ORIGINAL

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Memorandum

From the office of
Commissioner Andy Tobin
Arizona Corporation Commission
1200 W. WASHINGTON
PHOENIX, ARIZONA
(602) 542-3625

TO: Docket Control

DATE: August 4th, 2016

FROM: Commissioner Andy Tobin's Office

SUBJECT: Docket No. # E-00000J-16-0257

Attached please find Charlie Buck presentation entitled "Behavioral approaches to helping customers reduce peak demand" for the Reducing System Peak Demand Costs Workshop on August 4, 2016.

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Arizona Corporation Commission
DOCKETED
AUG 03 2016
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2016 AUG -3 A 10: 52

CERTIFICATION OF SERVICE

On this 4th day of August, 2016, the foregoing document was filed with Docket Control as a correspondence from Commissioner Andy Tobin, and copies of the foregoing were mailed on behalf of Commissioner Andy Tobin to the following who have not consented to email service. On this date or as soon as possible thereafter, the Commission's eDocket program will automatically email a link to the foregoing to the following who have consented to email service.

Diane E. Brown
Arizona PIRG Education Fund
130 N. Central, STE. 202
Phoenix Arizona 85004

Janice Alward
1200 W. Washington
Phoenix Arizona 85007

Thomas Broderick
1200 W. Washington St.
Phoenix Arizona 85007

Dwight Nodes
1200 W. Washington
Phoenix Arizona 85007-2927

By: _____
Jennifer Bontrager
Assistant to Andy Tobin

ORACLE® | OPOWER

Behavioral approaches to helping customers reduce peak demand

August 4, 2016

Int[illegible]n to
Op[illegible]

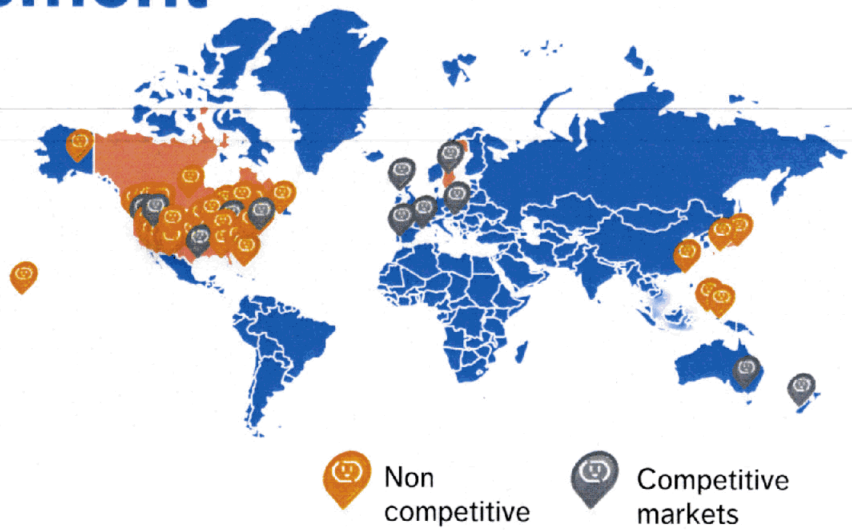
Opower works with utilities across the globe to improve customer engagement

Company

- Working with ~**100** utilities in **9** countries
- Reaching over **50 million** homes and businesses
- Over **400 billion** meter reads under analysis
- ~ **500** employees in London Tokyo, Singapore, Odessa, San Francisco, and Arlington, VA

DNA

- Behavioral science
- Big data analytics
- User-centric software design



Results

- 11 TWh of Savings
- $1.1 billion in bill reductions
- Most widely used platform for marketing and education

Opower in Arizona and the Southwest

Delivering energy savings to thousands of AZ households

AZ Impact to date (2010-Current)

350,000+ households served with reports and web tools

190 GWh lifetime electric savings

$20M+ in customer bill savings

133,962 metric tonnes of CO2 abated

Opower impact in the SW Region

2.6 MM+ households served with reports and web tools

591 GWh lifetime electric savings

$65 M+ in customer bill savings

415,434 metric tonnes of CO2 abated

Product core: Applied Behavioral Science

What messaging actually motivates customers to save?

Zero Impact on Consumption

6% Drop in Consumption

Schultz & Cialdini (OPOWER Scientists)
Hewlett Foundation San Marcos Study

Ho rgy Reports

Home Energy Reports: Improving Energy Literacy

NORMATIVE MESSAGING AND USAGE ANALYSIS

USAGE COMPARISON HISTORY

TARGETED LOW-COST TIPS

UTILITY DSM PROGRAM PROMOTION

ADDITIONAL INFORMATION

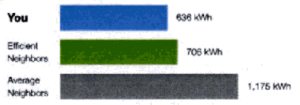
aps Mail Station 8028, O
P.O. Box 53999
Phoenix, AZ 85072-3999

Home Energy Report
July 6, 2016
Account number **********

We've put together this report to help you understand your energy use and what you can do to save.

Find a list of rebates and energy-saving products and services you can buy.
▸ **aps.com/save**

Here's how you compare to neighbors



Jun 7, 2016 - Jul 6, 2016

Based on 95 similar homes within approximately 1 mile(s). Efficient neighbors are the most efficient 20% in the neighbor group.
See back for details.

Great
Good
Using more than average

10% less electricity than efficient neighbors

Neighbor comparison over time

In the last 6 months, you used less than your efficient neighbors.
$115 saved

Tips from efficient neighbors

Raise your thermostat a few degrees in the summer
Save up to $100 per year

Improve shading for windows
Save up to $135 per year

Turn over →

Save up to 30% on your energy bill

Take the next step and get a Home Performance with ENERGY STAR® report

Call today to schedule your $99 home checkup (a $400 value) with an APS qualified contractor. During the checkup, the contractor will measure the efficiency of your HVAC system, ducts, insulation and more. You will also receive a report with recommendations to improve your comfort, reduce your energy use and potentially qualify for more than $1,000 in APS rebates! You can even earn an ENERGY STAR® Certificate of Energy Improvements that stays with your home!

Schedule your energy assessment today
(877) 850-8358 aps.com/checkup

Save on your next bill

Buy ENERGY STAR® appliances

The U.S. Department of Energy tests the efficiency of household appliances and electronics. The best earn the ENERGY STAR label. This program saves American households millions of dollars every year.

The ENERGY STAR label can be found on efficient models of many products. Certified models often run more quietly, last longer, and are more convenient to use than conventional models.

Visit **www.energystar.gov** for details.

Frequently asked questions

What's a kWh?
A kilowatt hour (kWh) is a way to measure electricity use. A 100-watt lightbulb uses 1 kWh every 10 hours.

How is my comparison calculated?
The homes in your comparison group share approximately the same square footage and the same heating source as your home. These factors typically lead to similar energy needs for a home. You can view your home information at **aps.com/energyreports.**

Why am I receiving these reports?
You've been selected to participate in our Home Energy Reports program, which provides personalized insights and recommendations to help you save energy.

How do I stop receiving reports?
Email us at energyreports@aps.com. You can also call us at (602) 371-3659 (In Metro Phoenix) or (855) 250-1566 (Outside Phoenix).

We're here to help

▸ **Visit us at aps.com/energyreports**
▸ **Email us at peakdays@aps.com**

Find more energy saving programs

▸ **aps.com/save**

aps

This program is funded by APS customers and approved by the Arizona Corporation Commission.

Printed on 10% post-consumer recycled paper using water-based inks.

