Studying the Smarter Consumer

Rebecca Leiter – FirstEnergy Corporation
Jennifer Potter – Sacramento Municipal Utility District
Jim Eber – Commonwealth Edison

Moderators: Peter Cappers (LBNL) & Bernie Neenan (EPRI)
Rebecca Leiter

• Program Manager for the Consumer Behavior Study conducted by FirstEnergy under the Smart Grid Investment Grant funding

• Member of FirstEnergy Rates and Regulatory Affairs Department. Have also served in the Risk Management, Financial Settlement and Business Strategy departments at FirstEnergy.

• Prior to joining FirstEnergy served in Sales, Marketing and Actuarial Departments in the Insurance Industry

• The project team is key to success. Along with the Smart Grid Technology Team, we have received support from Communications, Call Center, IT, Customer Service, Metering Services and many others as well as received invaluable advice and support from EPRI, DOE technical advisory team and PUCO staff
FirstEnergy Overview

- All states but West Virginia are de-regulated markets
- Department of Energy grant included customers in Ohio, Pennsylvania & New Jersey
  - Only Ohio included automated meters
  - DA/VVC in Ohio and Pennsylvania
  - Direct Load Control projects in New Jersey and Pennsylvania
- Roll-out of AMI to all customers in Pennsylvania in progress

<table>
<thead>
<tr>
<th>State</th>
<th>2013 Customers (in thousands)</th>
<th>2013 Distribution Sales (MWH in thousands)</th>
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<tbody>
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<td>Ohio</td>
<td>2,087</td>
<td>53,492</td>
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<td>Pennsylvania</td>
<td>2,023</td>
<td>52,224</td>
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<td>New Jersey</td>
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<td>West Virginia</td>
<td>525</td>
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<td>Maryland</td>
<td>256</td>
<td>6,987</td>
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<td>New York</td>
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<tr>
<td>Total</td>
<td>5,993</td>
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Consumer Behavior Study Overview

• Located in Cleveland Electric Illuminating Company in area that is east of the City of Cleveland
• Includes both rural and urban areas (some topographical challenges for communication network)
• Initial meter roll-out was 5,000 residential customers followed by a Phase II with approximate 29,000 additional residential and small commercial customers
Study Goals & Objectives

- Energy Savings
- Peak Demand Reductions
- Knowledge Gain For Future Cost Effective Implementation
- Help Customers Save Energy & Money
Study Overview Phase I

- Study population: Res
- Sample Frame: Subpopulation
- Enrollment Approach: Opt-in
- Experimental Design: RED
- Treatments - Pricing (#): PTR, Std Rate
- Treatments - Technology (#): PCT, IHD
- Treatments – Information (#): IHD, Web, Other
- Recruitment Method: Mail, Phone, Email
- Event Duration: 4 Hour, 6 Hour
Other Study Features

- Customers given the ability to opt out of the meter first
- Phase I study included a pre-treatment survey to identify if customers had central air, electric hot water heating, etc.
  - Customer were then made an offer for which they were qualified
  - PCT customers were also given the option of Direct Load Control by the Company or controlling the thermostat themselves in the events
- Critical peak days called during the months of June through August
  - Up to 15 days called per summer
  - Rebate of $.40/kwh given for curtailing load against their baseline usage
- Customers given day ahead notification of events through voicemail, e-mail, text messages
**Web Portal**

- Hourly usage data – can download to excel file
- Historical information back to June – August of previous year
- Estimates of peak time rebates as they occur
- Part of Home Energy Analyzer which includes tips for saving energy
Recruitment

✓ Conducted pre-marketing focus groups & survey to test what messages resonate with customers. Key learnings:
  - Customers want to control usage
  - They are intimidated by some of the in-home technology

✓ Marketing campaign conducted in phases to maximize hit ratio

Welcome Packet  First Follow-up  Second follow-up
Direct Mail Piece  Direct Mail Piece
E-mail Blast #1     E-mail Blast #12

