Bonneville Power Administration

Residential Behavior Based Energy Efficiency Program Profiles 2011

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Introduction

Behavior based energy efficiency (BBEE) programs focus on energy savings resulting from changes in individual or organizational behavior and decision-making. BBEE programs have been growing in prominence around the country as a means of achieving energy savings beyond what is obtained through traditional efforts focused on encouraging the adoption of energy efficient technology. There is a substantial body of knowledge and experience associated with behavior change that is rooted in the social sciences, with transfer now taking place to utilities and others with an energy efficiency focus. Some experts claim the potential energy savings may rival or even exceed the savings available from new technology.

BPA's goal is to enable, validate and increase the amount and persistence of energy savings achieved through BBEE programs in the Northwest. To accomplish this goal BPA is focused on three near-term objectives:

1. Monitor and assess national and regional behavior based energy efficiency (BBEE) programs and activities, identify and promote use of best practices;
2. Create policies that help build program infrastructure that all Northwest public utilities can use to operate BBEE programs and achieve related energy savings; and
3. Collaborate with three to five Northwest public utilities and market partners to implement and evaluate innovative BBEE pilot programs.

This report addresses objective #1, summarizing the results of recent research assessing national and regional residential BBEE programs and activities. The report builds on a market scan conducted in 2010, updating BBEE program information and results, and identifying promising new program activity. A basic foundation for behavior change is providing energy consumers with feedback on their energy consumption, with customer engagement strategies and tactics employed to get customers to take action and drive greater levels of energy savings. The residential BBEE programs profiled here do not represent a comprehensive inventory of programs across the continent. Instead, the approach taken was to identify select programs that collectively represent a range of BBEE customer engagement strategies and tactics, and programs that have a good base of experience to learn from.

Undoubtedly, there are programs we have overlooked that fit this definition. In fact, a key finding from conducting this research is how quickly market activity is advancing, along with the evolution of products and services available to support market activity. Much has changed in the market in just the last year. The information, program design features and motivational tactics that work best in getting energy consumers to be more efficient in their use of energy are being investigated, tested, and applied. What works best for different types of customers is being explored. New evaluation methods are being used to document energy savings and examine the persistence of energy savings over time. It is an exciting time, with the promise associated with BBEE programs too significant to ignore.

Summary of Key Features and Results from Profiled Programs

In the residential sector, customer feedback on energy use can be provided via paper reports, in-home displays, or on-line; and can be independent of, or leverage, utility advanced metering infrastructure (AMI) investments. Utilities, both nationally and regionally, have been operating customer feedback programs, including use of normative or comparative information, for several years now, with documented energy savings of 2-3% common across program participants. Using customer feedback as a foundation, a number of customer engagement strategies and tactics to encourage behavior change are being employed. Some examples include:

- *Marketing and Communications* – Use of traditional marketing channels and newer social media options (ie., Facebook, Twitter, You Tube, etc.) and devices (computers, mobile phone apps, etc.) to communicate messages and encourage dialogue that stimulates customers to be more efficient.
- *Tips and Assistance* – Customers may not know what behavior changes make the most sense and are likely to have the biggest impact on their energy consumption. Educating customers on the most effective actions to take, and assisting them in taking those actions, can help them move forward.
- *Goal Setting* – Once a customer or community commits to an energy reduction goal they may be more likely to change some of their energy use related behaviors.
- *Rewards and Recognition* – Monetary rewards or prizes can be motivating in stimulating behavior change, as can recognizing customers (or communities) that have been successful. Rewards can be fixed or random, with random rewards adding an entertainment component that customers may find appealing.

The graphic on the next page (Figure 1) is a visual representation of these residential sector customer feedback and customer engagement options. As mentioned in the introduction to this report, the programs researched and profiled here use some or all of these options, yet do not represent a comprehensive inventory of residential BBEE programs across the continent. The approach taken was to identify select programs that collectively represent a range of BBEE customer engagement strategies and tactics, and that have a good base of experience to learn from. Emphasis is placed on programs that seek to validate and document energy savings, as well as examine the persistence of energy savings. For utilities looking to count on BBEE as a conservation resource, this is of critical importance. Program results indicate that significant progress is being made along these lines.

Energy savings of 2-3% from customer feedback is now well documented, and programs that employ additional customer engagement strategies and tactics are claiming much higher per participant energy savings, often two to three times as much (Figure 2). A key finding from the research is that each type of customer engagement activity has the potential to yield significant benefits (i.e., energy savings), and programs that employ multiple strategies and tactics are achieving greater per participant savings. Leading edge programs are moving beyond simply providing customers with energy use feedback by deploying an array of innovative customer engagement strategies; including use of social marketing techniques, individual and community goal setting, energy saving tips and assistance, and events, contests, rewards and recognition. Practitioners report that achieving higher savings levels requires looking outside the energy industry to others that have experience using social science research to impact human behavior. Leading edge programs are transferring this knowledge and experimenting with what works to influence energy use related behaviors.

Residential Customer Engagement and Energy Efficiency

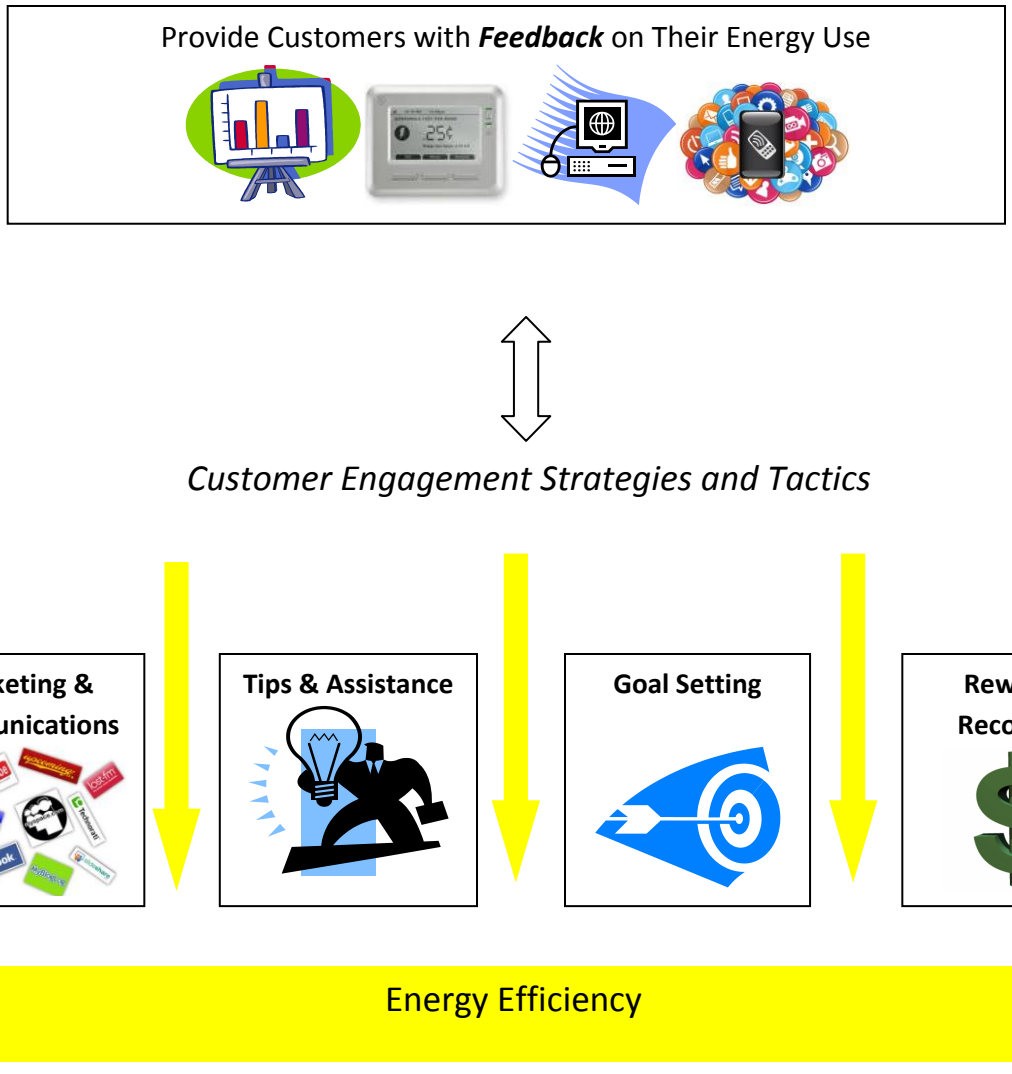

Figure 1.

The residential BBEE programs summary on pages 8-9 tells this story, as does the comments and advice from program managers and their market partners. The program manager for WMECO's Mass Saves Program stresses the importance of "on the ground" community involvement, and says that those communities joining the community challenge are reaching their 3% savings goal. WMECO uses "surround sound" marketing, with emphasis on the rewards component of the program to achieve greater customer engagement. B.C. Hydro's program manager says that regular communications and interaction is critical. Their research indicates a strong correlation between engagement and savings. They are focused on growing the amount of participants at the enjoyment (challenge) level of the program, where members are more engaged and the bulk of the energy savings occur. One important principle B.C. Hydro has learned is to meet customers where they are. In other words, customers are not necessarily interested in energy savings. Understand customer interests and motivations, and engage them accordingly.

Sacramento Municipal Utility District (SMUD) has found that normative messaging is more effective with some customers than others. SMUD segments its customer base, and is tailoring its messaging for various segments. SMUD also reports that its voluntary "pledge to save" goal participants have achieved approximately three times as much energy savings as the average savings from all program participants. Snohomish PUD's Energy Challenge program is structured around getting customers to commit to a 10% energy reduction goal, with 10% of those pledging having already met their goal. Cape Light Compact's (CLC's) program manager says providing basic feedback to customers is one thing, achieving significant reductions in usage is another. People informing each other about energy saving actions to take can be important. CLC has found that awareness of energy use by program participants increases. Some program participants have self-diagnosed increases in energy usage, uncovering causes such as the heat being left on, refrigerator cycling issues, or other problems.

There is a breadth and depth factor to consider in providing energy use feedback and engaging customers. Designed as a customer "opt-out" program, paper reports provide customers with feedback on their energy use (including normative comparisons) and have a high customer acceptance rate, with very few customers opting out. As a result, even though energy savings per participant are modest (2-3%), overall program energy savings can be quite large. In contrast, customers in programs that emphasize on-line participation and engagement must "opt-in". These programs achieve significantly greater per participant energy savings (2 to 3 times as much), but have lower participation rates, which impacts overall program energy savings. There is some convergence taking place, resulting in both options being applied within programs, with an aim towards driving more customers to "on-line" participation. For example, the CUB Energy Saver program provides customers with both print and email reports, and access to a program website. The print reports are sent to the entire target population, and customers "opt-in" to the email reports and program website. Ongoing communications, rewards, community contests and customer engagement are all geared towards getting more people to actively participate on-line.

It is important to recognize the role market partners are playing in creating, operating and evolving these programs. There are a few utilities profiled here that are developing and operating their own residential BBEE programs (B.C. Hydro and Snohomish PUD), but they appear to be the exceptions. Companies such as OPower, Efficiency 2.0, Tendril and Enerlyte are providing the products and services behind the other programs profiled here; partnering with utilities and others to brand and provide BBEE programs in the marketplace. And these companies are not the only ones providing these types of products and services. Others include metering companies, power monitoring companies, and technology (home automation) companies. However, these other companies are not focused on delivering comprehensive BBEE marketplace solutions utilities and others can tap into (at least not yet). Their products and services are being picked up and included within comprehensive solutions delivered by others. For example, Efficiency 2.0 used Greenlet's plug-in appliance (DR) product in its recent DR pilot within the CUB Energy Saver program.

