Identifying Energy Savings Drivers of Home Energy Reports

Brian Arthur Smith
Pacific Gas and Electric Company

Key Takeaways

o Self-report offers some understanding of the drivers of behavior change.

o Interval usage data offers some insight into when savings occur.

o On-site home inventories offer the most promise for understanding how neighbor comparison programs result in reducing energy consumption.

Report Anatomy: Opower

Your Home Energy Report
Account number:
Report period: 02/15/11 - 03/16/11

Be Informed: This personalized report is an educational tool to show your home's energy use.

Be a Program Ambassador: We'd like PG&E employees to have a firm understanding of the tools and resources we plan to offer our customers to help manage energy costs.

Talk to Us: We want your feedback on this program and encourage you to call the help line with questions at **1-866-767-6457** or submit your feedback to **homeenergyreports@pge.com.**

Last Month Household Comparison | You used 24% more than efficient similar homes.

Efficient Similar Homes 1,865*
YOUR HOME 2,317
Similar Homes 2,535

How you're doing:
Great 😊😊
▶ **GOOD** 😊
More than average

* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.

What homes are compared?

■ **Similar Homes**
Approximately 100 occupied nearby homes that are similar in size to yours (avg 4,250 sq ft) and have gas heat

■ **Efficient Similar Homes**
The most efficient 20 percent of similar homes

An Average Day Last Month
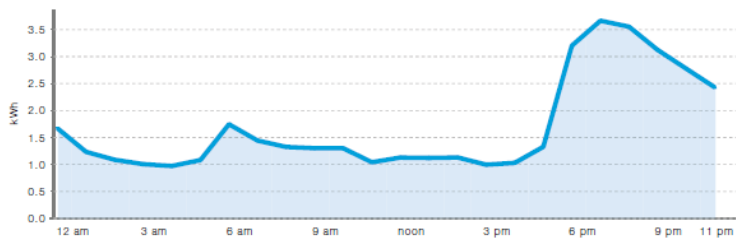
On average, you used the most from 7 – 9 pm. Think about what uses electricity during this time.
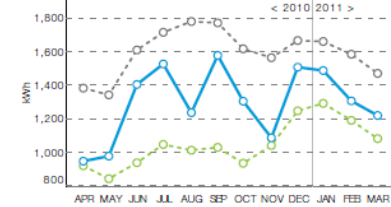
Turn over for savings ⟶
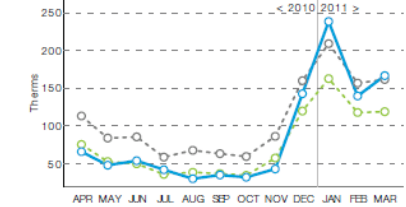
Last 12 Months Household Comparison

You used **21% MORE** energy than efficient similar homes. This costs you about **$886 EXTRA** per year.

⚡ **Electricity** | 24% more electricity than efficient similar homes

🔥 **Natural Gas** | 15% more natural gas than efficient similar homes

Key: ■ Your Home ■ Similar Homes ■ Efficient Similar Homes

Action Steps | Personalized tips chosen for you based on your energy use and housing profile

Quick Fix
Something you can do right now

☐ **Turn off lights when not needed**
It's a common misconception that turning a light off and on consumes more energy than leaving it on all the time. This is not the case.

Turn off incandescent lights every time they are not needed. For compact fluorescent lights, it's cost effective to turn them off when you won't need them for 15 minutes or more.

Turning off unneeded lights can save energy and money.

SAVE UP TO
$**45** PER YEAR

Smart Purchase
Save a lot by spending a little

☐ **Use and switch off power strips**
Many electronics continue to draw power even when they are turned off. These so-called "vampire devices" waste electricity throughout the day.

To save energy and money, plug devices into power strips — and then when you're not using them, turn off the strips.

Power strips are convenient because they allow you to control multiple products at once and can be easier to reach than the outlet. Look for other time- and energy-saving features, such as programming ability.

SAVE UP TO
$**85** PER YEAR

Great Investment
A big idea for big savings

☐ **Choose an efficient television**
Some large flat-screen televisions use more energy than a refrigerator. When shopping for a new television, look not only for a brilliant resolution but also the ENERGY STAR® label.

Televisions qualified to earn the ENERGY STAR® label use 30% less energy than similar non-labeled models without any sacrifice in picture quality.

