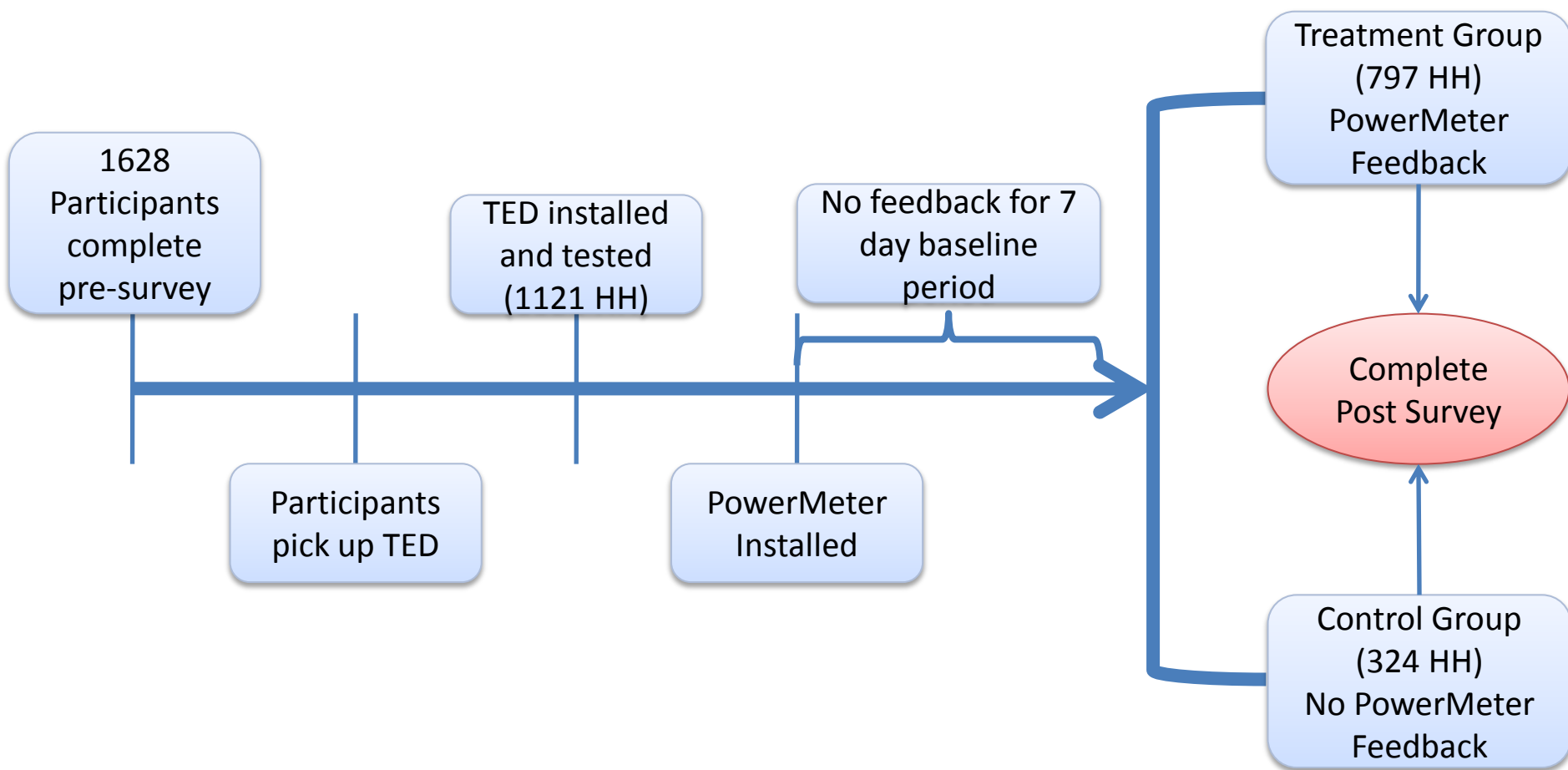
Google PowerMeter helps you to predict your annual energy bill so that you can start making changes and saving early.

## Budget Tracker

Set an energy savings goal for yourself and track your progress.