Outbound Calling
Phase II

- Phase II added an additional 29,000 Residential and Small Customers
- Treatment groups included PTR only, Education only and PTR + choice of technology
- Joint Motion with Public Utilities Commission of Ohio filed in the case for the Companies to implement an experimental TOU/CPP tariff in addition to the Peak Time Rebate program.
  - Only non-shopping Phase II residential participants with advanced meters would be eligible (Approximately 3,000 customers available).
  - Customers on this experimental tariff would pay this rider in lieu of the Generation Service Rider (Rider GEN) and not eligible for the Peak Time Rebate (Rider PTR)
  - Marketing resulted in six customers participating
Questions / Discussion
Jennifer Potter

• Jennifer Potter is a Principal Market Analyst in the Pricing and Resource Planning department at Sacramento Municipal Utility District.

• Jennifer spent the last 3 years as the Project Manager for the Department of Energy ARRA grant funded Consumer Behavior Study, currently known as SmartPricing Options pricing pilot.

• While at SMUD, she has worked as the program planner for residential and small commercial efficiency and incentive programs.

• Prior to her time at SMUD, Jennifer worked at City of Roseville, Roseville Electric, as the principal load and revenue forecaster, load researcher, and business analyst for the utility.

• Jennifer holds a B.A. in International Studies and Economics from Southern Oregon University and a M.S. in Public Policy and Management from Carnegie Mellon University.
Utility Overview - Sacramento Municipal Utility District (SMUD)

- 1.4 million population
- 900 mi², 2331 km²
- Elected Board of Directors
- Not-for-Profit Utility
- 2nd largest municipal in California, 6th largest in the US
- 3299 MW peak load
- 2034 employees
- AMI meters fully deployed
# Study Overview

<table>
<thead>
<tr>
<th>Study population</th>
<th>Res</th>
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<tbody>
<tr>
<td>Sample Frame</td>
<td>Subpopulation of customers with AMI meters</td>
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<tr>
<td>Enrollment Approach</td>
<td>Opt-in, Opt-out</td>
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<tr>
<td>Experimental Design</td>
<td>RCT, RED</td>
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<tr>
<td>Treatments- Pricing (#)</td>
<td>TOU, CPP</td>
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<td>Treatments- Technology (#)</td>
<td>IHD</td>
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<tr>
<td>Treatments – Information (#)</td>
<td></td>
</tr>
<tr>
<td>Recruitment Method</td>
<td>Mail, Phone, Email, Other</td>
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</tbody>
</table>
SmartPricing Options Study Objectives

The pilot includes a two-year application of experimental rate options on a sample population of SMUD customers with the intent of determining:

1. Electricity impacts of each of the treatments
2. Customer characteristics associated with behavior changes
3. The roles of enabling technology in customers’ daily electricity management
4. Program impacts on customer satisfaction
5. Rate and enabling technology program value to utility
6. Expected market penetration for rate and enabling technology programs
7. Effective educational and marketing strategies for customers
Key features of SPO pilot & enrollment

Total enrollment including deferred groups = 12,027; Total # of customers receiving offers (including deferred groups) = 53,798; Total # of customers in SPO including controls = 99,661
Study Overview

• Summer season only (June-Sep)
• Three rate plans available
  – Time-of-Use / Weekday Value Plan
  – Critical Peak Pricing / Off-Peak Discount Plan
  – TOU-CPP / Optimum Off-Peak Plan
• Effective in 2012 and 2013
• In Home Displays- shipped approximately 5,000 pre-provisioned devices to pilot participants
• Web portal with hourly energy use
• Dedicated Microsites for each pricing plan
Questions / Discussion
Engaging the Smarter Consumer

Karen Lefkowicz – PEPCO
Gail Allen – KCP&L
Dennis Sumner – City of Fort Collins Utility

Moderators: Peter Cappers (LBNL) & Bernie Neenan (EPRI)
Speaker Bio

- Ms. Karen Lefkowitz is the Vice President of Business Transformation and the Chief Information Security Officer for Pepco Holdings, Inc. (PHI)
- She is responsible for leading PHI’s enterprise-wide initiatives to implement business processes and advanced technologies, including Smart Grid
- She also leads the Security Steering Committee at PHI
- Ms. Lefkowitz is an industry veteran with more than 30 years experience
- She currently sits on the Boards of the GridWise Alliance, Woolly Mammoth Theater, and Strathmore Foundation for the Arts
About Pepco Holdings, Inc.