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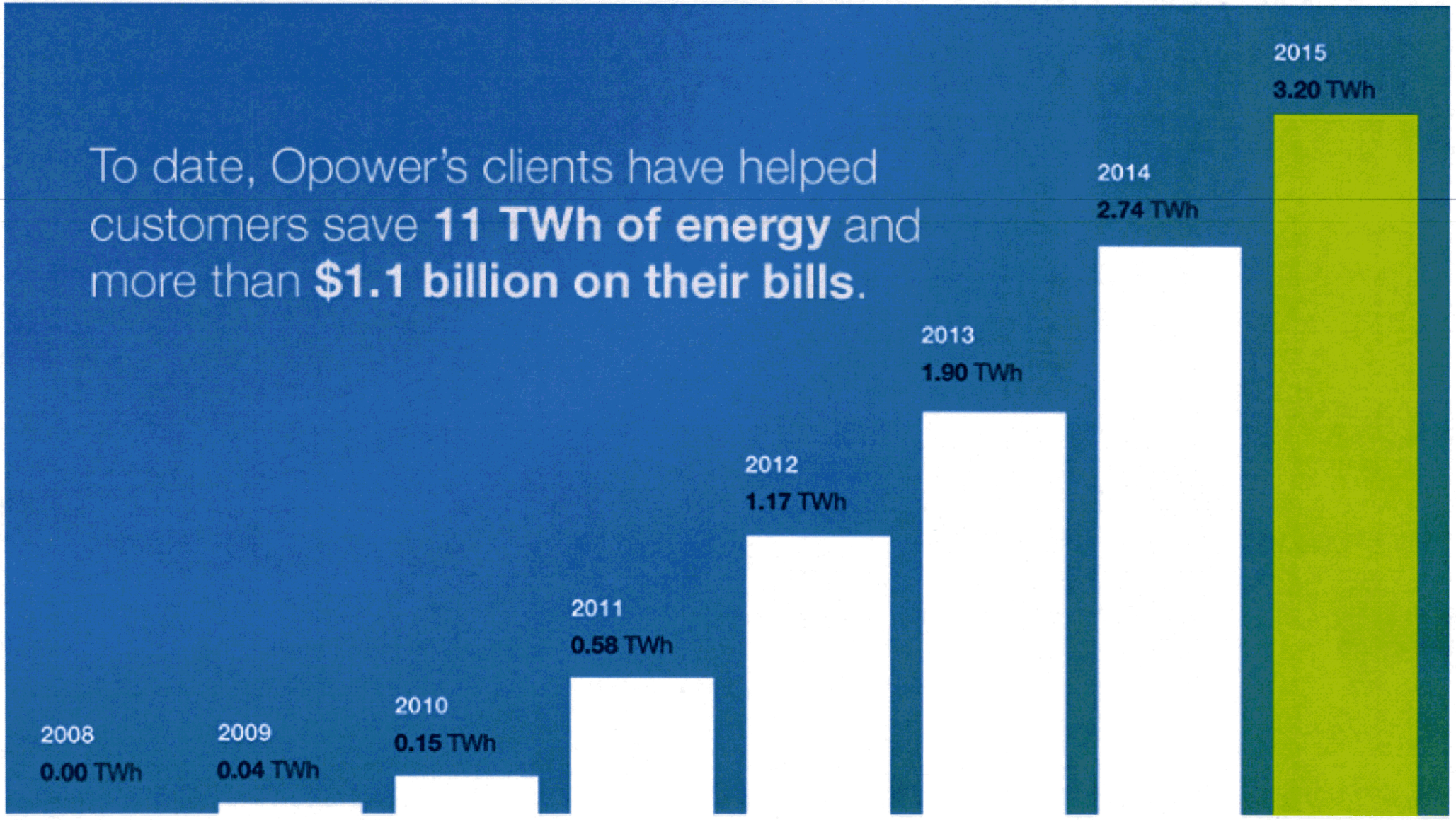
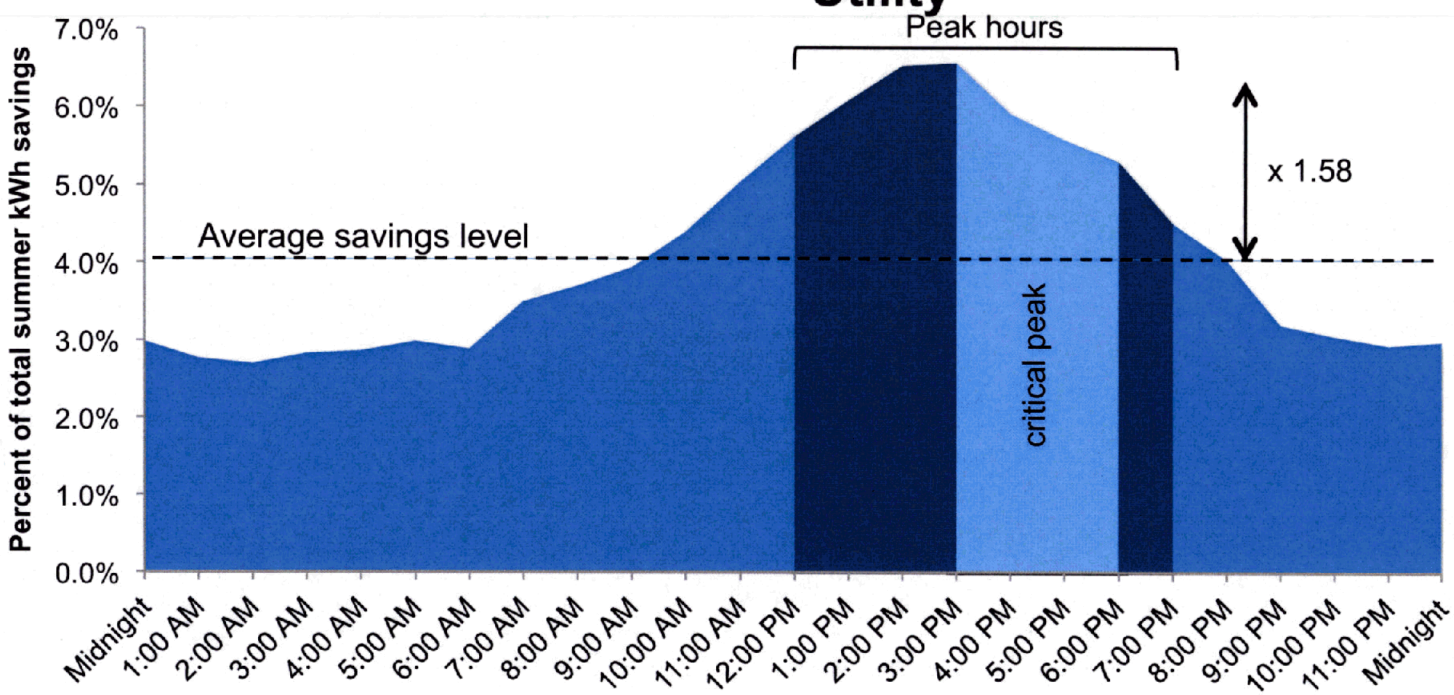
To date, Opower's clients have helped customers save **11 TWh of energy** and more than **$1.1 billion on their bills**.



Summer savings concentrated during peak hours

Distribution of summer kWh savings at Western Utility



- kW savings up to 1.58 times higher during daily peak hours
- 42% of savings happen during daily peak hours
- 18% of savings occur during daily super peak hours

*Based on AMI savings measurement of 3 waves of households in July – September of 2015, composed of approximately 122,000 treatment households and 35,000 control households.