# Experiment Design





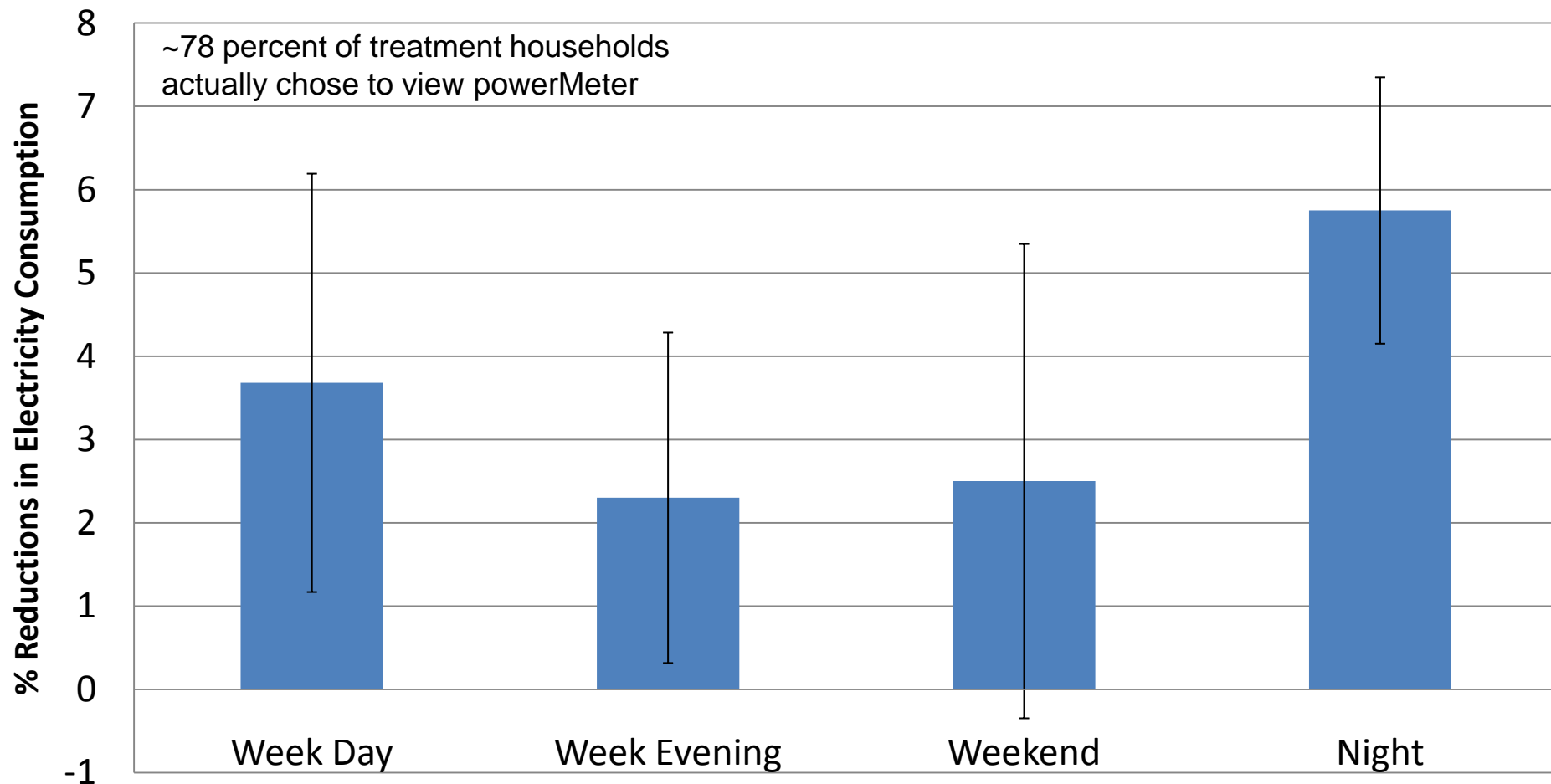
# Subject Pool: Summary Statistics

Demographics and Behaviors	Treatment	Control	US
Baseline Electricity Consumption (KWh/day)	21.25	21.00	30.67
Household Size	2.94	3.06	2.61
% Income: less than \$100,00	11.5	6.2	
% Income: \$100,00-\$150,000	24.2	22.1	
% Income: greater than \$150,000	64.3	71.7	
% California Residents	65.0	70.0	11.6
% White	56.5	56.6	74.3
% Home Owners	78.9	79.7	67.1
% Electrical Heating	20.1	17.6	33.5
% Democrat or leaning	49.9	53.4	44.0
% Make donations to environmental groups	23.1	30.0	
% Engineers	77.9	79.2	