- Approximately 2 million customers in Delaware, the District of Columbia, Maryland and New Jersey
  - Atlantic City Electric, Delmarva Power and Pepco provide regulated electricity service
    - Delmarva Power also provides natural gas service
- AMI is fully deployed among Pepco and Delmarva Power residential and commercial customers
- PHI has successfully rolled out a critical rebate program in Pepco Maryland and Delmarva Power Delaware, called the Peak Energy Savings Credit
Project Overview

Residential customers in Montgomery County and Prince George’s County, MD

490,000 customers

Enrollment Approach

Opt-out (Customers did not have to participate. No penalty.)

Treatments - Pricing (#)

Critical Peak Rebate (CPR)

Treatments - Technology (#)

AMI Network, Programmable Thermostat (DR Component)

Treatments - Information (#)

Web (Baseline) Phone Notifications

Recruitment Method

Mail, Phone, Email, Advertising
The Peak Energy Savings Credit Program

Introduces a new rate structure with a credit option designed to incent customers to reduce consumption during Peak Energy Periods

1. Peak Energy Savings Credit Enrollment

   - PHI defaults a customer to the Peak Energy Savings Credit (PESC) rate
   - Customer sets notification preferences or opts-out of the Dynamic Pricing rate (through My Account or a CSR)

2. Initiate Peak Energy Period / Notify Customers

   - PHI Power Procurement initiates a Peak Energy Period for the next business day
   - Customer receives notifications based on his preferences

3. Customer Views Peak Energy Period Results

   - Event results are visible to the customer on the Aclara modules, accessed through My Account

4. Customer Receives Dynamic Pricing Bill

   - A Dynamic Pricing customer will see interval information in the meter section, a Peak Energy Savings Credit table with event information and Peak Energy Savings Credit savings information
About the Peak Energy Savings Credit

- Pepco Maryland customers had already been educated about energy management tools on My Account and saving energy as part of AMI education
- First rolled out Peak Time Rebate (PTR) pilot in 2012 to 5,000 customers
- Summer of 2013 did a mass rollout to 533,000 residential customers
  - Introduced the Peak Energy Savings Credit (PESC) to all customers
- Summer of 2014 continued program with residential customers
  - focused on engagement as well as continuing education
  - used 2013 success stories and results to talk about

- **Key Lessons Learned:** How does everything work together? How do you leverage existing education investments, building a platform for long-term education throughout AMI and dynamic pricing?

  *Weather plays an important role if you are trying to roll out a PTR program.*
Building Upon Our AMI Customer Education

• Rolled out Smart Meters in 2011 with wide scale education effort that focused on customers “taking control” of their energy use using hourly energy data

• The Peak Energy Savings Credit leveraged this existing messaging

• Offering incentives to reduce energy use was a natural evolution and was well received by customers, who were focused on saving money

• New education focused on why customers should reduce energy use on high demand days and the benefits

Evolving your message is critical. Build a platform from which you can build upon.
Program Design

- The Peak Energy Savings Credit offers credits when customers reduce their energy use below their baseline on Peak Savings Days.
  - Customer baselines were calculated by taking the average of the three highest energy use days during the prior 30-day period, excluding the day prior to a Peak Savings Day, previous Peak Savings Days, weekends and holidays
  - Customers received $1.25 for every kWh reduced below the baseline
  - Customers saw their credit on My Account and on their next bill

We promoted our demand response program, Energy Wise Rewards™, with PESC to encourage further participation and automatic reductions.