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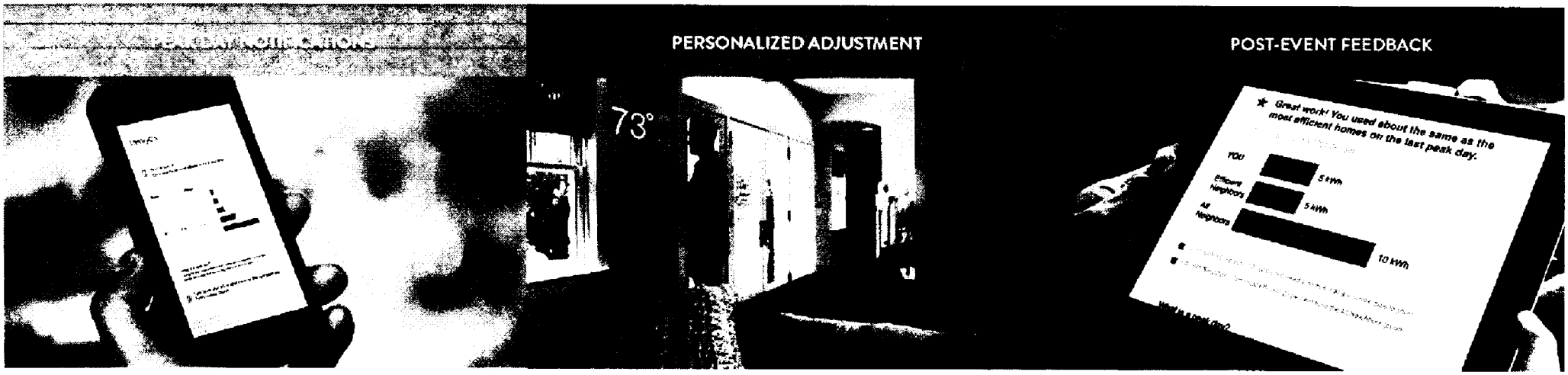
Behavioral Demand Response