# Average Treatment Effects

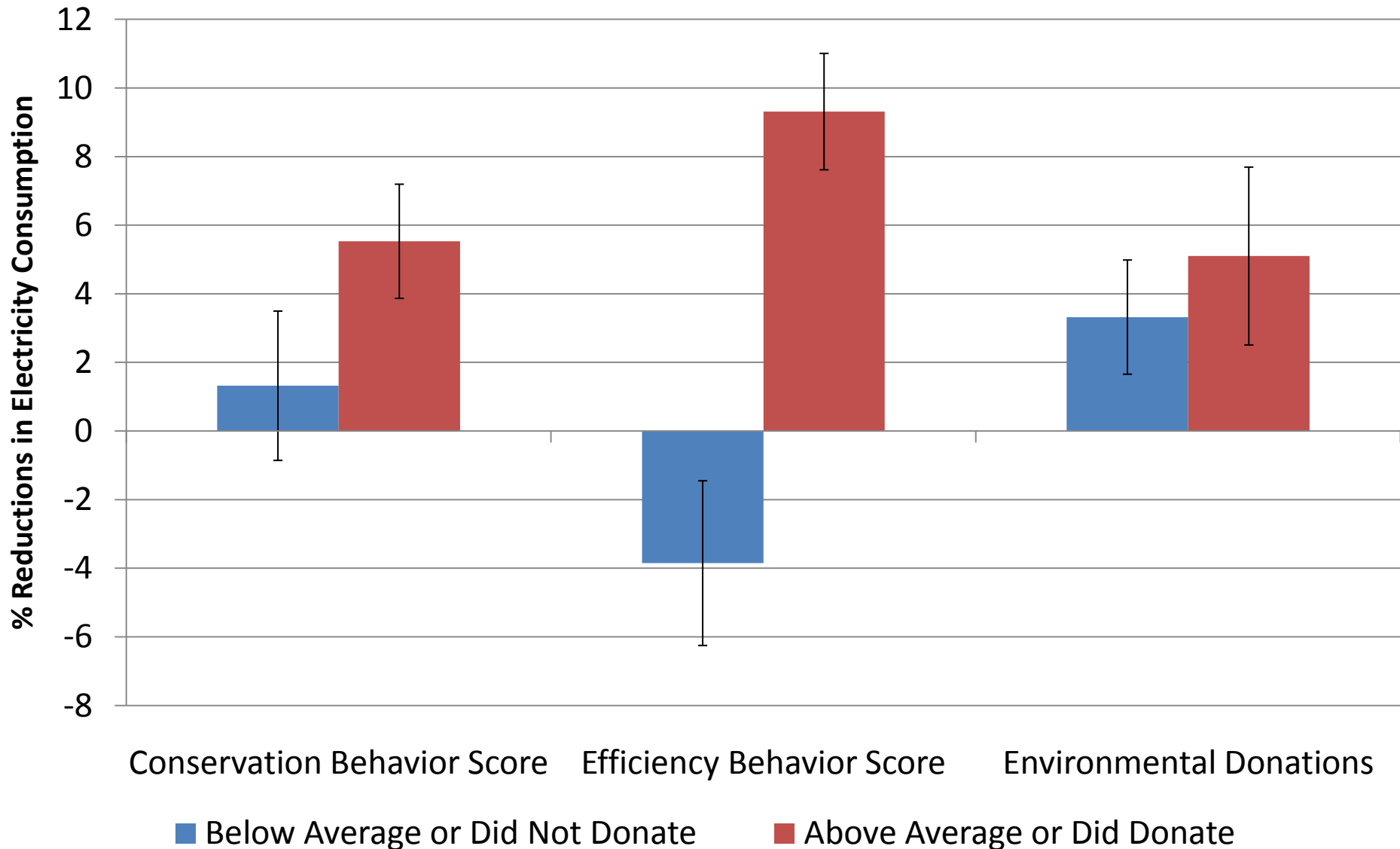
LATE estimator for households that actually used PowerMeter