- By helping customers understand how these programs worked together, we increased likelihood for participation and reduced potential confusion as both programs reward for energy reductions during Peak Demand Periods, called Peak Savings Days

*Combining education efforts around related programs can help reduce customer confusion.*
Our Education Approach

• We work collaboratively with a Commission appointed Maryland AMI Working Group which represents multiple stakeholders in the community

• Targeted research and ongoing tracking of customers as well as a segmentation study helped us understand our customers and their preferred channels
  — Conducted qualitative customer testing for the program name, process, and customer educational materials
  — Used different channels communications to reach all segments of the population (e.g., those without a computer and low income)
  — Focused on incentive-based messaging as well as some combined messaging with the demand response program

Base your messaging on good research.
"Look and Feel"

Postcard

Bill Insert

Print Advertising

The Smart Grid Experience: Applying Results, Reaching Beyond
Results

• Participants:
  – Over 350,000 customers participated in the 2013 season

• Bill Credits:
  – $3.4 million in bill credits were received in 2013
  – $4 million in bill credits were received in 2014

• kWh Saved:
  – 2.3 million kWh were saved in 2013
  – 2 million kWh were saved in 2014
What Our Customers Had to Say

"There are people like me that are on a limited budget and really need to save money."
- Stephanie J.

"I went online the next day to see what my Peak Energy Savings Credit was, and I was quite pleased."
- Richard K.

"During the months of summer when your bills tend to be the highest, there is nothing better than getting a discount off of those peak bills. Anytime that I can reduce those bills in the middle of summer is a huge benefit to me."
- Edward G.

"I will grill in the summer months as opposed to using the stove inside."
- Jacqueline H.
Questions / Discussion
Gail Allen, Kansas City Power & Light
Sr. Manager, Customer Intelligence

• She started in the IT department (15+ years applications and operations) and spent several years working on Six Sigma process improvement for Aquila. She directed a team that launched Aquila’s first energy efficiency programs in 2005. When she transitioned to KCP&L she led the Energy Consultants who were responsible for the utility’s key accounts.

• She shifted full-time to the Smart Grid project in 2010 where she managed a team who launched several smart grid tools for customers for the DOE Smart Grid Demonstration pilot in KCP&L’s urban core.

• Today she leads the Customer Insights team. They perform traditional customer market research (JD Powers), online customer panels and makes recommendations on target customer marketing campaigns. They are launching Oracle’s Business Intelligence customer data warehouse repository. Oh yes, in her spare time she serves on the core team that is implementing Oracle’s CC&B customer billing system.

• Gail has an MBA and is a Six Sigma Certified Master Black Belt. She has been in the utility industry for over 29 years (although she swears she doesn’t look it).
Utility Overview

Key Statistics

- Customers: 830,000
- Mtr. Generation: 6,100 MW
- 9 plant sites
- 26 generating units
- 10 peaking facilities

- Dist. Subs: 315
- Dist. Circuits: 1600
- AMI Meters: 150,000
Project Overview

**Study population**
- Res
- Small C&I received treatments
- Large C&I received meters

**Sample Frame**
- Pilot 10,000 urban core customers
- Green Impact Zone (subset)

**Enrollment Approach**
- Opt-in

**Experimental Design**
- Control group outside pilot

**Treatments - Pricing (#)**
- TOU
- Std Rate

**Treatments - Technology (#)**
- PCT
- HAN

**Treatments – Information (#)**
- IHD
- Web

**Recruitment Method**
- Mail
- Email
- Grassroots event enrollments

**Training**
- Dedicated CSR
- Local Ambassador office and in-home
The SmartGrid demonstration improvements will enhance service for the entire Midtown area through improved service reliability, reduced energy delivery costs, more efficient energy consumption, an improved carbon footprint and better information flow.
Project Co-located with the Green Impact Zone

Green Impact Zone

- 150-square block area (39th to 51st between Troost and Prospect).
- Comprehensive set of programs using grant funds and other resources for:
  - Economic development
  - Community policing & service centers
  - Training and employment
  - Energy and water conservation
  - Grant funds (over $100M) include
    - Transportation Investments Generating Economic Recovery (TIGER) grant
    - Energy Efficiency Conservation Block Grant (KC MO, MARC)
    - MDNR Innovative Weatherization Grant
    - KCP&L SmartGrid Pilot Project
    - Brownfields Grant — (Pending)
- Involves over 25 stakeholder groups including neighborhood groups, Congressman Cleaver, MARC, MEC, KCP&L, MGE, KCMO water & UMKC
Customer Focused Goals