Before moving your old TV to another room, consider its energy costs — recycling it may be a better option.

SAVE UP TO
$**55** PER YEAR

www.pge.com/homeenergyreports | 1-866-767-6457 | homeenergyreports@pge.com   runs on OPOWER®

Dollar savings are estimated by OPOWER for typical households in the PG&E service area. Actual savings may vary from household to household. PG&E has not independently verified these savings. "PG&E" refers to Pacific Gas and Electric Company, a subsidiary of PG&E Corporation. Energy efficiency programs are funded by California utility customers and administered by PG&E under the auspices of the California Public Utilities Commission.
♲ PG&E prints its materials on recycled paper. This report is printed with solvent-free inks.

© 2010-2011 OPOWER
H-0311-A
R10782

Report Anatomy: C3 Energy
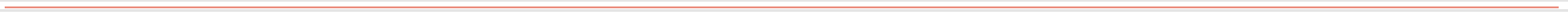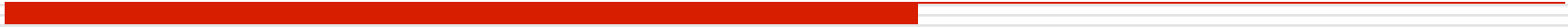
Report Effectiveness Well Known, But How Do They Drive Savings?

Code	Months of Treatment	Households	Observations	Average Treatment Effect
1	12	91,000	2,355,000	-1.6%
2	18	80,000	3,108,000	-2.3%
3	9	40,000	1,159,000	-2.1%
4	9	35,000	496,000	-1.9%
5	15	18,000	730,263	-2.9%
6 (a)	10	50,000	1,487,000	-1.6%
6 (b)	6	108,000	1,923,000	-0.9%
7	22	84,000	3,011,000	-1.7%
8	18	70,000	2,644,000	-1.1%
9	10	40,000	504,000	-1.3%
10	28	85,000	3,351,000	-2.5%
11	8	70,000	1,460,000	-1.6%
	Total/Average:	771,000	22,228,000	-1.8%

FIRST: Self Report Research

- Quantitative telephone surveys to unique treatment and control households
  - First wave (T1) conducted after three reports
  - Second wave (T2) conducted after six reports
- Control and treatment group respondents are similar across a range of specific EE attitudes
- Just over half of treatment respondents in T2 report taking actions to reduce their energy use specifically in response to the HERs
- Most commonly, respondents cite changes in lighting behavior (buying more efficient lights or turning lights off more often)

Taken Steps To Reduce Use?

**Have Taken Steps to Reduce Home Energy Use
in Last 3 Months / 6 Months**

Legend:
- T1 Treatment (n=418)
- T2 Treatment (n=637)
- T1 Control (n=201)
- T2 Control (n=335)
- Opower Benchmark Treatment