PG&E

BGE
An Exelon Company

ComEd
An Exelon Company

DTE Energy

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

City of Glendale Water & Power
Your Trusted Community Utility

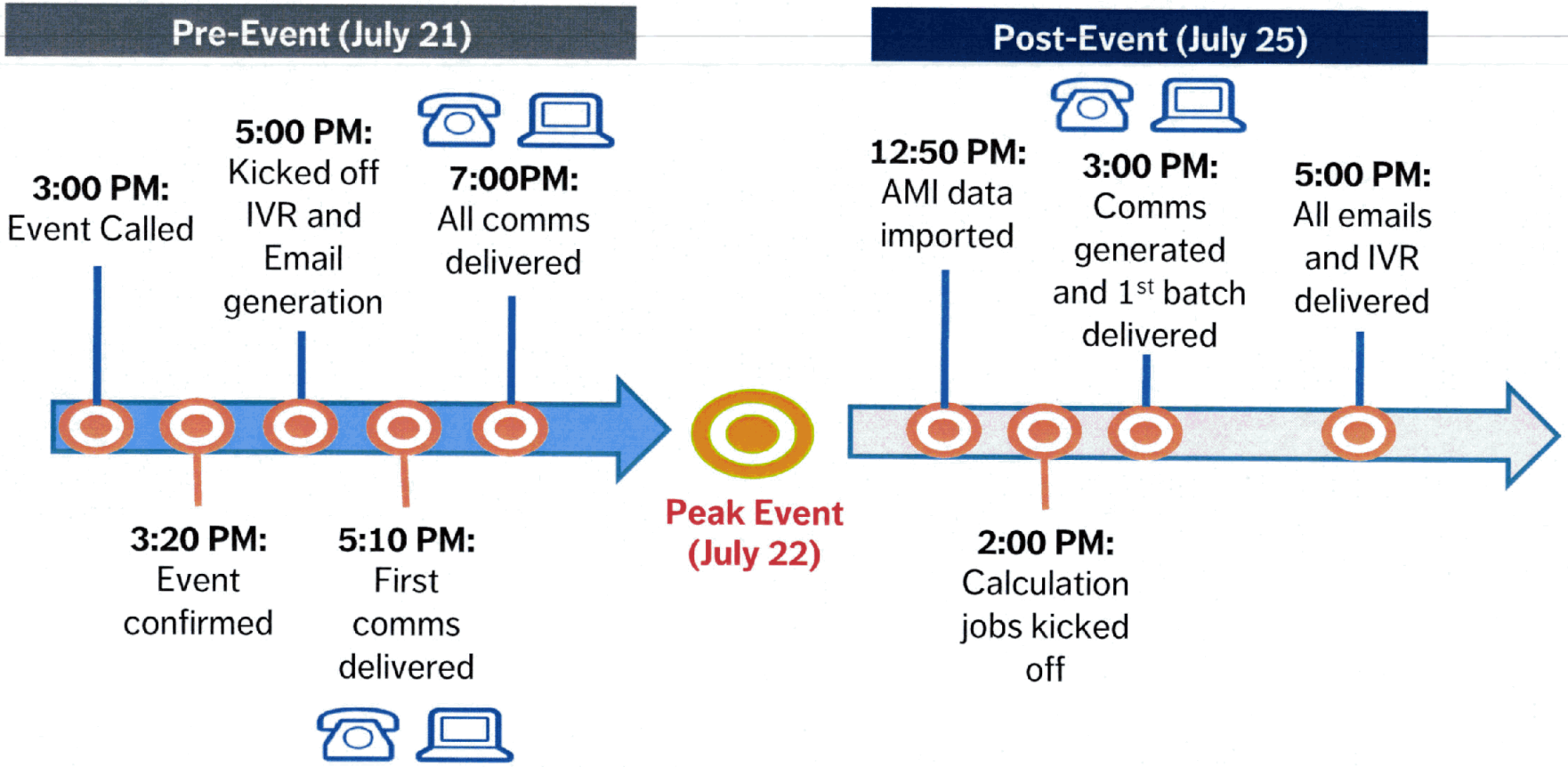
Consumers Energy
Count on Us

Efficiency Vermont
your resource for energy savings

Hydro

aps

Snapshot of a BDR event



Putting the behavior in BDR

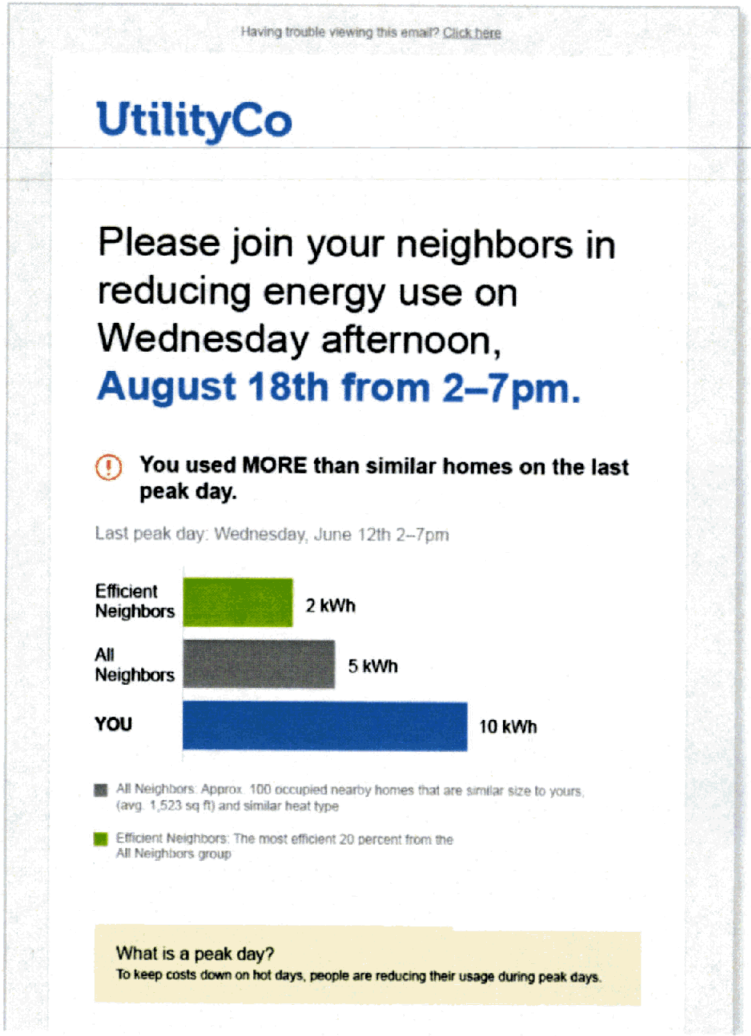
Normative call to action

Actionable tips

Peak event normative comparison

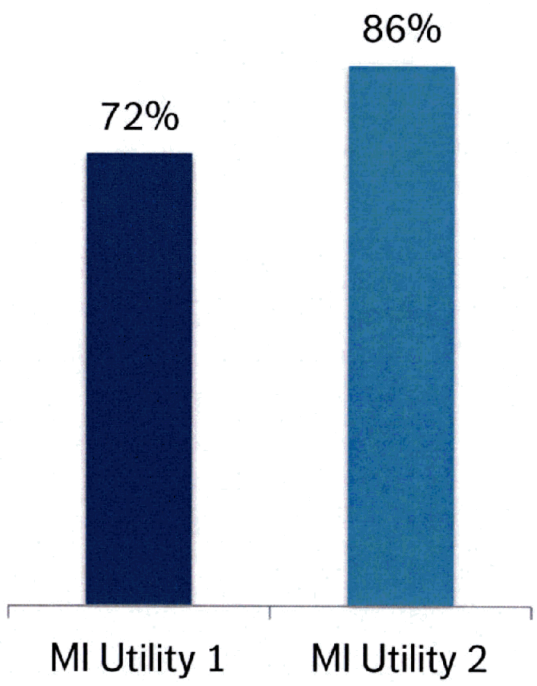
Simple opt out

Participation rationale

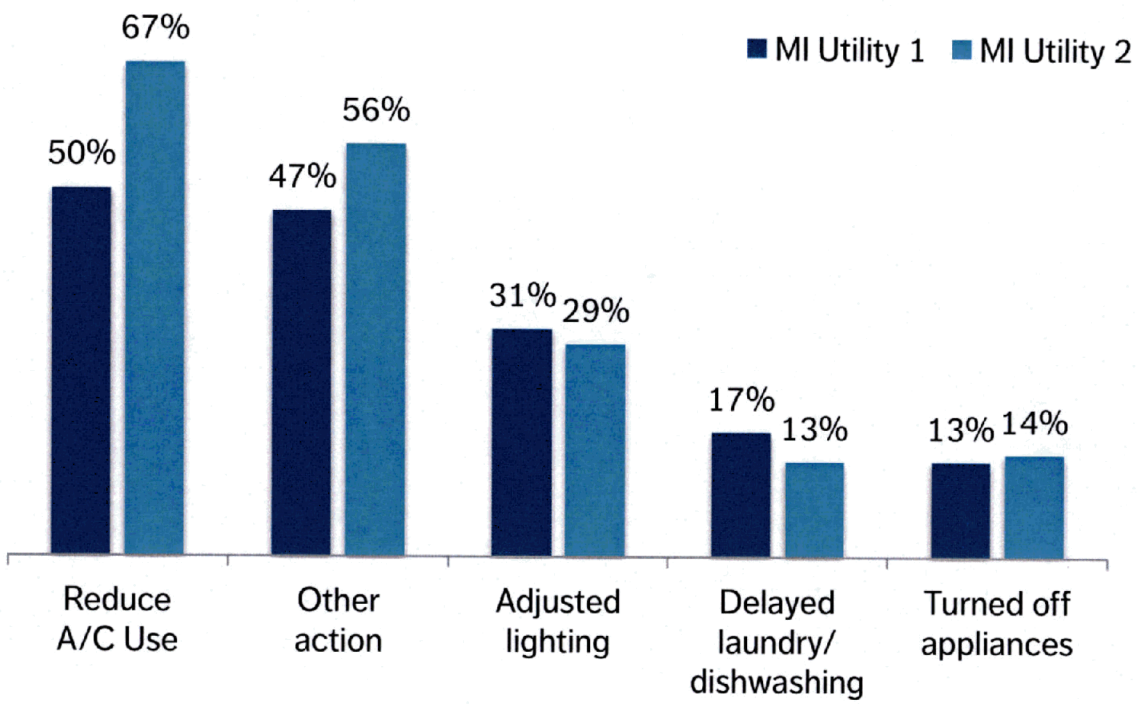


High recall, multiple peak-saving actions