Another factor to consider is economies of scale. Virtually all the program managers and their market partners contacted said much of the cost of operating these types of programs is in addressing initial program set up requirements. This can include aligning with the utility billing system/data, characterizing target markets, establishing baseline energy consumption, creating normative groups for comparison purposes, marketing messages and customer outreach strategies, customizing the website and basic tips, and establishing a control group and the M&V methodology. The point is these items are largely fixed costs, and must be addressed whether the target population is 10,000 or 200,000 customers. Variable costs are mainly related to customer marketing and outreach. As a result, there can be significant variations in per participant costs, with lower costs for large target populations. Based on economies of scale, per participant costs can vary by up to 50%. So this is a very different cost structure than utility rebate or incentive programs, where most costs are inherently associated with a per measure or project financial incentive.

A last point to be made is how quickly these types of programs seem to be advancing. More is being learned all the time. This means the information contained in these profiles will become outdated soon, as more programs are initiated and existing programs continue to evolve and change. All of the practitioners contacted indicated their companies are convinced that these programs provide value and there is much more to be learned.

Residential Behavior Based Energy Efficiency – Programs Summary Matrix

Program Name	Yrs Operating	Market Partner(s)	Usage Feedback Mechanism(s)	Customer Engagement	# of Participants	Claimed Energy Savings	Evaluation Methods
PSE Home Energy Reports	3 yrs (since 2008)	OPower	Paper Reports (mailed monthly or quarterly)	Usage comparisons (norms), action steps (tips), website	Opt-out, 40,000 (2010)	2.0% avg. elect. per part.	Billing analyses, control group
SCL Home Energy Reports	2 yrs (since 2009)	OPower	Paper Reports (mailed every 2 months)	Usage comparisons (norms), web-based option now available	Opt-out, 50,000 (2011)	Expect 2-3% per part.	Billing (kWh) analysis, control group
Snohomish PUD Energy Challenge	2+ yrs (since 2009)	None	Paper Reports (mailed every 6 months)	10% challenge (pledge) Usage comparisons (norms), tips, rewards	Opt-in, 3,500 (June 2011)	Avg. 1.5% per part. (2010)	Billing (kWh) analysis, control group
ETO Home Energy Reports	1 year (2011)	OPower	Paper Reports (mailed every 2 months)	Usage comparisons (norms), action steps (tips), website	Opt-out, 60,000 (2011)	2.0% avg. savings per part.	Billing analysis, control group, surveys
B.C. Hydro Team Power Smart	3 yrs (since 2008)	Various	Tool box (on-line) includes usage feedback	Tool box , Goal setting, Events, Contests, Rewards	Opt-in, 75-80,000 active	10% goal met by 20% , 4-5% others (2010)	Billing (kWh) analysis, surveys
Illinois CUB Energy Saver	1+ yrs (since 2010)	Efficiency 2.0 Recycleban k	Email & print reports, website	Website info/tools Social networks, Goals Contests, Rewards	Opt-in (on-line); 11,682 (yr. 1)	5.5-6% per on-line part.	Billing (kWh) analysis, control group
WMECO Mass Saves	1+yrs (since 2010)	Efficiency 2.0 Recycleban k	Email & print reports, website	Website info/tools Community contests Goals, Rewards	Opt-in (on-line); 7,200 currently	3-6% per on-line part.	Billing (kWh) analysis, control group
SMUD Home Electricity Reports	3 yrs (since 2008)	OPower	Monthly Paper Reports (some quarterly)	Usage comparisons Web tools (2010)	Opt-out, 38,500 (2011)	2.89% per part. (mo. reports)	Billing (kWh) analyses, control group
Payson City Power EE Reports	1 yr. (since 2010)	Enerlyte	Utility bills, website, phone app.	Usage comparisons Website info/tools Goals, contests	Approx. 5,000	2.4% per part. (receiving bills)	Billing (kWh) analysis, control group
CLC Energy Monitoring Pilot	2 yrs (since 2009)	Tendril	Web-based dashboard, In-home displays	Usage comparisons Social networking 10% goal, EE tips	Opt-in, 350 part.	9.3% per part.	Billing (kWh) analysis, control groups

Figure 2.

Residential Behavior Based Energy Efficiency Program Profiles

The information and data contained in the following program profiles was gathered from a variety of source information; including conference presentations and proceedings, information available on the internet, evaluation findings and reports, and through interviews with program managers and market partners. We would like to thank those that have given us some of their time and shared their insights. They are the BBEE pioneers, their commitment is admirable and the progress they are making is inspiring. The programs profiled include the following:

Regional Profiles

Puget Sound Energy Home Energy Reports (with OPower)

Overview

Puget Sound Energy (PSE) was the first utility company in the Northwest and one of the first utilities in the nation to partner with OPower to provide home energy reports to single family residential customers. The program has been in operation since November 2008. The home energy reports are mailed separately from energy bills and includes feedback on usage (current and historical), social norms (comparisons to neighbors, efficient use), and energy savings tips.

Goals

PSE is examining new and innovative ways to achieve energy savings. PSE sees the home energy reports as a means to save energy through behavior modification and also through increased participation in other PSE programs.

Main Design Features

In the initial pilot approximately 84,000 single family homes were randomly selected, with about 40,000 assigned to the treatment (participant) group and the rest to the control group. All the homes are dual fuel, single family structures with at least one year of billing data. Of those assigned to the treatment group, 75% received the home energy reports monthly and 25% received the reports quarterly. The home energy reports provide feedback on the household's energy use and compare the receiving household's energy usage with that of

neighboring homes. The idea is that peer pressure is used to motivate and achieve energy savings, with tips on using energy wisely provided (no cost, low cost equipment change, medium cost appliance upgrade). Participants can also set energy savings goals. Through OPower, PSE now also offers participants a website (https://pse.opower.com/) that provides other useful tips, tools, and information on conserving energy.

Program Delivery

OPower creates and mails the reports. Areas of utility involvement include utility data transfer, experimental design parameters and selection of participants/control group, customizing report, messaging and tips. Utility involvement in the initial launch includes preparing customers for what they are going to see on the home energy reports by providing Q&As, opt-out provisions, etc. The vast majority of customers are satisfied with the reports, but a vocal minority isn't satisfied (1-1.5% of targeted customers have opted out). After 2+ years with the initial pilot group, PSE has been making changes, with an additional 115,000 customers receiving bi-monthly home energy reports (6 reports per yr.) and discontinuing the reports for one third of the initial treatment group to evaluate the persistence of the energy savings.

Program Costs/Energy Savings

No program cost information was provided. First year average annual electricity savings were 1.7% per participant (190 kWh) and at the 20th month mark average annual electricity savings were 2.0% per participant (222 kWh). The 2010 evaluation report shows the program has increasing monthly and annual energy savings over time. Data indicate that at the 20th month mark savings continued to increase for the program year over year, with savings relatively constant throughout the year. Quarterly reports showed consistent savings whereas monthly reports showed increasing savings over time, indicating report frequency has some impact.

Evaluation Approach

PSE uses a randomized experimental design that assigns the target population to either a treatment group or a control group (for comparison purposes), with the treatment group receiving the reports. Two main evaluation approaches are used: a difference-of-differences billing data analysis to measure monthly and annual energy savings; and a time series, cross-sectional analysis to measure annual impacts. An evaluation was conducted after the first 20 months of the program (Nov. 2008-June 2010) to estimate energy savings. The evaluation results are based on the differences in energy consumption both pre—and post- reports and between treatment and control groups. It is expected that this approach removes the possibility of biased results. The large size of the treatment and control groups also assures highly precise estimates of the energy savings attributable to the home energy reports.

Lessons Learned

- The initial launch was a little rocky; it is important to prepare customers and be ready to respond to questions and concerns
- Six powerful words for learning the most from your behavior based pilots; experimental design, experimental design, experimental design
- Expected savings, and what you want to measure, have *everything* to do with how you design and implement your program, use expected savings as guidance on how many customers to target
- Small saving are extremely difficult to measure in a billing analysis, the smaller your expected savings, the larger your program needs to be for accurate measurement.

Future Plans

PSE feels they are just scratching the surface on behavior based energy savings. PSE will be examining results from recent design changes, including energy savings trends and the persistence of savings.

Contacts

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Figure 3.