Bar values: 67%, 73%, 70%, 68%, 77%
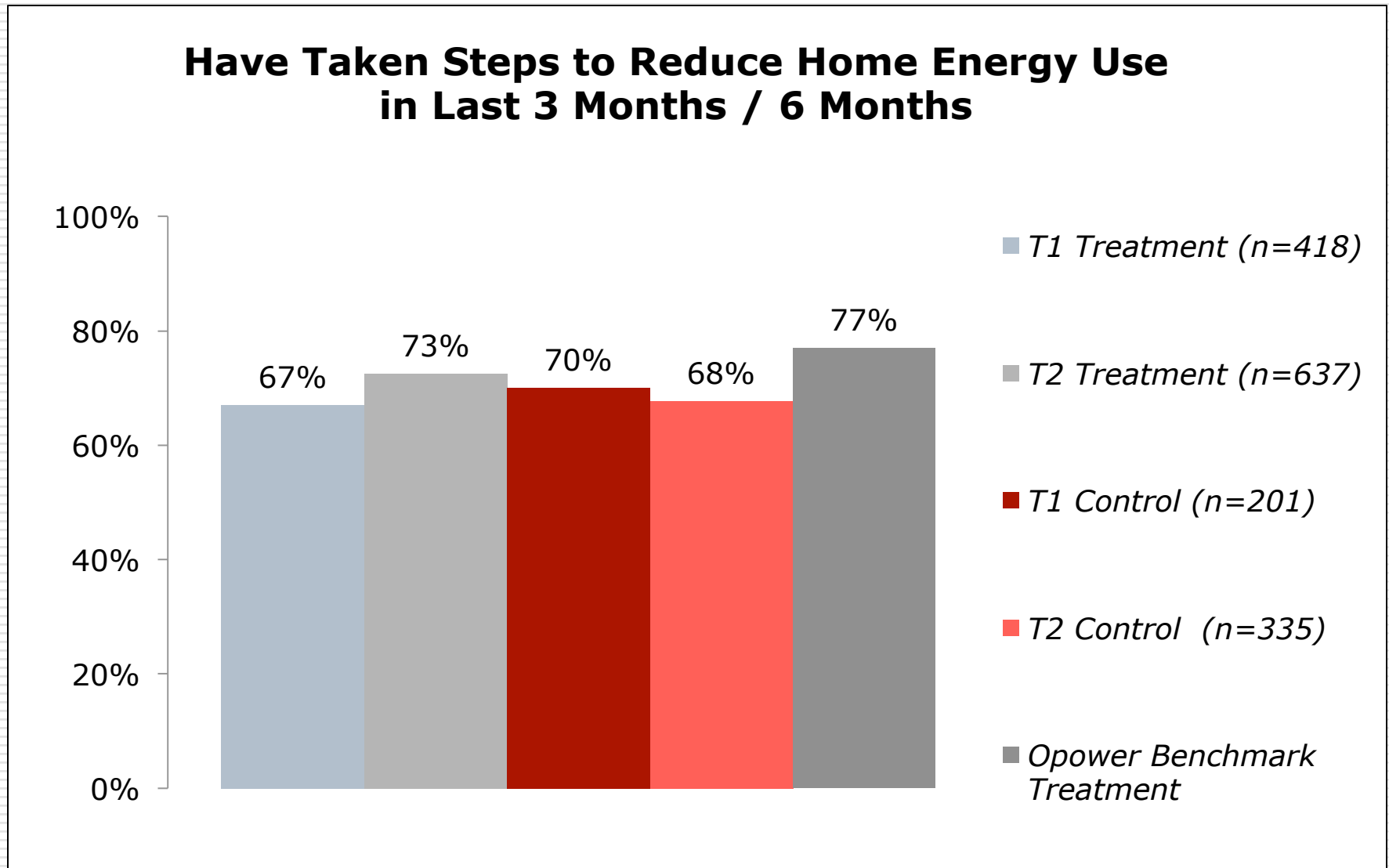
Results from (Aided) Self Report

Switched off power strips when not in use
- 95%
- 98%
- 96%
- 96%

Replaced incandescent light bulbs...
- 90%
- 87%
- 90%
- 89%

Purchased Energy Star label appliances...
- 80%
- 80%
- 80%
- 79%

Added weather-stripping or caulking...
- 70%
- 69%
- 63%
- 62%

Used energy-saving or "sleep" features of PC
- 53%
- 53%
- 54%
- 55%

Used a programmable thermostat
- 48%
- 51%
- 54%
- 54%

Performed a tune-up of AC system
- 44%
- 42%
- 42%
- 45%

Raised the thermostat setting on AC...
- 36%
- 44%
- 37%
- 47%

Disposed of a second refrigerator or freezer
- 28%
- 30%
- 37%
- 32%

Visited PG&E's website for tips about saving energy
- 26%
- 30%
- 29%
- 26%

Legend:
- *T1 Treatment (n=418)*
- *T2 Treatment (n=637)*
- *T1 Control (n=201)*
- *T2 Control (n=335)*

Second: Analysis Of Time of Day That Savings Occur

o   Interval data from Smart Meters allows calculation of time of day savings occurs