Peak saving day recall rate

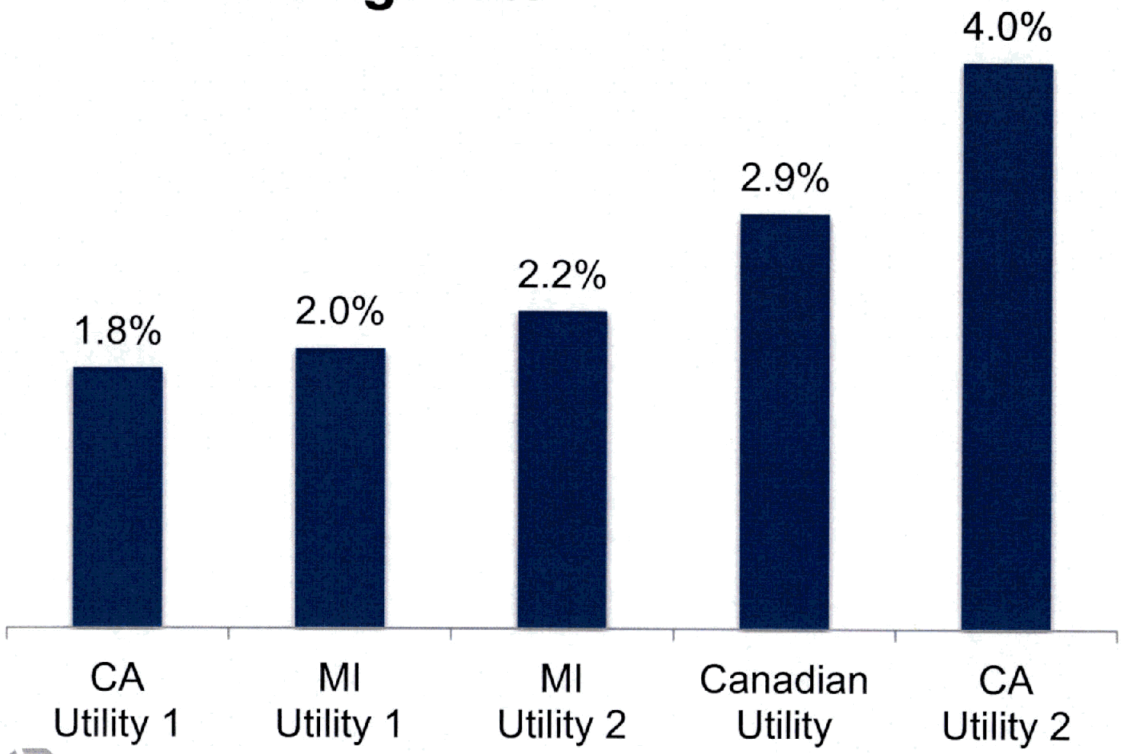


Peak-reducing actions



Customer behavior leads to reliable peak savings

Peak savings rate



Key results

3% peak savings

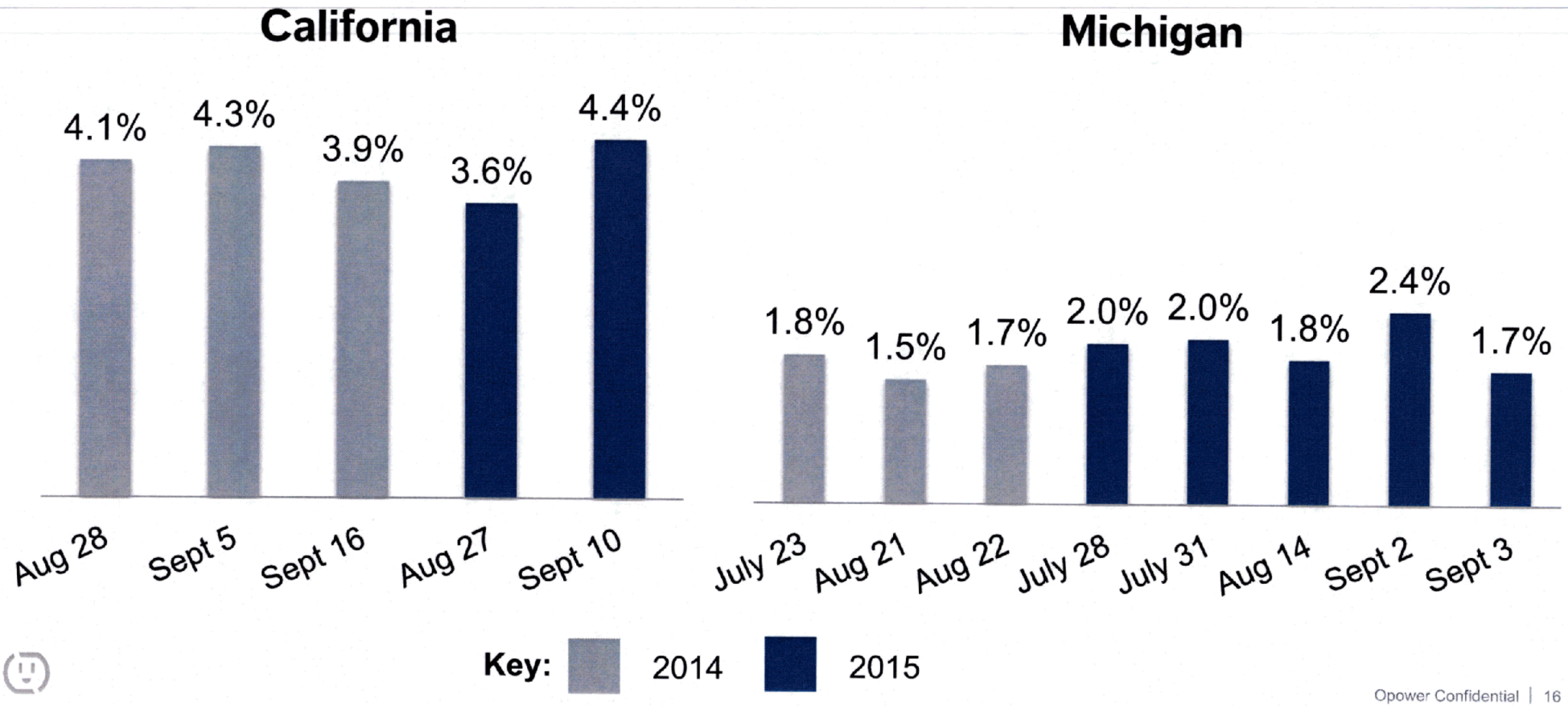
225k households engaged

13 MW delivered

21 peak events

2M communications

Savings persist within and across seasons



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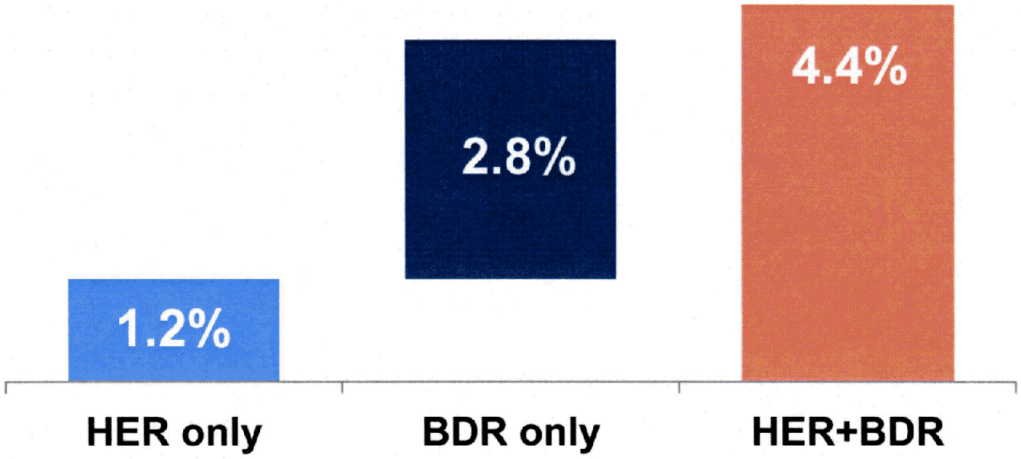
Surprising result: BDR layers savings on HERs

Average Savings during Peak Events



Takeaways

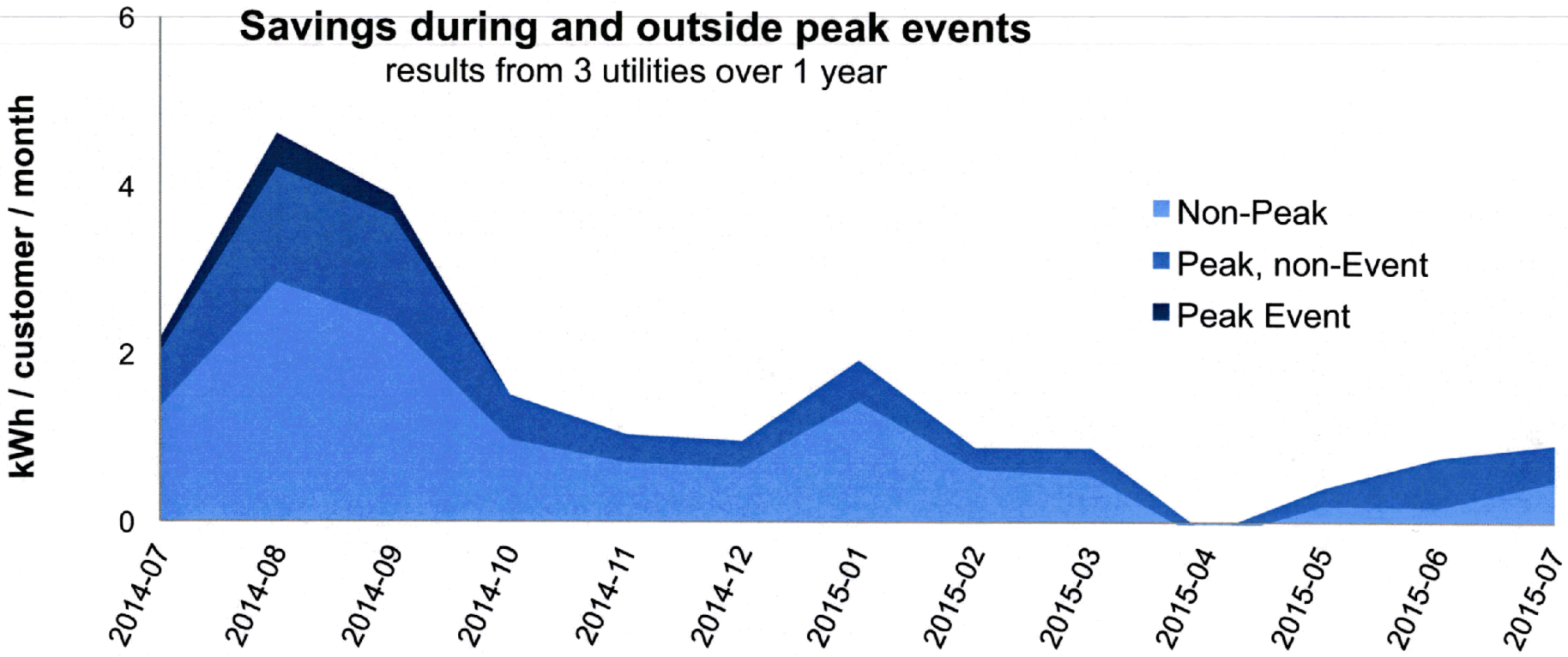
Peak savings from **BDR and HERs are additive**