Error bars show 90 percent confidence intervals



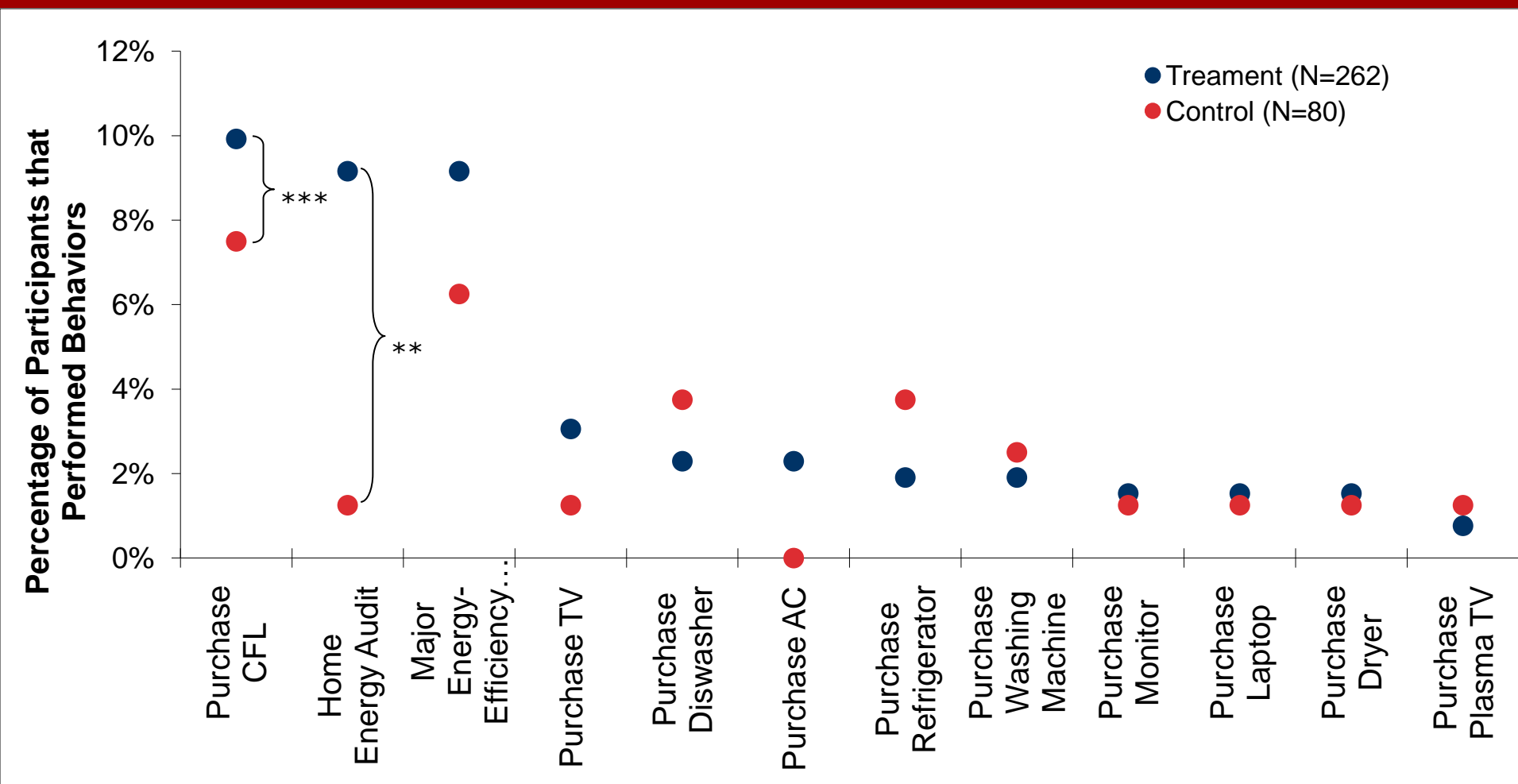
# Heterogeneity in Treatment





# Changes in Energy Behaviors

Differences in energy behaviors between treatment and control



Largest differences in two well known and easy efficiency measures





# User Comments On Feedback (Among many others)

I'd like to zoom in/out, slice & dice data with various aggregations

Alerts on a day to day basis - like you seem to be leaving lights on etc.

See the appliance usage!

I want it to beep or something when its spending a lot of \$\$\$

determine how much I would save by upgrading to an Energy Star version,



# Summary

- Small but significant reductions (3- 5 percent)
- Larger reductions during the middle of the night
- People that are prone to perform energy conservation/efficiency behaviors reduced more
- Feedback may have led to other information seeking behaviors: e.g. audit