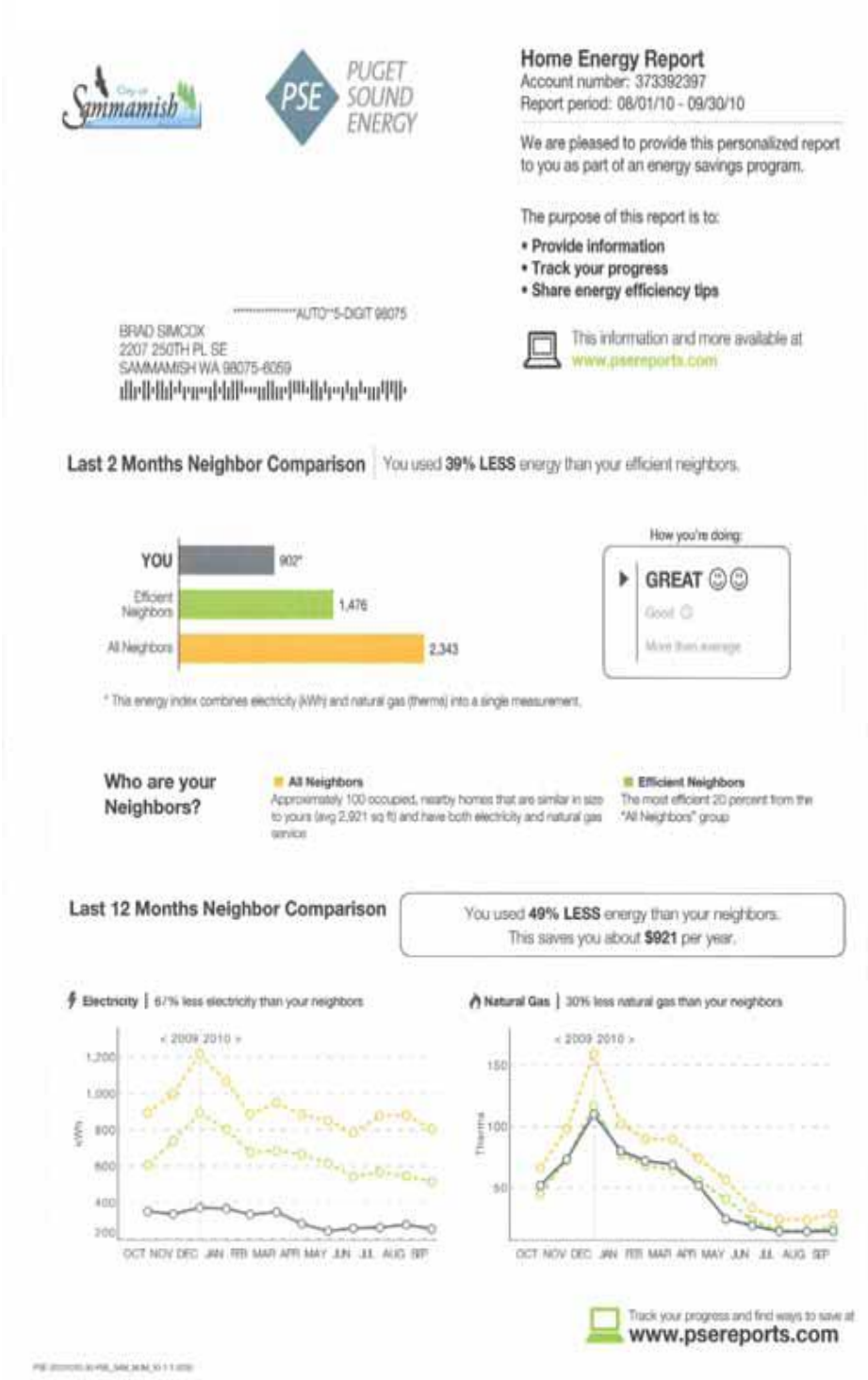
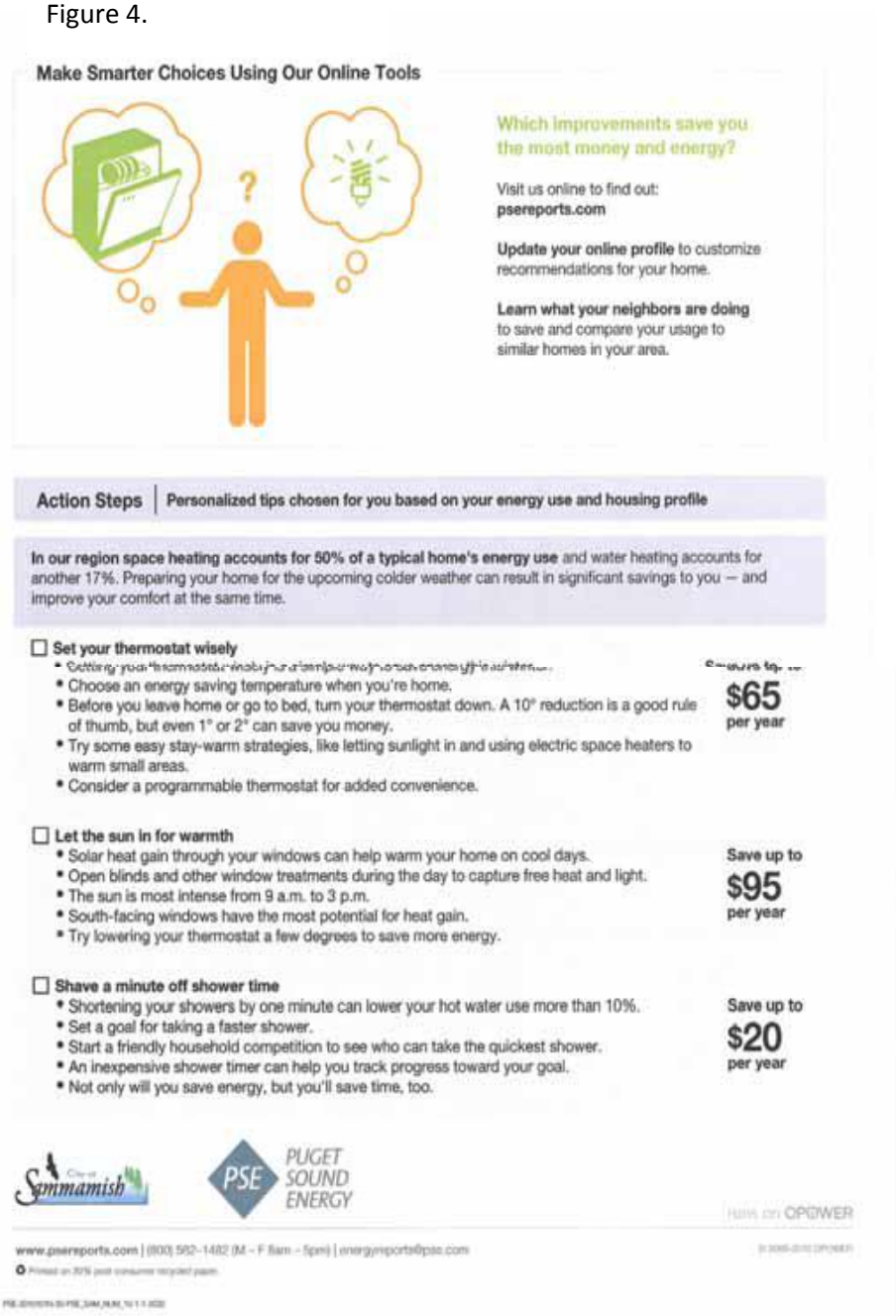

Sammamish
PSE
PUGET SOUND ENERGY
Home Energy Report
Account number: 373392397
Report period: 08/01/10 - 09/30/10
We are pleased to provide this personalized report to you as part of an energy savings program.
The purpose of this report is to:
• Provide information
• Track your progress
• Share energy efficiency tips
This information and more available at www.psereports.com
AUTO**5-DIGIT 98075
BRAD SIMCOX
2207 250TH PL SE
SAMMAMISH WA 98075-6059
Last 2 Months Neighbor Comparison
You used 39% LESS energy than your efficient neighbors.
YOU
902*
Efficient Neighbors
1,476
All Neighbors
2,343
How you're doing:
GREAT
Good
* This energy index combines electricity (kWh) and natural gas (therms) into a single measurement.
Who are your Neighbors?
All Neighbors
Approximately 100 occupied, nearby homes that are similar in size to yours (avg 2,921 sq ft) and have both electricity and natural gas service
Efficient Neighbors
The most efficient 20 percent from the "All Neighbors" group
Last 12 Months Neighbor Comparison
You used 49% LESS energy than your neighbors.
This saves you about $921 per year.
Electricity | 61% less electricity than your neighbors
Natural Gas | 30% less natural gas than your neighbors
< 2009 2010 >
kWh
Therms
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
Track your progress and find ways to save at
www.psereports.com

Figure 4.


Make Smarter Choices Using Our Online Tools
Which improvements save you the most money and energy?
Visit us online to find out:
psereports.com
Update your online profile to customize recommendations for your home.
Learn what your neighbors are doing to save and compare your usage to similar homes in your area.
Action Steps | Personalized tips chosen for you based on your energy use and housing profile
In our region space heating accounts for 50% of a typical home's energy use and water heating accounts for another 17%. Preparing your home for the upcoming colder weather can result in significant savings to you — and improve your comfort at the same time.
Set your thermostat wisely
Choose an energy saving temperature when you're home.
Before you leave home or go to bed, turn your thermostat down. A 10° reduction is a good rule of thumb, but even 1° or 2° can save you money.
Try some easy stay-warm strategies, like letting sunlight in and using electric space heaters to warm small areas.
Consider a programmable thermostat for added convenience.
$65
per year
Let the sun in for warmth
Solar heat gain through your windows can help warm your home on cool days.
Open blinds and other window treatments during the day to capture free heat and light.
The sun is most intense from 9 a.m. to 3 p.m.
South-facing windows have the most potential for heat gain.
Try lowering your thermostat a few degrees to save more energy.
Save up to
$95
per year
Shave a minute off shower time
Shortening your showers by one minute can lower your hot water use more than 10%.
Set a goal for taking a faster shower.
Start a friendly household competition to see who can take the quickest shower.
An inexpensive shower timer can help you track progress toward your goal.
Not only will you save energy, but you'll save time, too.
Save up to
$20
per year
Issaquah
PSE
PUGET SOUND ENERGY
Home Energy OPOWER
www.psereports.com | (800) 582-1482 (M – F 8am – 5pm) | energyreports@pse.com

Seattle City Light Home Energy Reports (with OPower)

Overview

Seattle City Light (SCL) is partnering with OPower to provide home energy reports to some of its single family residential customers. The reports use behavioral science to encourage energy efficiency. OPower research indicates that people are motivated by what their neighbors are doing, and the reports emphasize normative comparisons with similar neighbors. SCL began offering the reports to 20,000 customers via OPower in October 2009, and recently expanded the offering to an additional 30,000 customers.

Goals

Seattle City Light sees behavior based programs as a promising new approach to get significant energy savings. SCL's goals are as follows:

- kWh savings
- Making energy relevant and interesting to consumers
- A complement to measures – and minimizing the take back effect
- Engaging customers in a dialogue

Main Design Features

The home energy reports are currently mailed to 50,000 single family residential customers every two months, independently of their electricity bills. The reports provide customers with feedback on their current and historical energy use, normative comparisons with similar neighbors, and conservation messages and tips tailored to target specific household profiles (see attached example). A web-based option is now available to customers to access data and receive information on-line.

Program Delivery

OPower creates and mails the reports. Three areas of utility involvement include (1) development of data transfer protocols and automated weekly data uploads, (2) choosing participants for the program (random for evaluation purposes), and (3) customizing the report and messaging to fit the customer base (including ongoing updating of tips). SCL currently has one program manager and a call center person working on the program. Neither works on the program full-time. Interactions with customers take the most time, which is good because it shows customers care. The reports are now one of the top three reasons why people call the utility (100 calls/mo.). The majority of calls are positive ("What does this mean?", "What can I do?"), and those that initially complain can be turned around if handled properly.

Program Costs/Energy Savings

SCL calculates it is currently paying $9 per participant for 300 kWh savings per year (assuming a 1 year measure life). The savings trend per customer is up over time, indicating persistence of energy savings isn't an issue (to-date). OPower says to expect 2-3% savings per participant on average, however, SCL recently got closer to 4%. 2010 program savings totaled 5.4 GWhs and 2011 looks likely to be more than that. SCL calculated that the program achieved one million kWh savings in the month of March 2011 alone, with per household savings of 55 kWh. Savings follow seasonal usage, with customers saving more when they use the most. Less than 1% of SCL customers opt-out of the program.

Evaluation Approach

The program is set up with evaluation in mind. Once the target customer population is determined (in SCL's case, the lowest 25% of users were excluded), a randomized control group and participants are selected. SCL's control group includes 20,000 customers, while the participant group is now at 50,000 customers. The pretreatment differences between the participant and control groups are designed to be indiscernible and statistically insignificant. This allows for a comparison between the two to determine the program energy savings impacts, which are calculated on a monthly basis. A third party evaluation is underway to confirm the energy savings.

Lessons Learned

- Normative messaging seems to be effective in driving energy savings, and the savings appear to be significant and cost-effective.
- Using behavioral science for energy efficiency is an evolving and improving field.
- Make sure your utility is ready – procurement, legal, communications, executive
- A strong advocate is needed to make sure everyone is aware and supportive
- An enthusiastic conservation-focused call center is very important
- Some customers will be initially unhappy, but can often be talked through it.

Future Plans

The program is part of Seattle City Light's current 5 year conservation plan. SCL intends to expand its web engagement possibilities through the program and try new approaches to further customer engagement, including program promotions and messaging (via post-its, etc.).

