

Effective Research Methodology for Smart Grid Enabled Consumer Behavior Impact Assessment

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Agenda

- About AEP Texas
- In-Home Displays & AEP Texas's SMART View Program
- Research Best Practices
- SMART View Research Methodology

About AEP Texas

- Delivers electricity to nearly 1 million customers in South and West Texas areas
- Constructs and maintains power lines, restores service after storms and other outages, reads meters for REPs, connects and disconnects based on REP orders
- Headquartered in Corpus Christi
- 37,868 miles of distribution lines
- 8,889 miles of transmission lines
- Serves 92 counties
- AEP Texas North Company (TNC)
 - 153 cities
 - 53,000 square mile area
- AEP Texas Central Company (TCC)
 - 219 cities
 - 44,000 square mile area



AEP Texas Energy Efficiency

- Current residential programs include:
 - Residential Standard Offer Program
 - Hard-to-Reach Standard Offer Program
 - Targeted Low-Income Weatherization Program
 - ENERGY STAR New Homes Market Transformation Program
 - SMART Source Solar PV Program
 - Cool Saver AC Tune-Up Market Transformation Program

AEP Texas AMI

- Part of a broad AEP Texas gridSMART initiative that will bring even more opportunities to improve the efficiency with which we distribute and use electricity
- AMI is comprised of Smart Meters, a two-way communications network and information technology to support their interaction
- 1 million Smart Meters to be installed from Fall 2009 through 2013
- Key features:
 - Automated meter reading
 - Remote service connection and disconnection
 - Real-time access to customer usage
 - Ability to pinpoint outage locations



In-Home Displays

- In-home displays (i.e., home energy monitors) provide customers with real-time information about their energy consumption
- Customers can use this feedback to better understand and ultimately reduce their energy consumption
- An ACEEE meta-analysis of 23 studies evaluating the impact of real-time feedback found median savings of 6.9%*



* Ehrhardt-Martinez, Karen; Donnelly, Kat; and John A. "Skip" Laitner. 2010. "Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities." Washington, DC: ACEEE.

SMART View Program

- AEP Texas's SMART View Program is a research project that aims to:
 - Test 2-3 in-home displays for customer acceptance and ease of use
 - Enable test participants to receive energy usage data and use that data to make informed decisions about their energy usage
 - Develop a plan to measure and verify energy and demand savings related to the use of in-home displays

Research Best Practices

- Always begin with a soft launch
- Define your sampling frame before designing sampling methodology and screening criteria to maximize external validity
- Over-recruit to account for dropouts
- Include a control group to maximize internal validity
- Design treatment groups to isolate impacts of research variables
- Combine various data sources to improve understanding of impacts

Pre-Launch Activities

- Geavista Group is collecting best practices and lessons learned from utilities that have completed similar projects
- Before launching the research project, AEP Texas is conducting an internal pilot of in-home displays to:
 - Identify potential technical issues
 - Assess expected level of customer support required



Sampling Plan

- Geavista Group will use a sweepstakes incentive to recruit participants to an online survey through the following mediums:
 - Postcards to customers with advanced meters
 - AEP Texas's Web site, Facebook page, and Twitter feed
- Postcards will be “soft launched” to assess response rate and qualifying rate before full launch
- Qualifying survey participants will be given an opportunity to opt-in to the R&D Program
 - To encourage honest responses, the opportunity to pilot new technology will not be mentioned until eligibility has been confirmed

Screening Criteria

- To qualify for participation, respondents must:
 - Own a home in AEP Texas's service area
 - No plans to relocate in next two years
 - Have an advanced meter installed at their home
 - Validated by AEP Texas using ESI ID
 - Be likely users of in-home displays, as evidenced by:
 - Interest in reducing energy usage
 - Reported likelihood to purchase in-home display
 - Reported likelihood to participate in in-home display incentive program
 - Agree to the following terms:
 - Allow AEP Texas to monitor and report on energy usage (in aggregate)
 - Homeowner will install in-home display and connect to energy meter
 - Commit to responding to a second survey