Layer BDR on HERs to **maximize reduction during peak hours** and **increase total energy savings**

Incremental benefits from BDR **can boost cost-effectiveness** of HER program

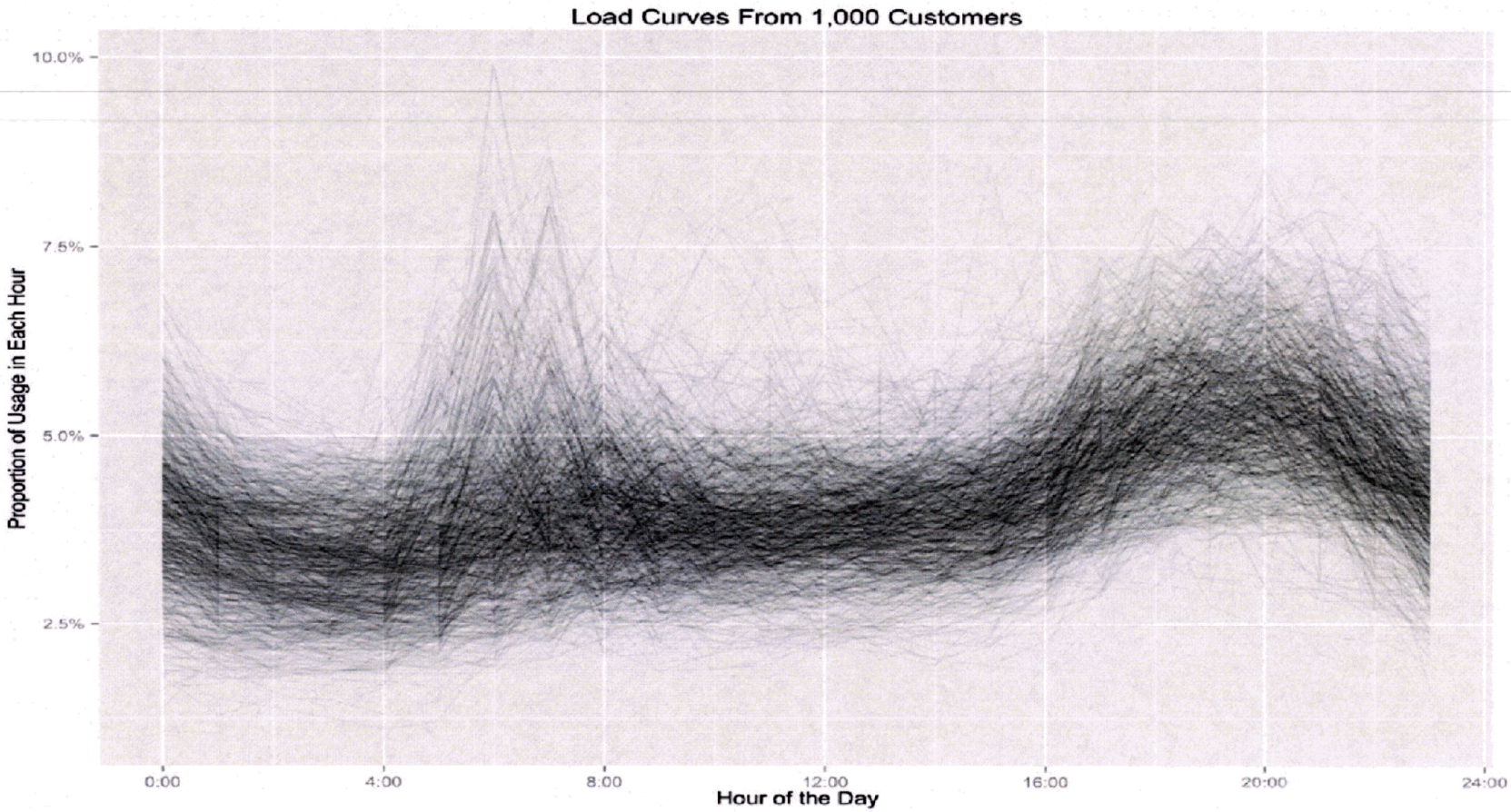
Based on randomized control trial at 2 utilities running BDR + HER summer programs