Contact

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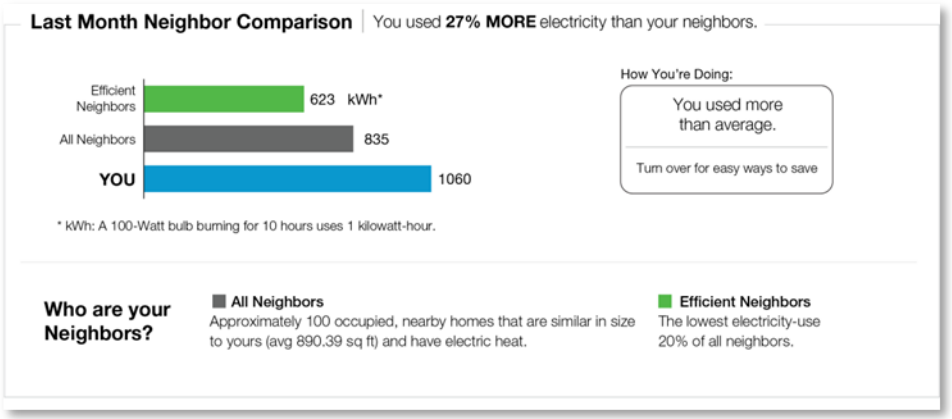
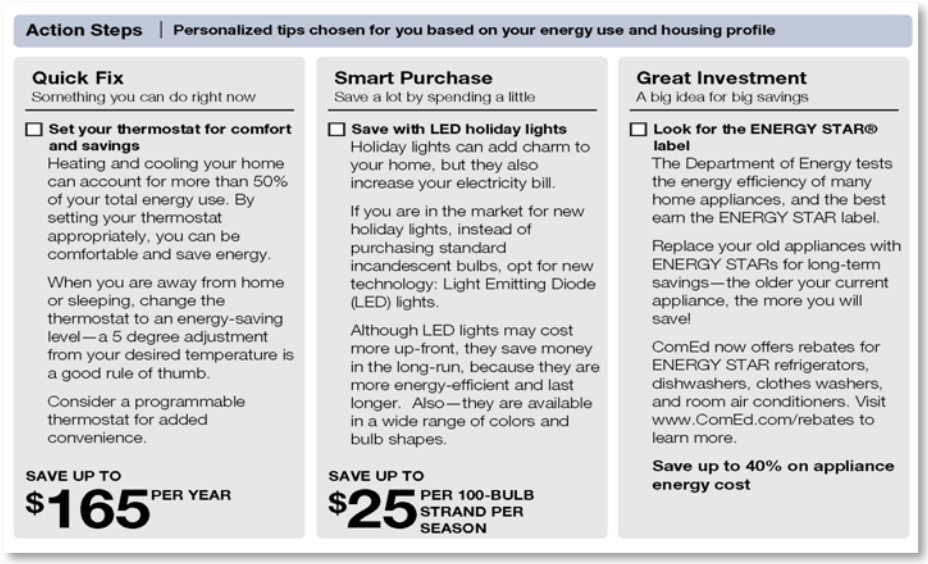
206-615-1683 lars.henrikson@seattle.gov

Figure 5. Seattle City Light Home Energy Report





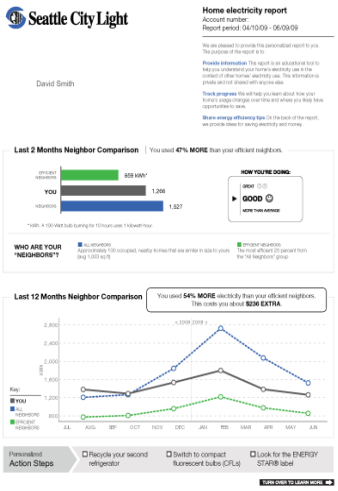


Figure 6. Seattle City Light

Figure 7. Seattle City Light

Snohomish Public Utility District Energy Challenge

Overview

Snohomish Public Utility District (PUD) launched its Energy Challenge program in late 2008 – early 2009. The Energy Challenge is a call to action, a community wide invitation to voluntarily reduce use by ten percent. The Energy Challenge includes customer feedback on energy use,, social norms, energy savings tips, and rewards.

Goals

Snohomish PUD has had success with residential EE programs and campaigns in the past, and sees behavior change as a new energy efficiency opportunity. Snohomish PUD wants its program to be inclusive of all customers, approachable, adaptable and scalable, and easily implementable. Snohomish PUD is looking to stimulate customer interest in energy efficiency, move customers from concern to action, and influence behavior change and utility EE program participation. Metrics for measuring program effectiveness include

- Customer Awareness
- Customer Participation
- Customer Engagement
- Customer Satisfaction
- Energy Savings

Main Design Features

Participants commit to use 10% less electricity. The Energy Challenge creates an ongoing two way dialogue with Snohomish PUD's customers about their energy use. The Energy Challenge includes customer feedback on their energy use via mailed paper reports (not part of the utility bill), social norms (comparisons), energy savings tips, and rewards (drawings for prizes). The paper reports are mailed semi-annually with customer progress towards meeting the challenge goal including utility generated feedback. The PUD has regular, targeted contact with participating customers. Participants are entered in a quarterly drawing to win prizes including energy efficiency related products, such as home energy use monitors (TED, Blue line, etc.), and a free home energy audit.

Program Delivery

Snohomish PUD is implementing the program itself, without third party vendor assistance. Snohomish PUD has segmented its residential customer base and is currently targeting four demographic slices of customers: practical idealists, green idealists, affluent conservers, follows the crowd. A variety of marketing tactics are used to recruit participants, including direct mail, advertising, emails, customer contact and referrals. In addition to customer feedback on their energy consumption, the PUD offers each participant three approachable energy-saving tips: free and easy, low cost, and smart investment. The PUD uses an adaptive management model (define, research, design, implement, adjust) to guide its activities.

Program Costs/Energy Savings

No cost information was provided, however, the PUD has said that the program is low cost, relying on staff time and involves no vendors. As of June 2011, nearly 3,500 residential pledges had been made with an estimated 4,375,000 kWh in potential savings. Pledging households are representative of the customer base, with 75% single family homes and approximately half with electric heat. The PUD's evaluation of 2009 vs. 2008 (Jul-Dec) shows that 50% of participants reduced their consumption. Overall, participants achieved a ~1% decrease in gross consumption, compared to a ~0.5% increase in control group consumption. Approximately 10% of those pledging have already met their goal. The 2010 evaluation is underway now.

Evaluation Approach

Snohomish PUD is measuring success by looking at awareness, participation, engagement, customer satisfaction, and energy savings. The energy savings evaluation methodology is based on Northwest regional protocols (RTF-approved). The PUD is reviewing individual participant changes and for the program as a whole, tracking participants in 3 groups, and comparing their usage to control groups.

Lessons Learned

- Everything has been harder to do than we thought. Learn as much as you can from utilities and others that are already doing this.
- Customer communication is key. Use an independent marketing firm to obtain customer feedback and help structure customer messages and content.
- The challenge approach works for commercial too. We tried it first at the PUD, which was a great learning experience.
- It would be great to have some interval meter data to tailor information to specific customer usage and provide more timely feedback.

Future Plans

Snohomish PUD offers the Energy Challenge to its commercial customers as well, with quarterly reporting and a 1-3 year pledge period. The response has been great, with a number of businesses already exceeding goals (up to 34% savings) and total savings over double the residential sector to-date. In the future the PUD sees recruiting additional residential and commercial customer to the Challenge. They are also considering outside support to help them further evolve and operate the program.

Contact

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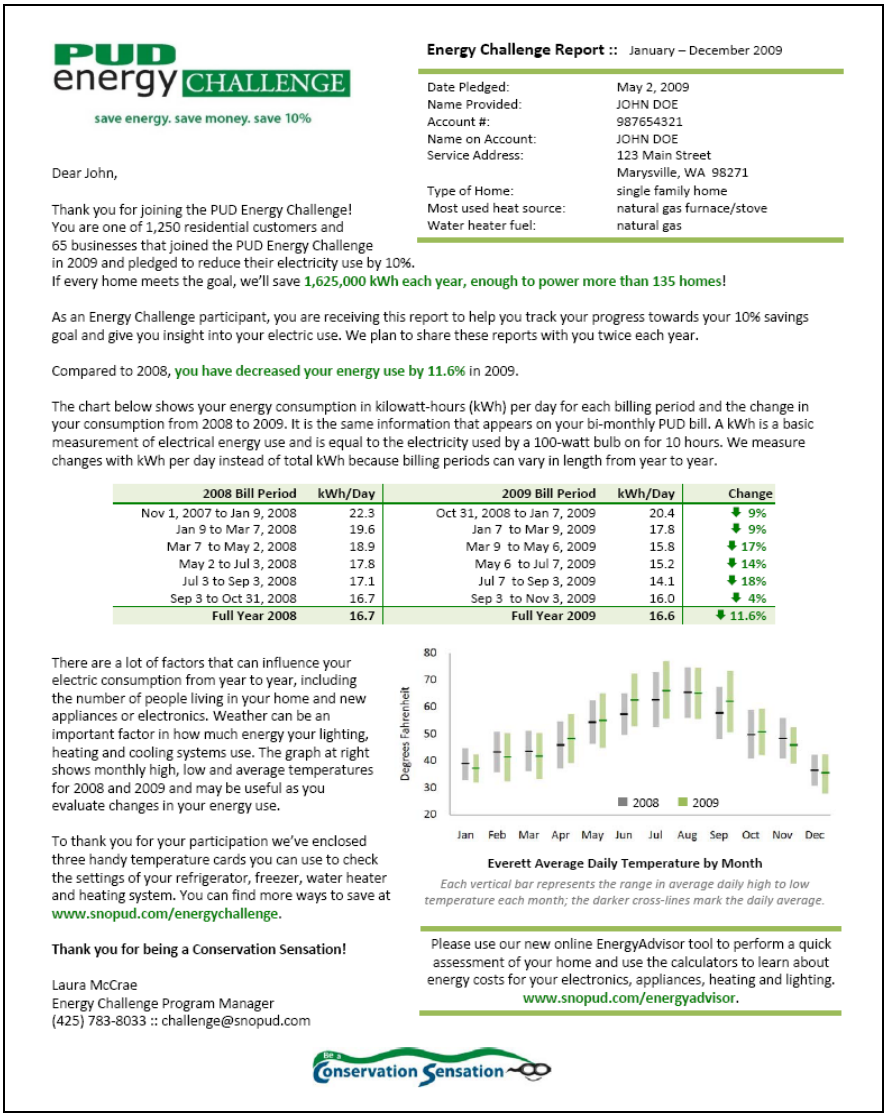
Figure 8. Snohomish PUD Energy Challenge



PUD energy CHALLENGE

save energy. save money. save 10%

Energy Challenge Report :: January – December 2009

Date Pledged:	May 2, 2009
Name Provided:	JOHN DOE
Account #:	987654321
Name on Account:	JOHN DOE
Service Address:	123 Main Street Marysville, WA 98271
Type of Home:	single family home
Most used heat source:	natural gas furnace/stove
Water heater fuel:	natural gas

Dear John,

Thank you for joining the PUD Energy Challenge! You are one of 1,250 residential customers and 65 businesses that joined the PUD Energy Challenge in 2009 and pledged to reduce their electricity use by 10%. If every home meets the goal, we'll save **1,625,000 kWh each year, enough to power more than 135 homes**!

As an Energy Challenge participant, you are receiving this report to help you track your progress towards your 10% savings goal and give you insight into your electric use. We plan to share these reports with you twice each year.

Compared to 2008, **you have decreased your energy use by 11.6%** in 2009.

The chart below shows your energy consumption in kilowatt-hours (kWh) per day for each billing period and the change in your consumption from 2008 to 2009. It is the same information that appears on your bi-monthly PUD bill. A kWh is a basic measurement of electrical energy use and is equal to the electricity used by a 100-watt bulb on for 10 hours. We measure changes with kWh per day instead of total kWh because billing periods can vary in length from year to year.