- Provide **sustainable energy savings** for our customers as we increase customer satisfaction by:
  - Educating customers in the demonstration area about how smart grid investments will ultimately impact and benefit them
  - Engaging customers and influence behavior/participation in energy usage management
  - Informing the remainder of KCP&L’s customer base about how smart grid investments will ultimately impact and benefit them
- Understand new smart grid technologies and interoperability
- Improve **community relations** with our stakeholders
- Create jobs and focus on economic development
- Streamline processes
- Share information with the broader utility industry on the progress and outcome of the project
Project Timeline

2010
- Launch of Meter Exchange (Oct. 18)
- MySmart Display offer begins
- Access to customized energy management, MySmart Portal
- Neighborhood meetings
- SG Energy Fairs
- Open Project Living Proof

2011
- Commercial Solar installation at Paseo High School
- MySmart Portal upgrade for goal setting and social media
- Community partnerships continue

2012
- Begin offering MySmart Home
- Start installations of MySmart Thermostat
- Time of Use Rates are offered for summer months
- Continue Solar installs
- Electric Vehicle Charging Stations installed
- Battery substation site is developed
- Open SmartGrid Innovation Park

2013
- Paseo Academy’s Education Program continues
- Finish MySmart Home installations
- Finish MySmart Thermostat installs
- Begin customer survey process
- Conduct DOE mandated testing
- Verify energy savings for customers
## Product Offerings

<table>
<thead>
<tr>
<th>Product Offerings</th>
<th>MySmart Portal</th>
<th>MySmart Display</th>
<th>MySmart Thermostat</th>
<th>MySmart Home</th>
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<td><strong>Tendril’s Energize</strong></td>
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Community Engagement

Welcome to the KCP&L SmartGrid Innovation Park!

180 kWh solar at 8 locations (including local High School)

Project Living Proof
## Key Lessons Learned

### Key Decision | Lessons Learned
--- | ---
**Hire local labor** | • Ambassadors lacked product knowledge; customer training weak  
• Training curve for local labor; additional processes and handoffs

**Partnerships and Grassroots outreach** | • Multi-purpose events held jointly with partners are more successful than utility-only events; strong neighborhood associations will help

**Customer product adoption** | • Customer adoption did not always equal customer engagement  
• Testing if tools will fit wide range of customer preferences  
• Only 1 product per customers; restrictive for display users  
• Product participation requirements will limit thermostat enrollment

**Customer tools at the time of meter install** | • Technology constraints with meter network stabilization  
• 95% adoption (for customers who were home); 50% usage

**Dedicated smart grid support staff** | • Non-traditional support tasks include marketing and outreach  
• Segment from normal customer service operations

**Customer Segmentation** | • Unable to fully implement true enrollment segmentation model due to EM&V and a non-bias approach for non-proven SG tools  
• Will utilize segment model to evaluate customer enrollment and participation groups during evaluation phase and future marketing  
• Limited segmentation (on usage) will guide equipment purchase
Questions / Discussion
Speaker Bio

- City of Fort Collins Colorado
- BS/EE University of Colorado
- 42 years power industry experience
- Project Manager Fort Collins Smart Grid Projects:
  - Smart Grid Investment Grant
  - Renewable & Distributed System Integration Cooperative Study
Utility Overview

Disclaimer:
The City of Fort Collins does not endorse or recommend any commercial product, process, service, or manufacturer. Mention of any specific trade name, trademark, or manufacturer in the following materials are provided for informational purposes only and do not indicate favored status by the City of Fort Collins. Such statements shall not be used for advertising or endorsement purposes and do not represent the views, position, or practices of the City of Fort Collins.
Utility Overview