o   Total energy used by hour by adding up usage of treatment and control groups

o   Simple subtraction of hourly electric usage over 24-hour period

o   Resulting graph shows energy savings curve as is common in demand response analyses
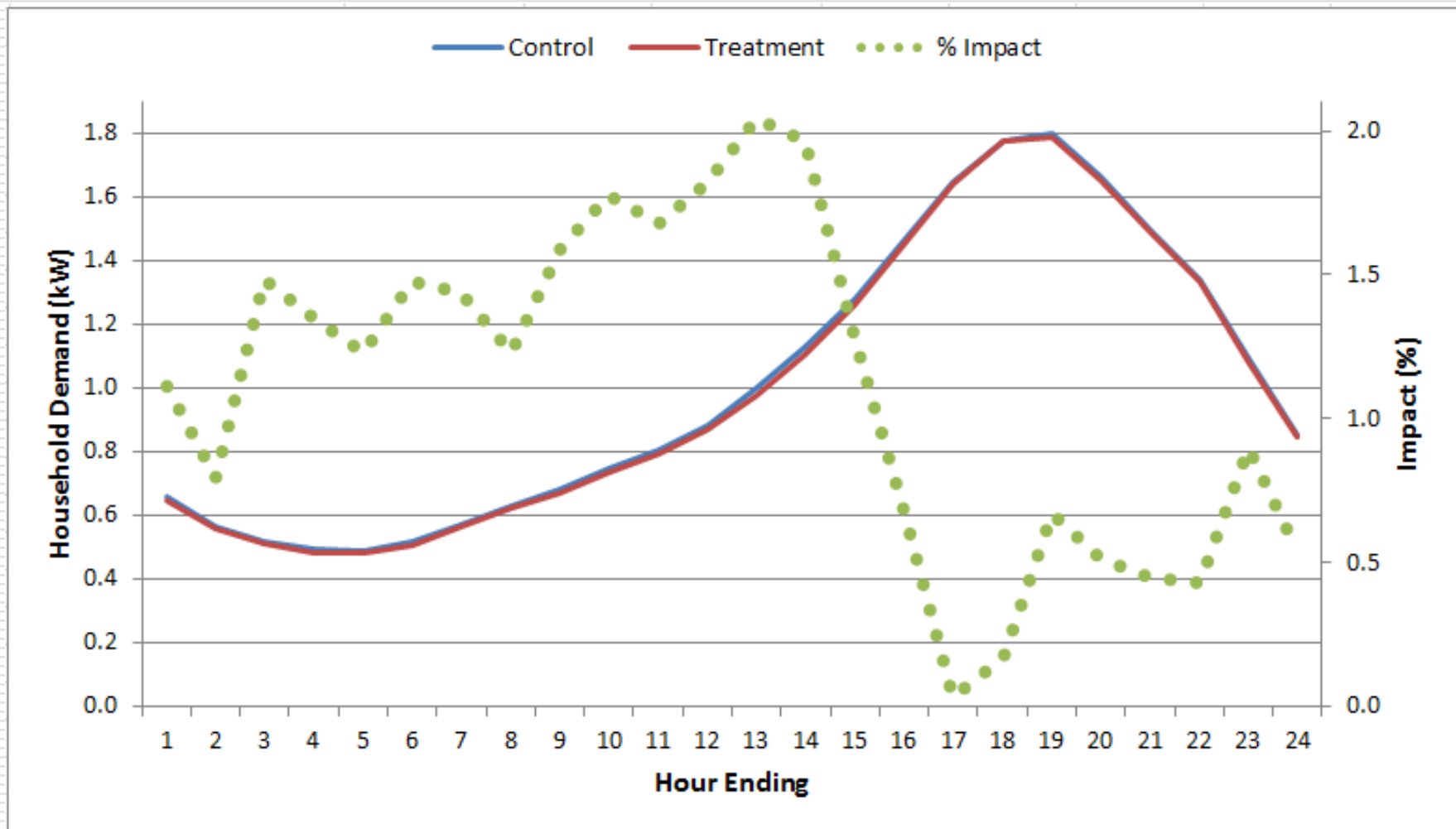
Focus Area for Interval Data
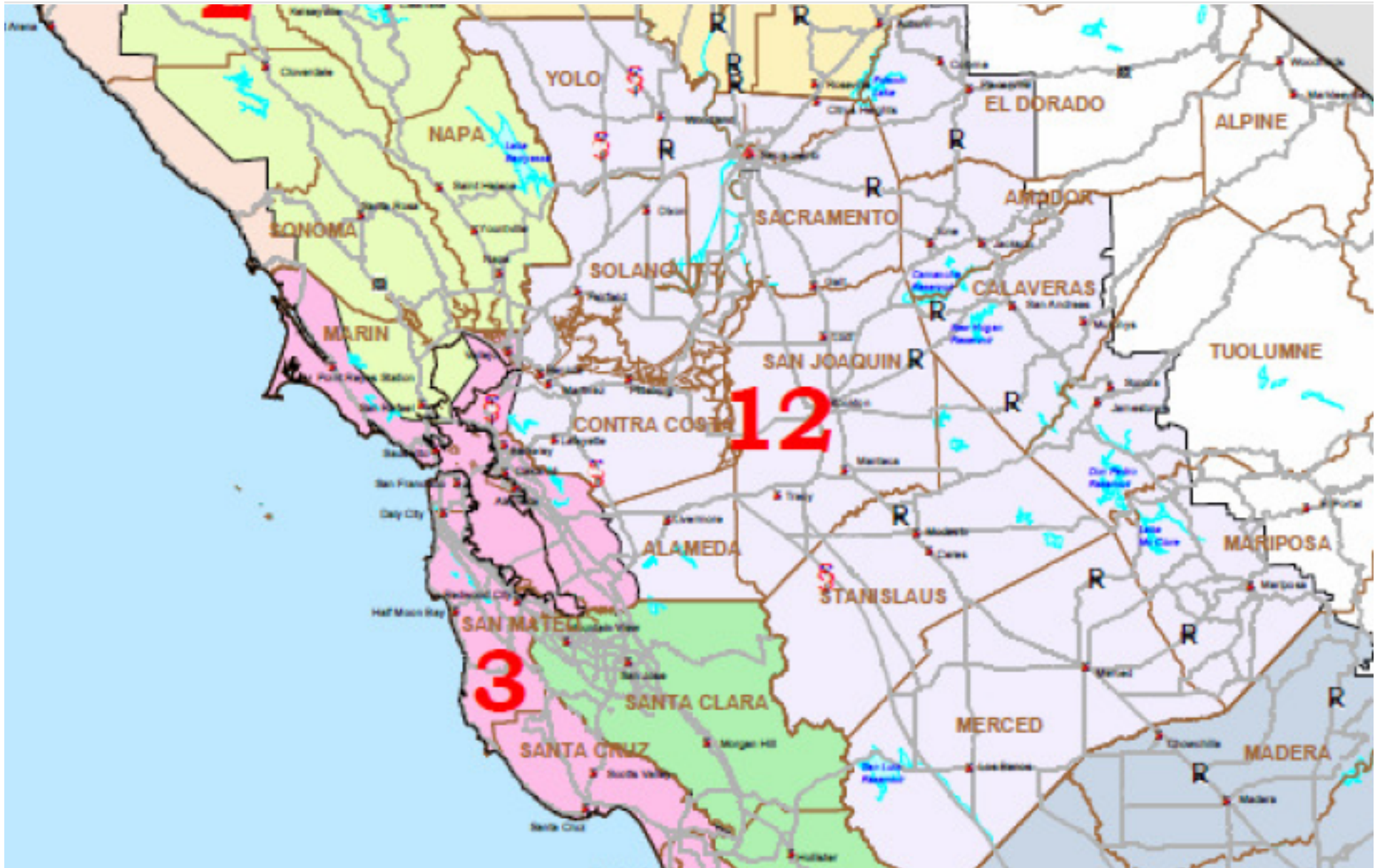
Typical Residential Summer Load
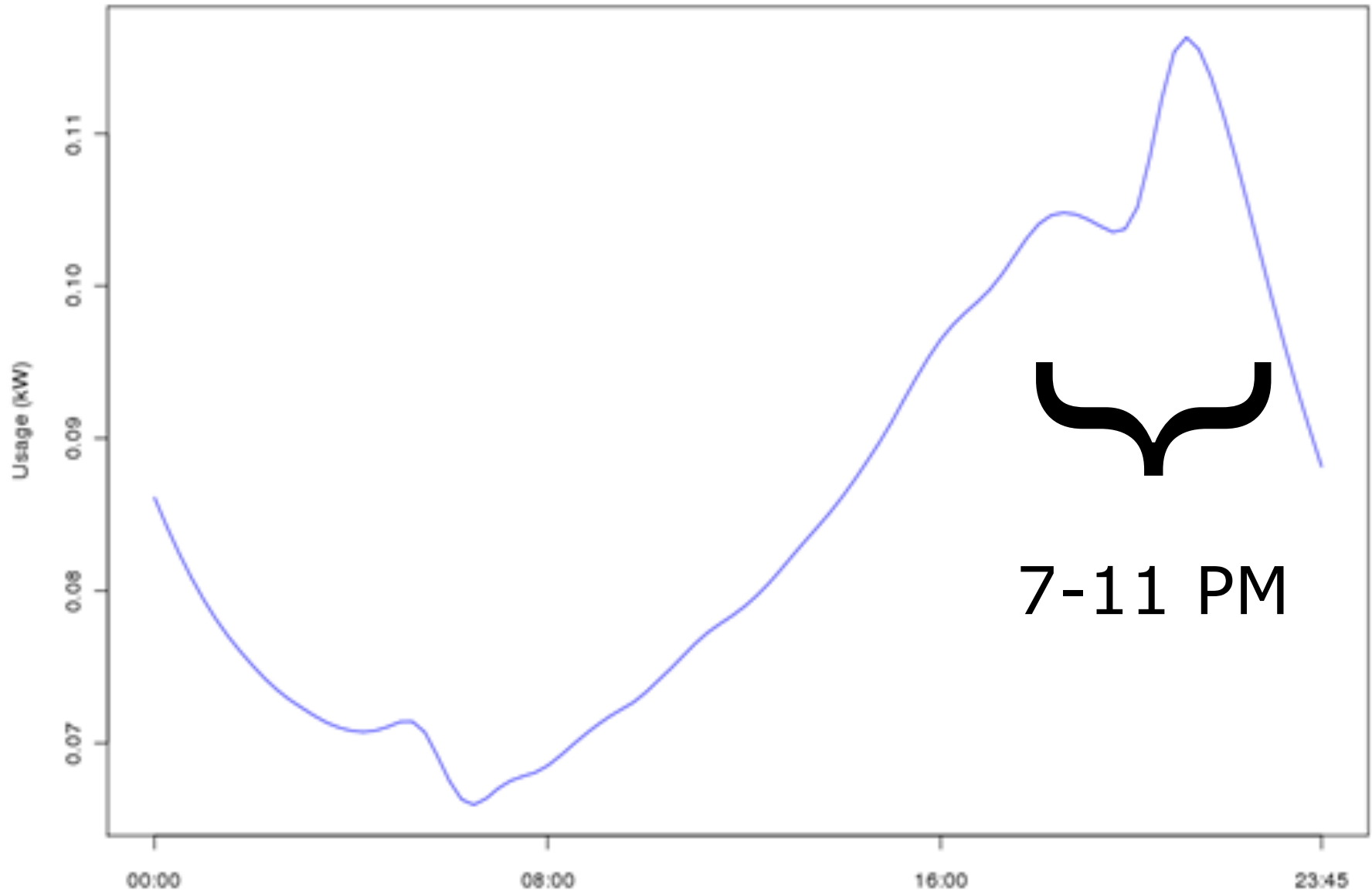
Savings In Summer Occurs Throughout the Day