Pre-Survey

- Pre-survey of participants will also collect:
 - Participant and home characteristics
 - # of people in home
 - Age of home
 - Size of home
 - Fuel type for heating, water heating, etc.
 - Awareness/understanding of energy efficiency
 - Awareness of current energy usage (in dollars and kWh)
 - Awareness of energy efficiency technology and home energy efficiency improvements
 - Understanding of behaviors to reduce energy usage
 - Awareness of AEP Texas's EE Program
 - Past participation in AEP Texas's EE Programs
 - Likelihood to participate in AEP Texas's EE Programs



Treatment Groups

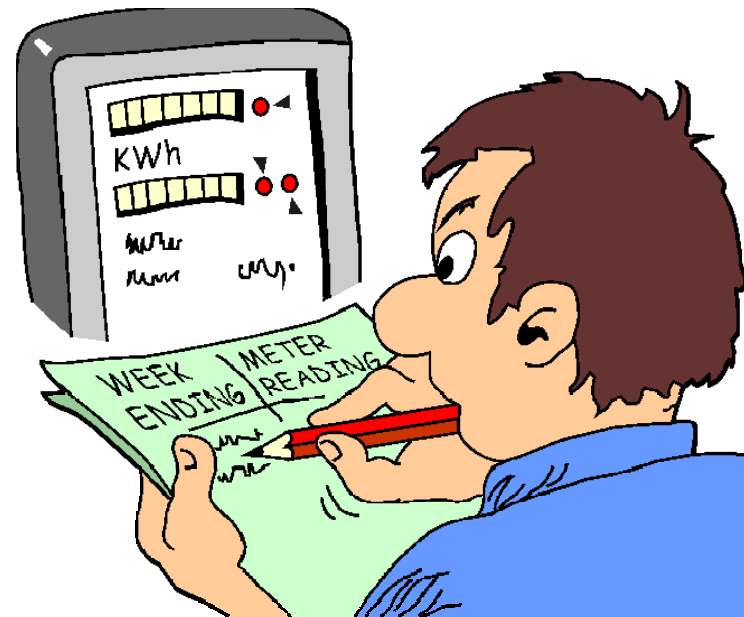
- Treatment groups will be defined based on display type and educational outreach

	Supplemental Communication	No Supplemental Communication	Total
Display A	120	120	240
Display B	120	120	240
Display C	120	120	240
No Display	120	120	240
Total	480	480	960

- Counts are based on initial recruitment with the expectation that some will drop out before the conclusion of the study
- Participants without a display will be monitored as a control group to help identify changes attributable to the in-home displays

Data Collection

- Geavista Group will collect energy usage data for a period of 18 months after distribution on the displays
 - Will allow Geavista Group to evaluate the persistence of any impacts observed
 - Includes two summers
- 15-minute interval data will be captured to provide maximum opportunities for analysis
- Geavista will also collect EE program participation data for research participants



Post-Survey

- After the completion of the R&D period, Geavista Group will conduct a survey to assess:
 - Participant perception of in-home display's impact
 - Behavior changes
 - Equipment upgrades and home efficiency improvements
 - Changes to home or residents that may have impacted energy consumption
 - Participant satisfaction with device
 - Changes in awareness/understanding levels evaluated during initial survey

Data Analysis

- A thorough research plan provides many opportunities for data analysis, including:
 - Comparisons between:
 - Control group and treatment groups
 - Communication group and no-communication group
 - Device types
 - Various participant/home characteristics collected during pre-survey
 - Initial impacts
 - Persistence of impacts
 - Perceived impacts



Conclusion

- ✓ Always begin with a soft launch
- ✓ Define your sampling frame before designing sampling methodology and screening criteria to maximize external validity
- ✓ Over-recruit to account for dropouts
- ✓ Include a control group to maximize internal validity
- ✓ Design treatment groups to isolate impacts of research variables
- ✓ Combine various data sources to improve understanding of impacts

Questions?



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