• City of Fort Collins Light & Power
• Northern Colorado – Front Range
• Population 151,000
• Municipal
• Retail only
• Urban
• 100% AMI penetration
• Policy context, But no CBS
Utility Overview – Policy Context & Community Values

FCL&P Energy Policy

- 1.5% energy savings
- Reduce system peak by 5% by 2015 / 10% by 2020
- Renewable resources to meet Colorado Renewable Energy Standard
- Provide Highly reliable electric service – 12 months ending June 2014
  - Average System Availability Index 99.9981%
  - Customer Average Interruption 39 minutes
  - System Average Interruption Frequency Index 0.260
Utility Overview – Policy Context & Community Values

- Climate Action Plan
  - 20% GHG reduction below 2005 levels by 2020, 80% by 2050

- Energy Efficiency

- FortZED: Zero Energy District / Demonstration

- Stormwater Management

- Water Conservation Plan

- Water Quality
# Project Overview

<table>
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<tr>
<th>Category</th>
<th>Description</th>
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<tr>
<td>Study population</td>
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<td>Sample Frame</td>
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<td>Enrollment Approach</td>
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<td>Experimental Design</td>
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<td>Treatments- Pricing (#)</td>
<td>Standard Rates: Residential Tiered, Commercial Energy and Demand</td>
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<tr>
<td>Treatments- Technology (#)</td>
<td>Demand Response: Wi Fi Thermostats</td>
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<td>Treatments – Information (#)</td>
<td>N/A</td>
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<tr>
<td>Recruitment Method</td>
<td>Promotions: Media ads, electronic, social media, word of mouth</td>
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<tr>
<td>Deployment</td>
<td>Phased: Friends and Family, Expanded Friends and Family</td>
</tr>
<tr>
<td>Other</td>
<td>?</td>
</tr>
</tbody>
</table>
Programs that Support Goals

1. Customer Web Portal
   • ‘Manage My Use’
2. Demand Response
   • Peak Partners/’Reduce Our Peak’

*Programs are designed to align with City & Utilities strategic direction.*
Web Portal

with Utilities’ FREE online tool...

YOU ARE IN CONTROL

▶ Monitor Your Use
▶ Control Your Costs
▶ Conserve Our Resources

Log in now at: fcgov.com/utilities
970-212-2900
http://Facebook.com/FCUtilities
@FCUtilities

City of Fort Collins Utilities
Web Portal: Fact Sheet

• Enrollment
  – Online tool made available to all residential and small commercial customers

• Marketing Approach
  – Limited followed by mass launch
  – Multi-channel campaign

• Results & Metrics
  – Google Analytics

• Monitor Results & Refocus Marketing Based on Analytics
Web Portal Analytics Drive Marketing

Sessions
4,093

Users
2,215

Pageviews
16,376
Demand Response
Demand Response: Fact Sheet

- Phase 1: Replaces existing AC load control program
  - Offered to ‘Friends & Family’ during test phase
  - Offered to legacy program customers
  - Offered to all customers
- Option to decline participation
  - Two conservation events per season
- Incentive
  - Free Wi-Fi programmable thermostat installed at no charge to customers
Customer Research Helps Tailor Program

Comfort Level During Conservation Events

- Comfortable 30.1%
- Neutral 28.9%
- Uncomfortable 16.9%
- Very uncomfortable 7.2%
- Don't know 6%
Customer Research Helps Tailor Program

Overall Satisfaction

- Very satisfied: 48.8%
- Satisfied: 35.4%
- Neutral: 7.3%
- Dissatisfied: 8.5%

Recommend to a Friend

- Very likely: 46.3%
- Likely: 32.9%
- Neutral: 15.9%
- Unlikely: 4.9%
Marketing Communications

- Login Dashboard
  - Icons visible to all
  - Drive e-Bill customers to explore WP & DR
- Cross Marketing
  - Energy Reports
  - Water Reports
- All Channels
  - Electronic Media
  - Social Media
  - Traditional Media
- Segmented Approach
Questions / Discussion