2008 Bill Period	kWh/Day	2009 Bill Period	kWh/Day	Change
Nov 1, 2007 to Jan 9, 2008	22.3	Oct 31, 2008 to Jan 7, 2009	20.4	⬇ 9%
Jan 9 to Mar 7, 2008	19.6	Jan 7 to Mar 9, 2009	17.8	⬇ 9%
Mar 7 to May 2, 2008	18.9	Mar 9 to May 6, 2009	15.8	⬇ 17%
May 2 to Jul 3, 2008	17.8	May 6 to Jul 7, 2009	15.2	⬇ 14%
Jul 3 to Sep 3, 2008	17.1	Jul 7 to Sep 3, 2009	14.1	⬇ 18%
Sep 3 to Oct 31, 2008	16.7	Sep 3 to Nov 3, 2009	16.0	⬇ 4%
Full Year 2008	**16.7**	**Full Year 2009**	**16.6**	⬇ 11.6%

There are a lot of factors that can influence your electric consumption from year to year, including the number of people living in your home and new appliances or electronics. Weather can be an important factor in how much energy your lighting, heating and cooling systems use. The graph at right shows monthly high, low and average temperatures for 2008 and 2009 and may be useful as you evaluate changes in your energy use.

Everett Average Daily Temperature by Month

Each vertical bar represents the range in average daily high to low temperature each month; the darker cross-lines mark the daily average.

To thank you for your participation we've enclosed three handy temperature cards you can use to check the settings of your refrigerator, freezer, water heater and heating system. You can find more ways to save at **www.snopud.com/energychallenge**.

Thank you for being a Conservation Sensation!

Laura McCrae
Energy Challenge Program Manager
(425) 783-8033 :: challenge@snopud.com

Please use our new online EnergyAdvisor tool to perform a quick assessment of your home and use the calculators to learn about energy costs for your electronics, appliances, heating and lighting. **www.snopud.com/energyadvisor**.

Be a Conservation Sensation

Energy Trust of Oregon Home Energy Reports Pilot (with OPower)

Overview

The Energy Trust of Oregon (ETO) initiated its Home Energy Reports Pilot with OPower in January 2011. The pilot uses paper home energy reports mailed bi-monthly over 12 months. The reports show the standard OPower information as described earlier in this report. Recipients have the option to go to a website to view similar and more detailed energy efficiency information.

Goals

The ETO became interested in residential customer energy use feedback in 2007 after seeing promising results from other studies, showing possible savings anywhere from 1-18% of household energy usage. The ETO decided to conduct a pilot in Oregon to examine the energy savings potential and cost-effectiveness, and determine the feasibility of a full-scale program in the future. The ETO's primary goal is to drive energy savings from non-program actions and behaviors, a secondary goal is to encourage greater participation in other ETO programs.

Main Design Features

The home energy reports are dual-fuel, co-branded with the local utilities (Portland General Electric and Northwest Natural Gas). There are 60,000 households in the pilot, with another 60,000 households in the control group. Reports are mailed bi-monthly over a 12 month period. The reports contain the standard OPower information (benchmarking usage, peer comparisons, and tips for energy savings). Participants can also go to a website to view similar and additional energy efficiency information.

Program Delivery

The Energy Trust of Oregon has contracted with OPower to deliver the home energy reports. This is the first time that two utilities (gas and electric) and a third party (ETO) have worked together to implement OPower's home energy reports.

Program Costs/Energy Savings

The Energy Trust of Oregon (ETO) estimates its costs for the pilot at approximately $1 million. ETO is estimating a 2% reduction in electricity usage and a 1% reduction in natural gas usage for the pilot. This equates to annual electricity savings of 13,470,000 kWh (229 kWh/household) and annual natural gas savings of 420,000 therms (7 therms per household). Preliminary indicators, based on participants receiving 5 of 6 home energy reports, suggest both gas and electric energy savings are meeting or exceeding initial estimates.

Evaluation Approach

The Energy Trust of Oregon (ETO) is conducting both a process and impact evaluation. For evaluation purposes, ETO is tracking results in 60,000 comparable homes that do not receive the home energy reports. Savings from measures installed are being tracked separately from savings resulting from behavioral changes. The evaluation includes billing analyses and three surveys by phone of 200 participants during the year. Research objectives include determining if the reports are resulting in measurable behavior changes, the types of behavior changes the reports are driving, as well as how the service can be improved.

Lessons Learned

- Less than 1% of participants have opted out, a very small percentage
- The customer service calls related to the home energy reports have been low
- ETO had an in-home display pilot (for customer feedback), but there were no verified energy savings from the pilot and it was discontinued.

Future Plans

The pilot evaluation is ongoing and has not yet been completed. Preliminary indicators suggest both gas and electric energy savings are meeting or exceeding initial estimates. The ETO is unsure whether there has been any lift in other program participation. If the preliminary indicators are validated, the ETO will probably expand the program to include more households, including those served by Pacific Power and Cascade Natural Gas.

Contact

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National/North American Profiles

B.C. Hydro Team Power Smart

Overview

B.C. Hydro's Team Power Smart is a behavioral based opt-in loyalty program launched in 2008 that applies social marketing principles to engage residential customers and encourage energy efficiency. Members (participants) commit to a 10% electricity reduction goal over a 12 month period; with B.C. Hydro providing tools, feedback, support, motivation and rewards.

Goals

B.C. Hydro's Conservation Potential Review confirmed the value of behavior change opportunities, and recommended they be pursued. In relying on a behavioral approach, the program complements B.C. Hydro's existing end-use focused programs. B.C. Hydro's key performance metrics for the Team Power Smart program focus on customer engagement (level of participation) and related kWh savings. B.C. Hydro sees the program as a long-term effort impacting the way people live, requiring stamina and persistence to achieve energy savings.

Main Design Features

Team Power Smart is web-enabled, with an on-line members toolbox, and applies a wide range of social marketing concepts to engage and motivate participants. B.C. Hydro uses a multi-channel marketing approach to get customers to sign up on-line; including advertising, outreach teams, sign-up kiosks, partnering, and member-to-member sign up campaigns. Members' on-line tool box contains

- Feedback tools (consumption graphs, usage comparisons, home analysis)
- Instructional tools (tips & to-do's, consultations, personal energy planner)
- Motivational tools (messages, contests, special offers and promotions)

B.C. Hydro communicates regularly with members through a monthly e-newsletter, complimentary magazines, and special correspondence and events. There are three levels of participation in the program; residence (logging in), enjoyment (10% challenge participant, attending events), and affiliation (hosting). Members at the affiliation level act as ambassadors for the program. Members that achieve their 10% reduction goal receive a $75 reward.

Program Delivery

Team Power Smart is designed, operated and delivered by B.C. Hydro. The program's value proposition is to get customers to join team power smart, get them to use the on-line tool box, and to increase the level and frequency of customer engagement. Because Team Power Smart is an opt-in program, creative marketing tactics can be employed. Social marketing, events, contests, and rewards are all geared toward increasing engagement. Examples of innovative engagement tactics include member ambassadors (volunteers), celebrity endorsements, member stickers and a customized monopoly game. B.C. Hydro continues to experiment. Research shows a strong correlation between engagement and kWh savings.

Program Costs/Energy Savings

B.C. Hydro declined to discuss specific program costs, however, they did indicate the program is cost-effective using standard utility cost-effectiveness tests. Categories of program costs include the website, the call center, communications, events and campaigns. Most costs are variable marketing costs, and can be ramped up or down. Regularly communicating with members is seen as critical to program success.

B.C. Hydro has approximately 300,000 participants in the program at all three levels combined. In 2010

- 25,000 Challenge participants (10% goal) saved a total of 5.2 GWhs
- 20% of challenges were successful, with some getting savings of 15-16%
- For those that didn't reach goal, savings still averaged 4-5%
- Some participants didn't save at all.

B.C. Hydro is focused on growing the amount of participants at the enjoyment (challenge) level of the program, which is where members are more engaged and the bulk of the energy savings occur. This year participation at this level has reached 75-80,000 households, and continues to grow. Early participants in the challenge were devoted conservationists. The program is now attracting other customer segments, and is shifting its marketing strategy to better engage them (i.e., do a few things often and move from there). In a loyalty program it is very important to meet people where they are at, and talk about what people are interested in. Initially, only 41% of challenge participants contributed to energy savings, now the figure is 75% and B.C. Hydro expects it to climb higher.

Evaluation Approach

B.C. Hydro validates its program concepts using a social marketing firm, conducts billing and statistical analyses and participant/non-participant surveys to attribute kWh saved to the

program. The billing and statistical analyses show significant energy savings (see results summarized above). The surveys show no specific dominate behavior action, with 35 different actions (in aggregate) where members out-perform non-participants. Power Smart cross promotes with its transactional (technology oriented) programs and has seen greater participation in those programs as a result, but the Power Smart program does not take credit for these savings (to avoid double counting).

Lessons Learned

- In an opt-in loyalty program regular communication and interaction is important. Research indicates a strong correlation between engagement and savings.
- Segment your customer base, target the segments likely to participate. Shift your marketing strategy over time to better engage them.
- Connect with what people really care about; B.C. Hydro categories include health & wellness, family & friends, food & drink, home and garden, life & leisure, gadgets & technology.
- Follow social marketing knowledge, look outside the energy industry for examples (a growing number of industries/companies have effective loyalty programs) and experiment.
- Don't give away incentives just for signing up, reward customers for engagement and performance.
- Performance is improving, and the best is yet to come; it takes 5-6 years to build up an effective social marketing program.

Future Plans

B.C. Hydro continues to build and evolve the program. Team Power Smart's value proposition is intended to increase member engagement levels over time. While the program has a critical mass and is using the power of norms, a next phase is to make members feel more special. B.C. Hydro is also exploring how to use the challenge model to continue to reward those that are green and remain green. In addition to Team Power Smart, B.C. Hydro has an inclining residential block rate and is deploying smart meters. Smart meters will provide program participants with real-time or near real-time feedback via the website. Use of in-home displays and devices can help enable program participants to achieve greater levels of savings.

Contact

Arien Korteland, Power Smart Program Manager 604-453-654 arien.korteland@bchydro.com