BDR generates substantial EE savings

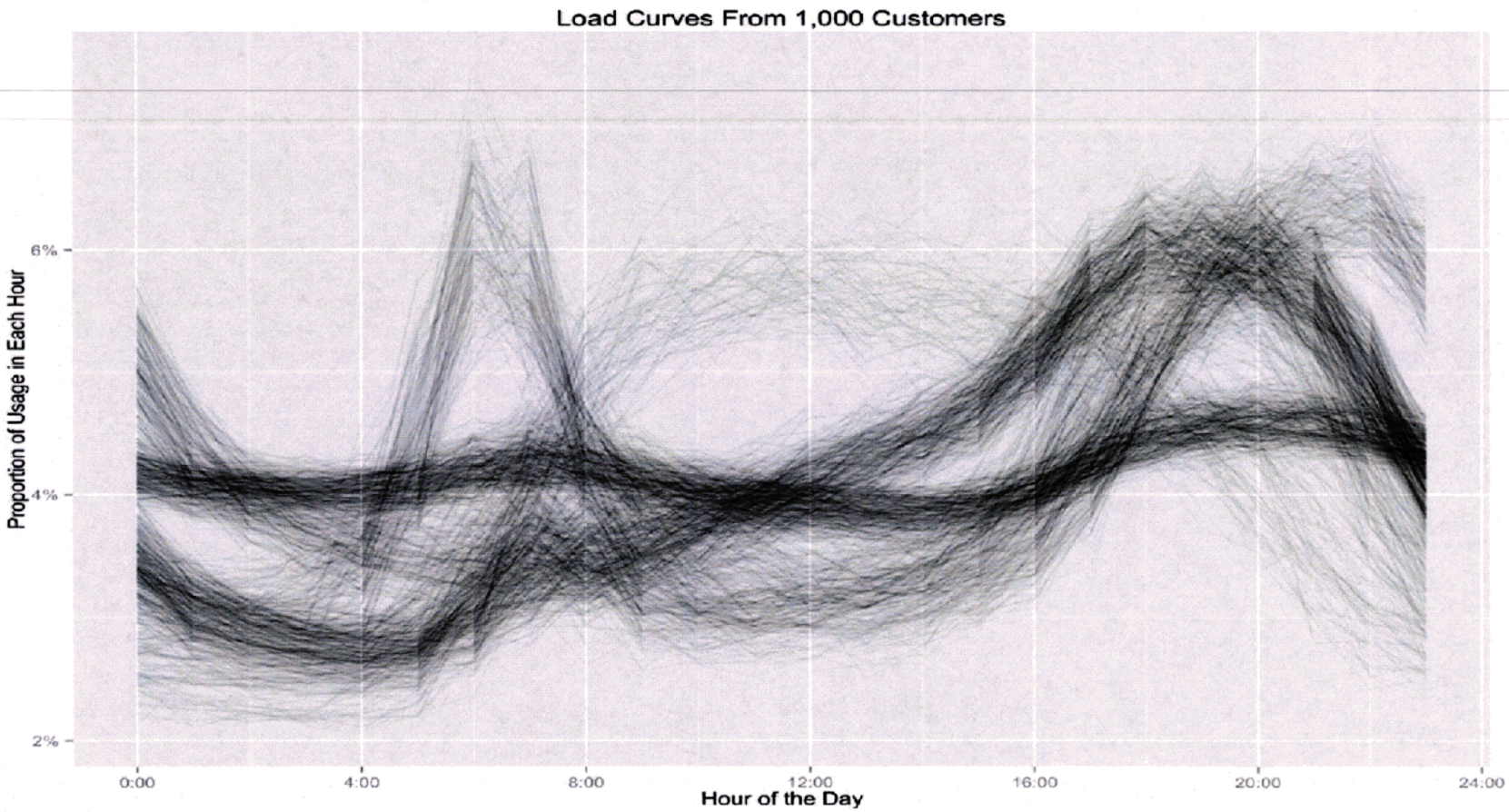


Us to better
un d customers

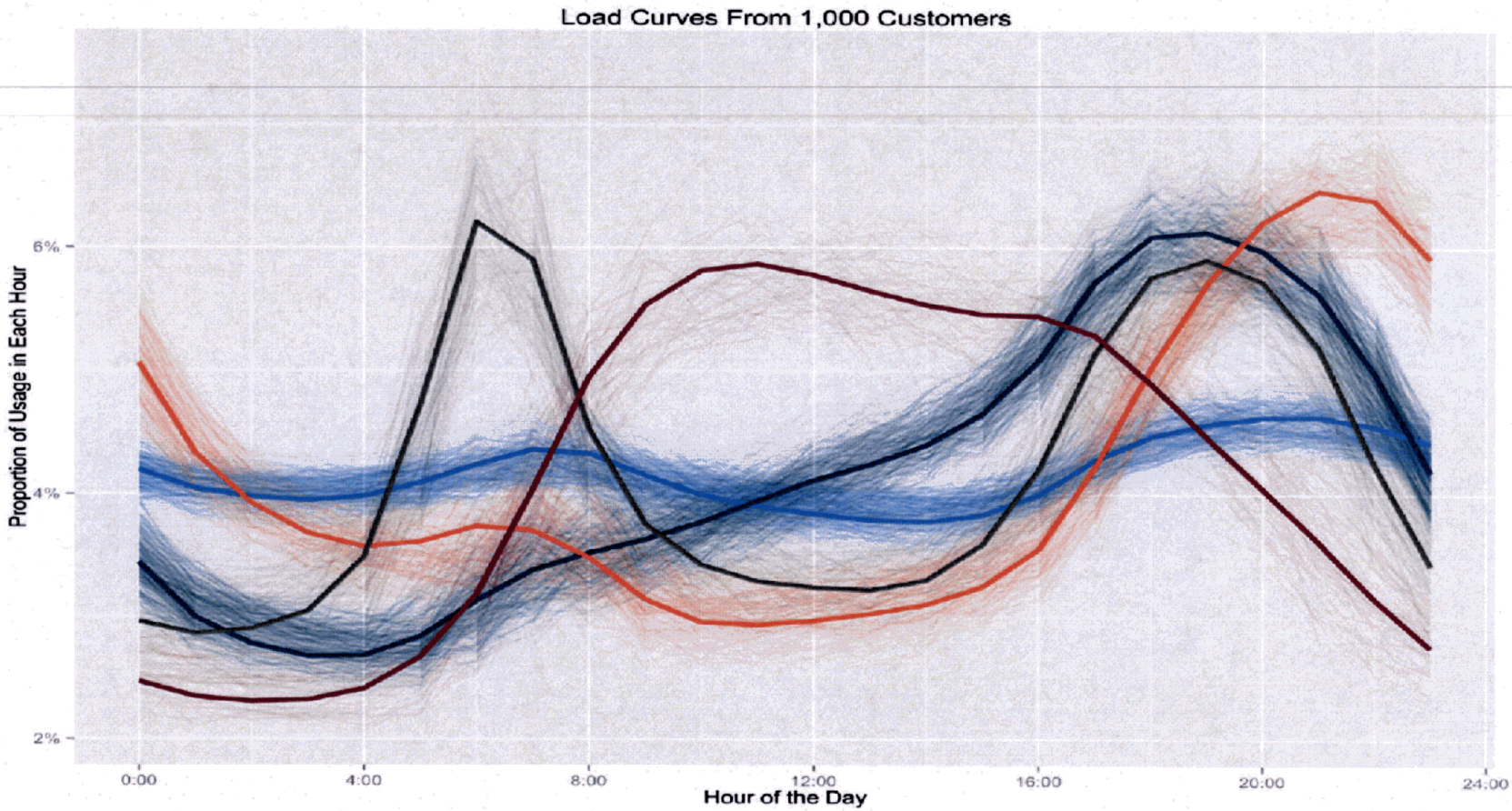
Hairball


Load Curves From 1,000 Customers
10.0%
7.5%
5.0%
2.5%
Proportion of Usage in Each Hour
0:00
4:00
8:00
12:00
16:00
20:00
24:00
Hour of the Day