Third: Home Inventory

o **Survey.** Administer a survey with behavioral items (ask customers about various energy efficiency measures that may be in place in their homes or that they may engage in).

o **Inventory.** Conduct a visual inventory of energy efficiency measures in which they will assess a number of energy efficiency-related aspects of the household.

  ■ The number of sockets and bulb inventory.
  ■ The make, size, technology, and purchase age of TVs.
  ■ The presence of door and window weather stripping.
  ■ The type (programmable or not) and settings of thermostats.
  ■ The presence of measures for limiting phantom loads, such as power strips for entertainment centers.

Home Inventory Sampling

o   By randomly choosing a limited set of zip codes and then randomly sampling from participants within those zip codes by usage quartile (in proportion to the electric savings attributable to each quartile), the geographic scope and cost of the effort is constrained.

o   There will be a total of 26 geographical clusters, with 30-35 within each cluster (split between treatment and control households).

- The clusters consist of zip codes that are randomly chosen from among all the zip codes included in the program.

- Zip code selection is performed so that zip codes with more participants are proportionally more likely to be selected.

- The selection does not limit a zip code to being selected a maximum number of times, meaning that populous zip codes might be selected more than once.

Home Inventory Survey Participants

Legend

● Home Inventory Survey Participant

Opower Participants by ZIP Code

- 24 - 530
- 540 - 1,200
- 1,300 - 2,000
- 2,100 - 3,900
- 4,000 - 8,100
- Other ZIP Codes

Miles
0   7.5   15   30   45   60