Figure 9. B.C. Hydro Team Power Smart Online 1

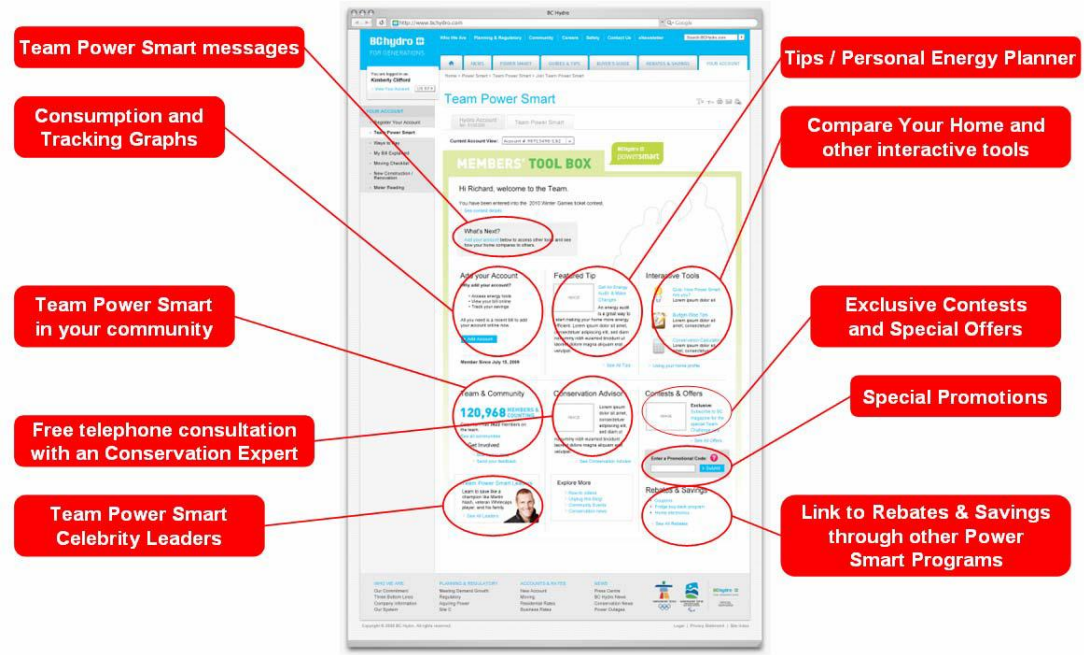
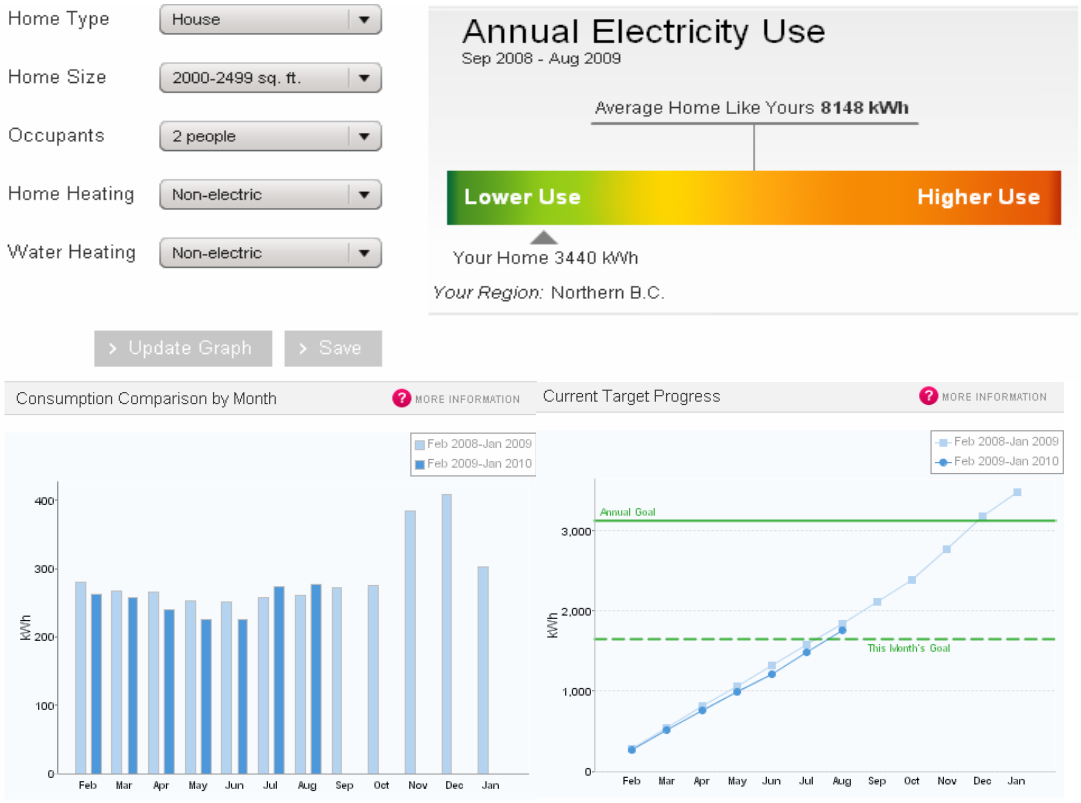


Image 8. B.C. Hydro Team Power Smart Online 2



Illinois Citizens Utility Board (CUB) Energy Saver With Efficiency 2.0

Overview

The Illinois Citizens Utility Board (CUB) has been offering the Energy Saver program to customers of Commonwealth Edison and People's Gas since June of 2010. The CUB Energy Saver program provides participants with tools and information developed and administered by Efficiency 2.0 to encourage energy efficiency related behavior change. Through Recyclebank participants can redeem points earned by saving energy for discounts on purchases from national and local merchants. CUB recently initiated a related 100 home direct response (DR) pilot with Efficiency 2.0 using Greenlet Technologies' plug-in appliance DR product to dispatch washers, dryers and air conditioning units.

Goals

The Illinois Citizens Utility Board (CUB) is a non-profit consumer group created in 1983 to represent the interests of residential utility customers across the state. CUB sees the Energy Saver program as contributing to fulfilling its mission. Specific goals for the program include

- Create ways for consumers to save money (and energy)
- Empower consumers to engage with their local community to help solve critical energy and environmental issues
- Reward smart decisions with discounts at national and local retailers.

Main Design Features

The CUB Energy Saver program provides participants with personalized print and email Energy Savings Reports, access to a program website, and rewards points for saving energy. The print reports are sent to the entire target population, and customers opt-in to the program website, becoming eligible for rewards for saving energy and gaining access to additional savings tools. The website includes

- Participants' usage, comparison to neighbors
- Personal goal, community contests, social networking
- Customized tips/recommendations, feedback on goal progress
- Additional tools, such as an on-line audit (Resnet Personal Energy Advisor)
- Reward points based on energy savings, redeemable for retailer discounts

Program participants get a personalized savings plan and regular email updates that communicate their plan/goal progress, reward points accrual, and redemption opportunities. The program engages communities in contests to encourage greater participation and energy savings. For example, in Evanston the city is launching a push to triple the number of people

registered by sponsoring seven teams associated with the city's largest employers to compete for the most energy savings.

Program Delivery

The program is administered by Efficiency 2.0, a provider of energy efficiency software and marketing programs based in New York. The main program platform is the website, yet the program includes both mail and electronic reports. Mailings are used to recruit on-line participants, with mail recipients considered "passive" participants until they sign up. Once they opt-in to the program and sign up they are "active" participants. Engagement is the key to customer recruitment, with a 25%+ conversion rate achieved in the first year of the program. Customers are recruited by direct mail; but other marketing activity, such as press coverage, competitions, and referring a friend are credited with the high conversion rate.

Three primary delivery focus areas are (1) program set-up; including billing integration, web-site customization, local merchant recruitment and customer targeting (including evaluation control group); (2) program marketing; which varies depending on level of aggressiveness (direct mail, advertising, media events, etc.); and (3) program management; which includes ongoing stakeholder relations and community engagement (typically less than 1 FTE). Community level engagement plays an important part in generating customer participation (organizations, government, schools, businesses, churches, etc.). Rewards via discounts with national and local retailers are set up and administered by Recyclebank.

Program Costs/Energy Savings

Efficiency 2.0 calculates its costs $7-11 per household to deliver the program given a 25-50,000 household minimum. The biggest variable cost is the customer engagement (or marketing) budget. Efficiency 2.0 says its products and services are cost-effective compared to other utility energy efficiency program options (excluding lighting). The program typically costs $35-55 per MWh of energy savings. A report on the first year of operation documented average bill savings of 5.5-6% by the 11,682 active participants that opt-in and sign up for the on-line component of the program. According to Efficiency 2.0, passive program participants, that just receive reports by mail, average between 1.5 - 2.5% energy savings. More information on an evaluation of these participants will be released soon.

Evaluation Approach

Efficiency 2.0 uses a difference-of-differences analysis to determine energy savings. The change in usage from one year to another for participant households is compared to similar changes from a control group. All weather, economic, price, building code and other exogenous factors are net out via the difference-differences analysis to determine the impact of the program. The

control group is determined based on random assignment for opt-out participants (mail reports only) and using a matching process for opt-in participants (those that sign-up on-line). The matching process identifies non-participants that are similar to participating customers. Any savings that are attributable to other programs are net out to prevent double counting.

Lessons Learned

- Get the program logic and evaluation plan/data worked out in advance.
- There are no silver bullets, utilize a combination of behavioral strategies and effectively integrate the components, goal setting and rewards are key motivators.
- Customization, accuracy and timing of feedback and communication is important to customer engagement, we are getting a lot better at messages that work.
- Make room for innovation and learning, integrate it into the design (using quick feedback). For example, a flag added to the website giving participants positive reinforcement when they take an action has become an important motivator.

Future Plans

In addition to continuing to operate and innovate with the core Energy Saver program, a recent 100 home direct response (DR) pilot in suburban Chicago used Greenlet's plug-in appliance DR product to dispatch washers, dryers and air conditioning units. Neither the hardware nor software from Greenlet requires professional installation. Customers plug the product into an electrical outlet and then connect the appliance plug to it. The "Greenlets" communicate with a wireless router. CUB controls activity from a central command center, dialing power down for AC to either 50% or 80% and can prevent washers and dryers from operating during power curtailment events. CUB activated load-reduction cycles several times each week to look at the energy and ancillary service value in addition to the peak response value. Customers, recruited from the Energy Saver program, received incentives of $20-$30 per appliance for the summer, and received award points. CUB and Efficiency 2.0 know the technology works, so the pilot was geared more towards learning about customer interaction and motivations. A post pilot analysis is underway. CUB and Efficiency 2.0 plan to expand pilot program participation and deployment of the technology next summer.

Contacts

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David Kolata, CUB Exec Dir.	312-263-4282	dkolata@CitizensUtilityBoard.org

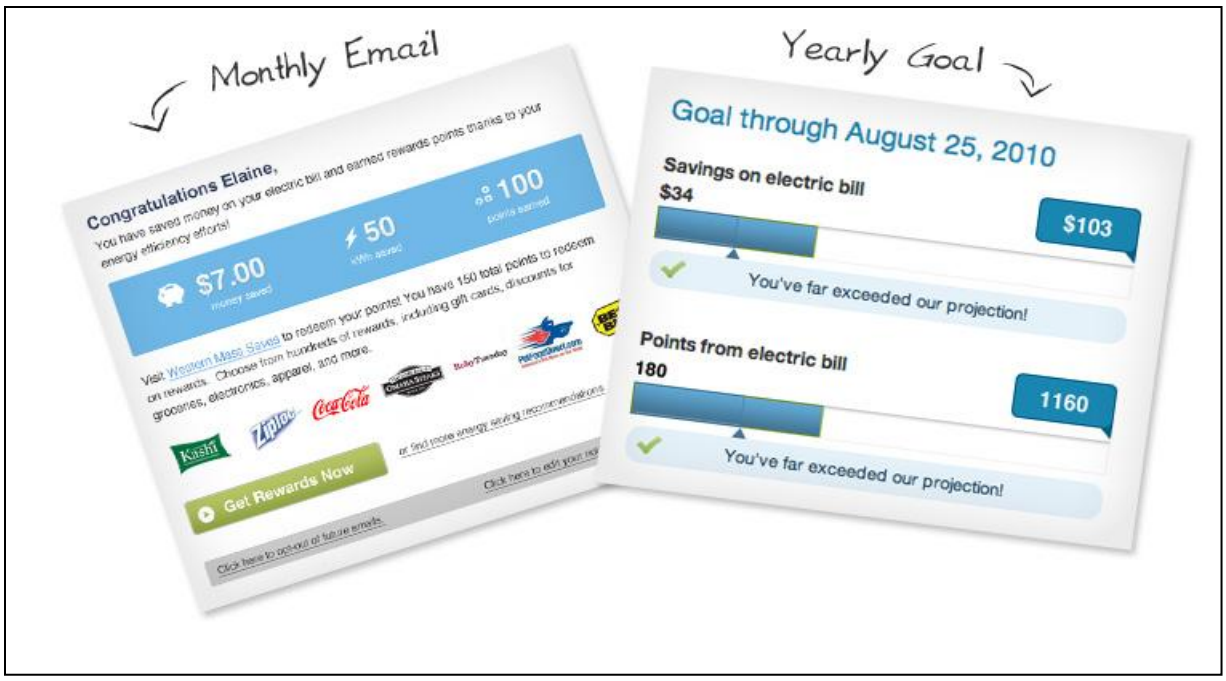


Figure 10. CUB Energy Saver Email

Figure 11. CUB Energy Saver Web Portal

Western Massachusetts Electric Company Western Mass Saves! (with Efficiency 2.0)

Overview

Western Massachusetts Electric Company (WMECO) is partnering with Efficiency 2.0 to market and operate a residential behavior based energy efficiency pilot (Western Mass Saves!) using a "multi-channel approach" to capture both broad and deep energy savings. The approach includes direct mail, targeted email communication, advanced web experience, and local community teams, contests and prizes. Direct mail energy savings reports and other marketing tactics (community teams, contests, prizes) are designed to encourage deeper on-line customer engagement, where more energy savings can be achieved at less cost.