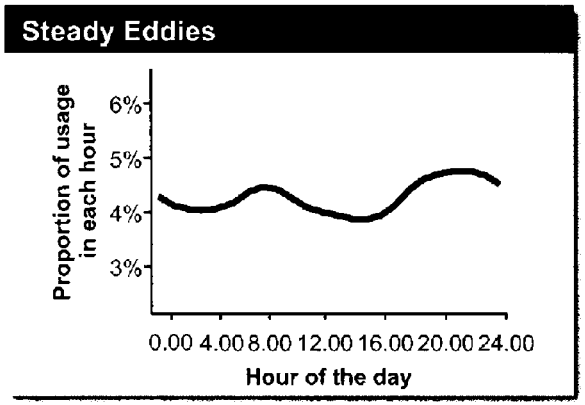
Finding signal in the noise

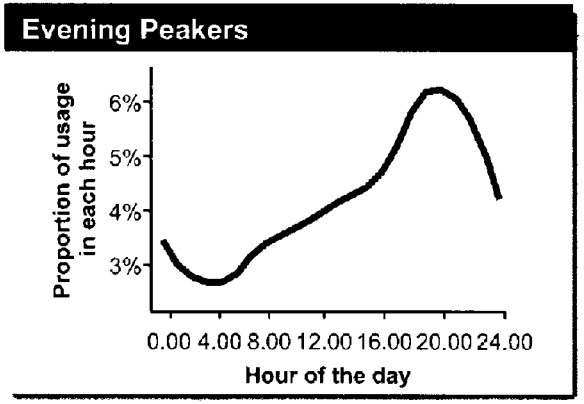


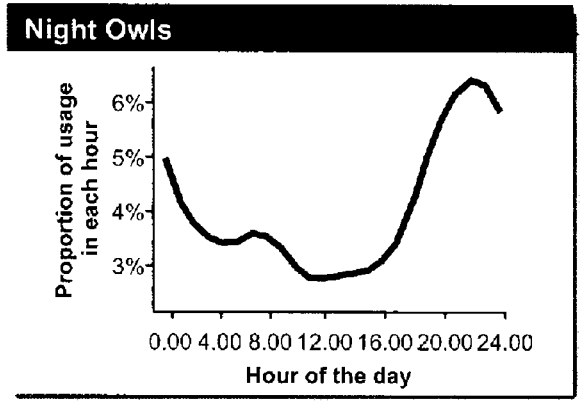
Finding signal in the noise

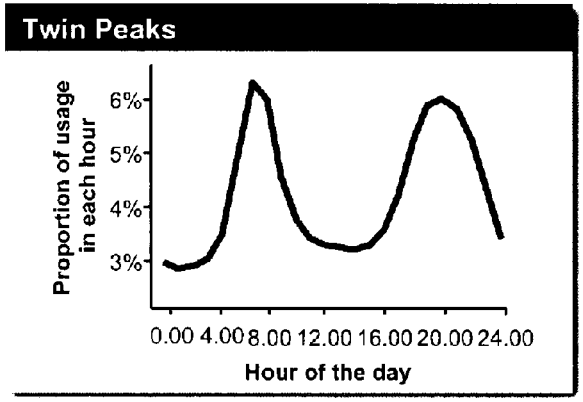


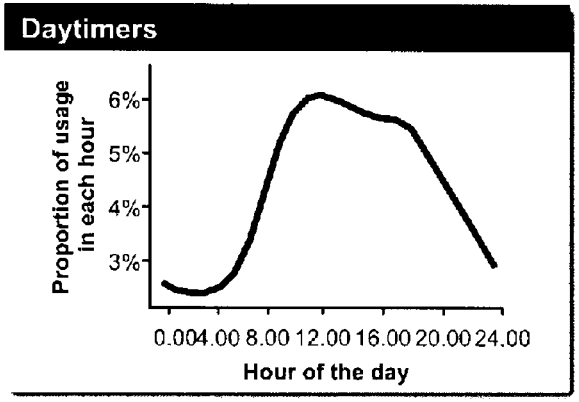
Enter the AMI archetypes



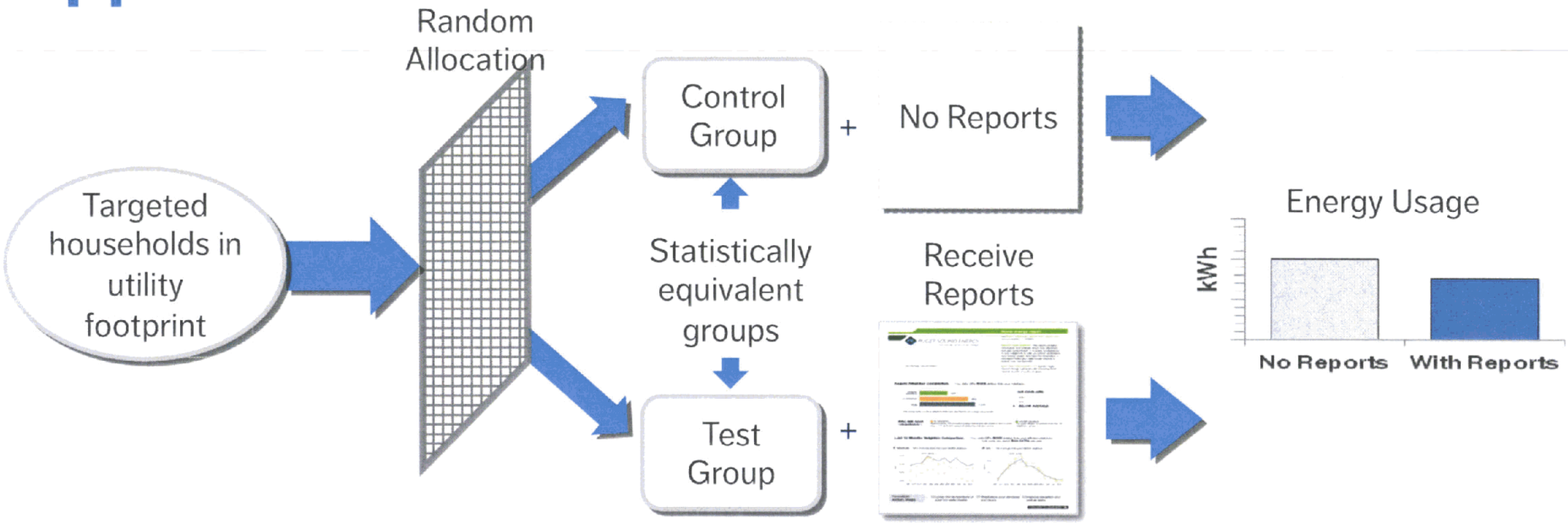








Clearly Defined Measurement & Verification Approach



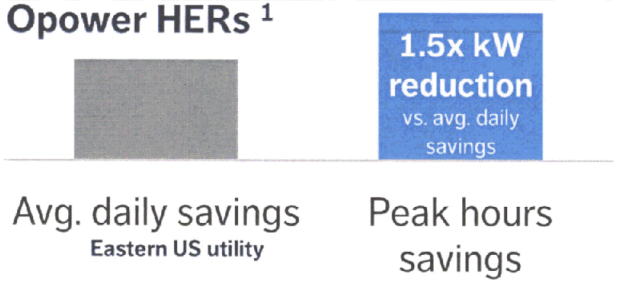
Methodology endorsed by:

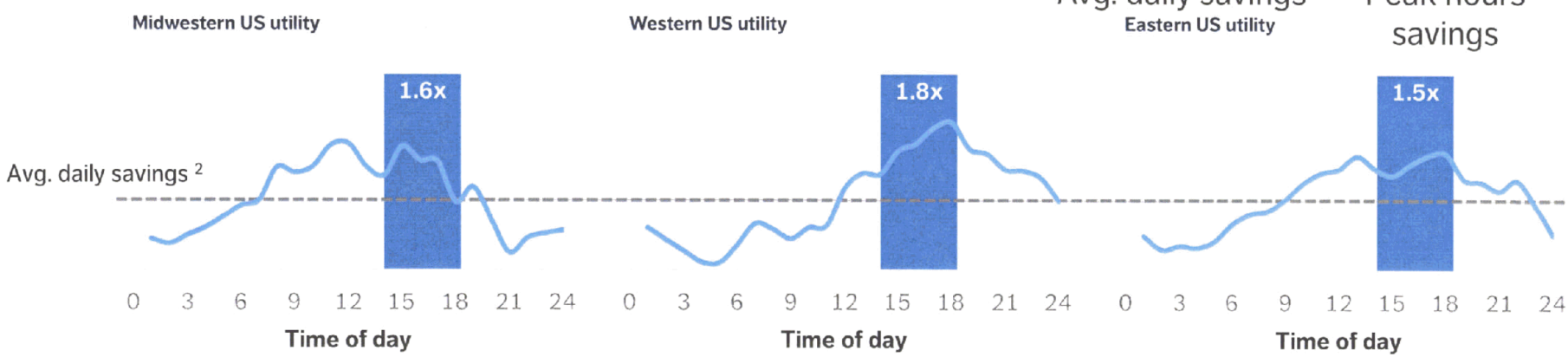
U.S. DEPARTMENT OF ENERGY | EPRI ELECTRIC POWER RESEARCH INSTITUTE | NRDC | UNITED STATES ENVIRONMENTAL PROTECTION AGENCY | neep

Greatest savings occur during times of peak demand, even without price signals or in-home devices

Customers receiving Home Energy Reports (HERs) save 1.5x kW during peak hours, when it matters most to the utility [1]

kW reduction during peak vs. average daily savings for households receiving Opower HERs [1]





1. Based on August savings across 12 Opower deployments and 5 US utilities; savings measured through randomised control trials and verified by two US research organisations (The Cadmus Group and Lawrence Berkeley National Laboratory)
2. kW savings are normalised across utilities and programmes
3. Peak savings hours are arbitrary and not based on each utility's peak times