Goals

WMECO serves 182,000+ residential customers in 59 cities and towns across 1,500 square miles of service territory. As part of the Green Communities Act, WMECO has been encouraged to explore all possible cost-effective energy efficiency measures, including behavioral. The Western Mass Saves! Pilot includes eight communities and has the following goals:

- Community engagement (including towns and cities, schools and classrooms)
- Community wide (broad based) 3% energy savings goal
- Engage 5,000+ customers online for deeper energy savings

Main Design Features

WMECO's multi-channel approach uses the Efficiency 2.0 platform; including direct mail energy savings reports, a utility branded web-site designed to further engage customers "on the ground" community engagement tactics (including challenges, contests) and customer rewards.

- The energy savings reports (showing home energy use and comparisons) are a tool for customer engagement. While they result in "passive" energy savings, the reports and other marketing tactics are designed to encourage customers to be "active" on-line.
- Examples of community engagement include town competitions (including local teams, messaging, events and prizes) and school/classroom competitions (selling EE products and signing up households into the online program).
- The advanced web experience (website) includes more detailed energy consumption information, customized tips and ways to save, targeted messaging and personalized recommendations, community/social engagement, and customer rewards.
- Customers earn points for energy savings through a rewards program administered by RecycleBank (as part of the Efficiency 2.0 platform). Points can be redeemed for discounts from local and national retailers.

Program Delivery

Through partnering with Efficiency 2.0 the pilot has been largely turn-key. WMECO has a part-time program manager for the pilot and uses less than one FTE of IT resources. The Efficiency 2.0 online platform went live November 2010 (with utility branding) with 25,000 customers selected to receive direct mail energy savings reports and another 25,000 customers serving as the "control" group (do not receive reports). Customers can opt-out from the paper reports (very few do so), and others can opt-in via referrals, interest, or email outreach (as long as they aren't part of the control group). Customer call-ins have been manageable because WMECO explained things well up-front when the pilot was launched, and is able to refer customers to the website. A challenge has been dealing with senior citizens that don't use computers. Different recruitment methods (direct mail, bill stuffer, email) have been used to help convert "passive" paper report recipients to "active" online participants. Offering Recyclebank reward points for signing up (opting-in) online has resulted in a high conversion rate. The pilot currently has 7,200 online participants, well beyond the initial goal of 5,000.

Program Costs/Energy Savings

No cost information was provided by WMECO. Energy savings results are as follows:

Mailed Participant Results

Verified kWh savings (%)	est. 0.98% as of 6/15
Projected annual kWh savings (%)	est. 1-2%
Households receiving mail at least once	59,019
Conversion to online	0.2 – 5.9%
Opt-out rate	0.1% (61 total)

Online Participant Results

Verified kWh savings (%)	est. 4.2% as of 6/15/11
Projected annual kWh savings (%)	est. 3.5 – 6.5%
Online members	6,142
Ways to save marked as "doing" or "done"	14 per member
Customer satisfaction increase	7-11%
Monthly email open rate	53%
% who say WMS led to taking EE measures	94%

Evaluation Approach

WMECO/Efficiency 2.0 are using an experimental and quasi-experimental evaluation design. Aggregate and individual savings are tracked on a monthly basis using billing analysis with

comparison control groups (difference of differences analysis). Independent interim and final evaluations are planned for the pilot. Control group considerations include:

- Statistical tests determine heterogeneity in participant versus control bills
- Regressions run for mean usage, geography, property characteristics, demographic characteristics, etc. to filter any biases
- Temporal constraints imposed for rolling control group, with minimum of 500 control customers in each period
- Bills normalized for duration through daily use values
- "Passive" savings from customers who receive direct marketing, but do not sign up online executed through traditional experimental design, with random assignment

Other evaluation metrics include customer acquisition metrics (website hits, web sign-ups from mailer and no-mailer customers, mailer customer opt-outs), customer activation metrics (rewards program registration, savings plan commitments), and customer engagement metrics (cross program referrals, number and most common committed actions, estimated resource savings from committed actions).

Lessons Learned

- Online channel appears to be more cost-effective and scalable than the printed report channel
- Rewards can drive increased customer satisfaction and increased energy efficiency benefits for online participating customers
- Strong engagement with customers (over 50% email open rate) but very little discernible call center impact due to vendor program support management

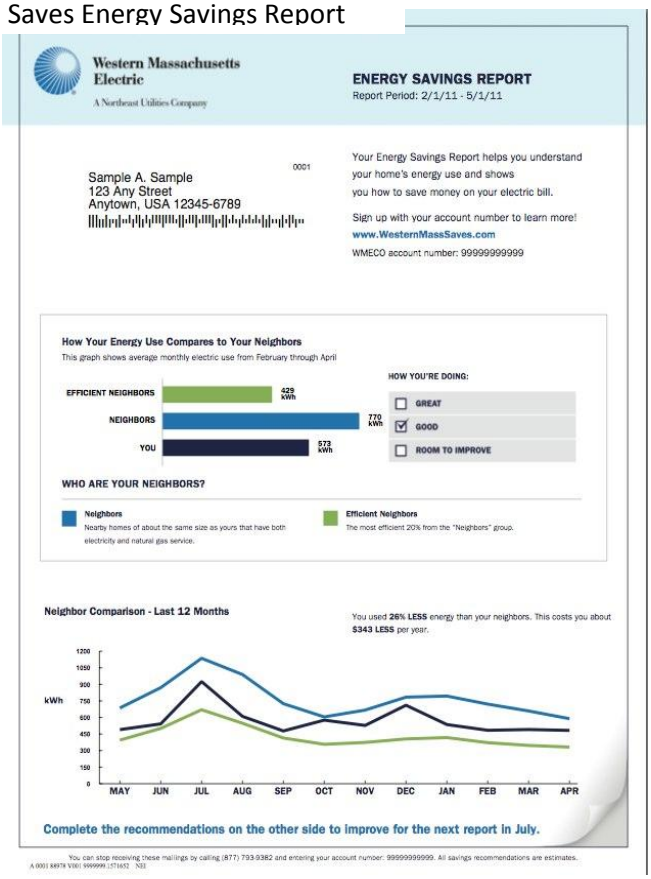
Future Plans

WMECO is pleased with the results to-date. Third party evaluation needed to confirm energy savings and persistence. If the savings are independently verified the pilot will be very cost-effective. WMECO is looking to continue the pilot and expand local business, non-profit and service organization engagement with energy saving "teams".

Contact

Tony Fornuto, Residential Program Administrator 413-787-9329 fornuaj@nu.com

Figure 12. Western Mass Saves Energy Savings Report



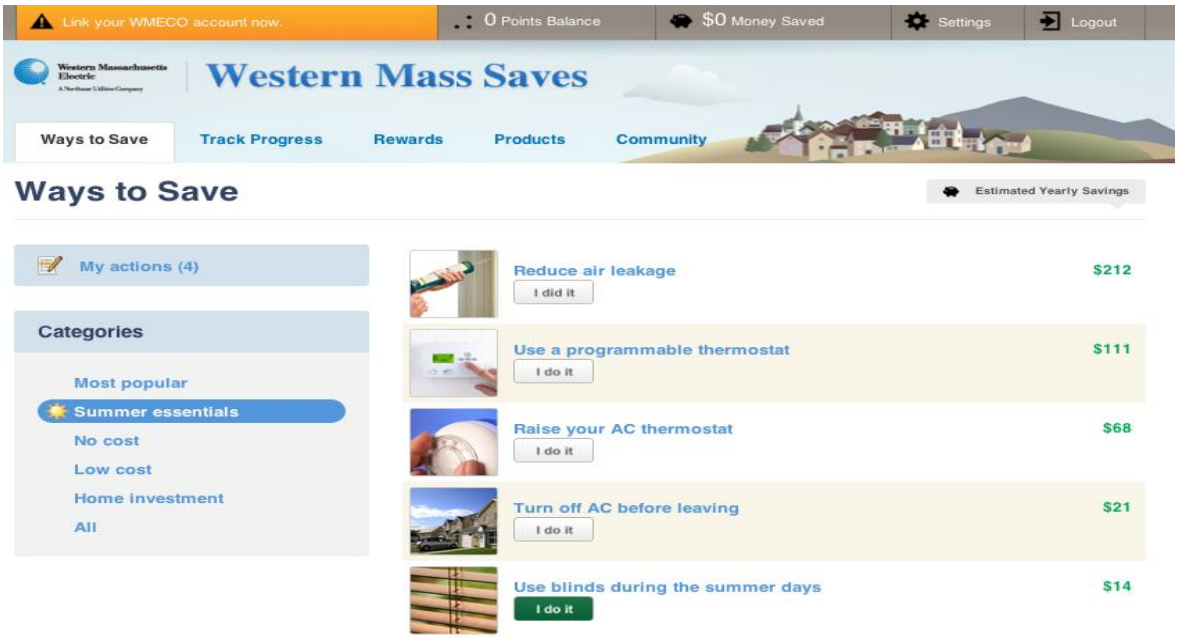


Figure 13. WMECO Western Mass Saves Web Portal

Sacramento Municipal Utility District (SMUD) Home Electricity Reports (with Opower)

Overview

As one of the first utilities to partner with Opower, Sacramento Municipal Utility District (SMUD) has the best documented and longest running home energy reports program. SMUD began its 3 year program in the spring of 2008 with a 12-month pilot using an experimental design that randomly assigned 35,000 single family residential customers to a treatment group and 50,000 customers to a control group. The treatment group regularly receives "home electricity reports" comparing their usage to their historical use, and to that of similar and "efficient" neighbors. The reports also contain tips or suggested actions the household can take to reduce electricity use. Since the pilot, SMUD has adjusted the program to measure the persistence of savings after the reports are stopped (for a sub-set of households) and has expanded the number of households receiving reports to target customer segments achieving the highest rates of savings in the pilot.

Goals

SMUD has been very widget oriented (in promoting energy efficient equipment) in the past, and sees normative messaging as a means to impact customer behavior and achieve additional energy savings. SMUD now has enough experience to know it works, and has learned it is more effective with some people than others. SMUD's goals are as follows:

- kWh savings
- Customer engagement
- Increasing customer satisfaction over time.

Main Design Features

The home electricity reports are received monthly by the majority of participants, with others receiving them quarterly. The reports provide customers with feedback on their current and historical electricity use, normative comparisons with similar neighbors, and conservation messages and tips tailored to target specific household profiles. Participants can voluntarily make a "pledge to save" goal. In October 2010, SMUD launched OPower's suite of interactive web tools that compliment the paper reports. Customers access these tools via a single sign-on through SMUD's web portal. The online tools include more detailed energy saving tips, energy use reports, and the ability to set and track progress towards savings goals.

Program Delivery

Customers are selected by SMUD to receive the reports, and cannot opt-in. They may contact SMUD to opt-out, and opt-out rates have ranged from 2% per year at the beginning of the pilot to less that 1% in 2011. OPower creates and mails the reports. SMUD has been involved in structuring a rigorous experimental design and evaluation protocols for the pilot. SMUD sees this as particularly important given that the savings being measured per customer are relatively small.

In July 2010, SMUD ceased sending reports to approximately 9,000 recipients to measure the persistence of savings after reports were stopped. The remaining recipients continue to receive reports to measure long term savings trends. In October 2010 reports were sent to 20,000 additional recipients representing three customer target segments that had the highest rates of energy savings in the pilot. This expansion included 15,000 who receive reports monthly plus a test of a "summer burst" for 5,000 recipients who receive the reports for only four summer months. It also includes a group of 5,000 recipients who receive no paper reports, but instead a monthly email notification with a link to an electronic version of the report.

OPower's preliminary energy savings estimates for the three additional "high saver" customer target segments indicates that the group selected based on highest annual kWh consumption is saving the most. Therefore, SMUD is targeting an additional 18,700 customers from this customer segment beginning in October 2011.

Program Costs/Energy Savings

The 2011 program cost is forecast to be $412,000 including all administrative and overhead costs. The average 2011 participation is expected to be approximately 38,500 customers, at an average annual cost per recipient of $10.70.

The average gross energy savings per recipient in the pilot was 213 kWh/year as measured by ADM Associates in a SMUD sponsored impact evaluation, with at most 53 kWh of the savings attributable to other SMUD rebate programs. In February 2011 Navigant Consulting reported on its latest energy savings analysis:

- Year 2 savings = 2.89% for high consumption households (HCH) receiving monthly reports (22% increase over year 1) and 1.70% for low consumption households (LCH) receiving quarterly reports (a 36% increase)
- Year 2 average household savings is 381 kWh for HCH and 104 kWh for LCH
- Highest savings occur during SMUD's peak season, 3.56% savings in July/August of 2009
- There are no signs of energy savings impact deterioration to-date (30 months).

The gross annual savings for the "high savers" group first targeted in 2010 is forecast to be in the neighborhood of 360 kWh/year. Actual savings through year three including the various sub-group tests will be measured by a third party impact evaluation in late 2011, with results available in February 2012.

Evaluation Approach

SMUD uses an experimental design that randomly assigns customers to the treatment group (participants) or the control group. For the Navigant evaluation, two statistical analyses were used to estimate savings, a difference-in-difference (DID) analysis and a linear fixed effects regression (LFER) analysis. The latest evaluation results are summarized above.

Lessons Learned

- Normative messaging is effective in driving energy savings, and while the savings are small per household, they are significant and cost-effective in aggregate.
- Set up the experimental design and evaluation in advance to assure valid energy savings results.
- An opt-out strategy results in very high participation rates (less than 3% of customers have opted out)
- Normative messaging is more effective with some customers than others. Initially target those more likely to save (such as high users). Segment your customer base, and tailor your messaging for various segments.
- Voluntary "pledge to save" goal participants have achieved approximately 3 times as much savings as the average savings from all participants.
- Savings to-date from recipients of electronic reports are far lower than for paper reports because click-through rate for SMUD's test were only 12%, compared to open rates for the paper reports above 90%.

Future Plans

SMUD is exploring ways to integrate the lessons learned from the Home Electricity Reports program into tools and products being created and tested as part of its Smart Grid initiative. Normative messaging will be incorporated into analytical and feedback tools that utilize hourly energy use data. It is possible that paper versions similar to the current OPower reports will continue to have a role given the significantly higher rates of engagement experienced to-date compared to electronic communications. SMUD will complete its smart meter rollout by March 2012, and plans to test new customer-facing applications through 2013 and roll out a variety of new customer products and programs gradually through 2014.

Contact

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Payson City Power Energy Efficiency Reports (with Enerlyte)

Overview

Since 2010 Payson City Power (Utah) has been partnering with Enerlyte to provide energy use and efficiency information on its residential customer energy bills. The information provided on the customer's bill can be customized; and typically includes a graphic display of current energy use with comparisons to previous usage, neighbor's usage, and efficient use. Customers are directed to an interactive web portal dedicated to further educating and motivating customers to take action to save energy, including setting goals and creating challenge groups, with progress updates included on the customer's bill.

Goals

Payson City Power is looking to reduce the utility's peak power demands, educate and motivate customers to use energy efficiently, and help customers save money on their energy bills. This contributes to lower utility system costs and good customer service.

Main Design Features

Program features begin with a customized utility bill, including the "energy efficiency report", that provides customers with feedback on their energy use and comparisons to others (see attached examples). Customers can access an online web portal that contains additional information and tools for managing energy use, including an online audit and efficiency tips. Customers can set personal goals and create challenge groups with neighbors and friends (with progress reported on their bills). Website information can tie into utility energy efficiency programs and customers can create an action plan and report what they have done. A smart phone application has recently been added to communicate peak alerts. The program includes a utility reporting center. Customer service representatives can review customer information and change the energy efficiency report information presented on the customer's bill (per customer reporting preferences). The center also gives the utility analytical capabilities to segment and target customers based on their energy consumption profile and other factors.

Program Delivery

Enerlyte works with Payson City Power to customize customer bills and the web-based presentation, which now includes the new smart phone application. Payson City's Power Director indicated that Enterlyte does most of the work, including bill redesign, integrating with the utility's billing software and printing. The customized bills were first delivered to Payson City Power's 5,500 residential customers (except for the control group) beginning in October

2010. The website is utility branded and is hosted and maintained by Enerlyte. The Power Director says they are very pleased with the program and results to-date, indicating that given their size, it would not have been possible for the utility to develop and offer the program on its own. They have had few customer issues, with some customer calls when the program was first launched asking questions about the new energy efficiency report information contained with their bill. Enerlyte continues to improve the customer engagement system and has added a number of customer service tools and utility reporting capabilities over the past year.

Program Costs/Energy Savings

Participant's usage for the twelve months ending October 2011 was 2.4% less than the control group (control group customers have never received Enerlyte's consumption comparison data on their bills). Since the beginning of the program (1 year) Payson City Power customers have saved approximately 726,000 kWh, equating to $84,600. Payson City Power's cost to run the program over the first year has been approximately $15,000; with about $5,400 in one-time set up costs and $9,700 in annual operating costs.

Evaluation Approach

Enerlyte compares participants (treatment group) with a control group (non-participants) to determine energy savings. The control group represents approximately 10% of customers. The analysis is based on monthly energy usage for the median consumer in both the treatment and control groups. The difference between each group's median kWh usage when multiplied by the number of consumers in the treatment group is indicative of the total energy savings for that month. Consumption data is not "temperature adjusted" (weather normalized) because both groups experience the same weather and have the same number of "usage days" between meter reads.

Lessons Learned

- Educating and informing customers when the program is launched is important. Although few customers had problems with the revised bill and report, a number of customers called in during the first few months asking questions, such as "Who are my neighbors?" The utility got better at explaining to customers what they were looking at and directing callers to the website for further information. Payson City Power continues to learn about its residential customer base through the program.

Future Plans

Payson City Power is looking to add more conservation and product information to the website, and make better use of the additional customer engagement features (goal setting, challenge groups, phone app) and administrative functions (customer service, reporting, segmentation).

Contact

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Sam Steele, Enerlyte	801-214-8484	sam@enerlyte.com

Figure 14. Payson City Website Home Page & Customized Utility Bill with Energy Efficiency Report

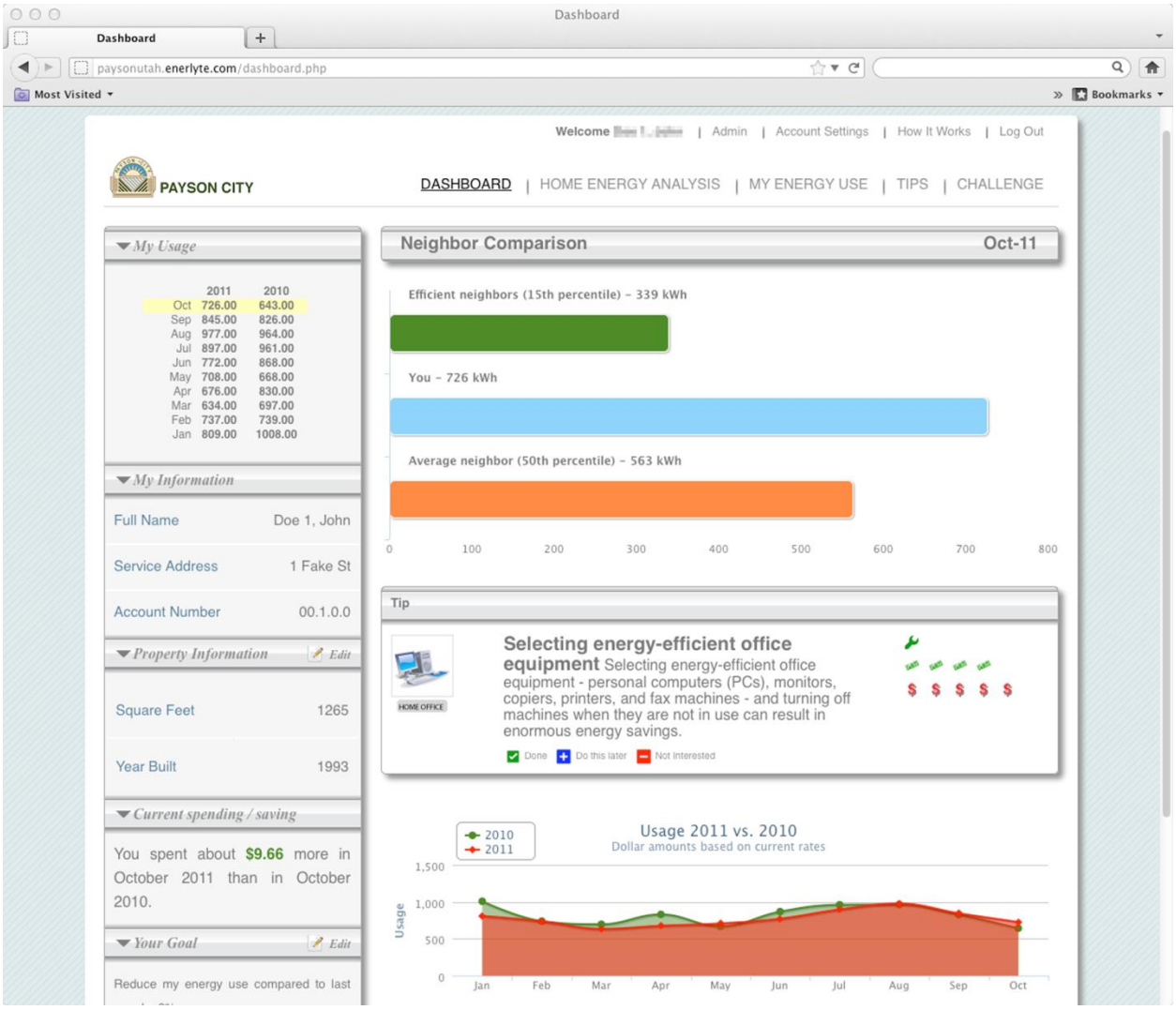
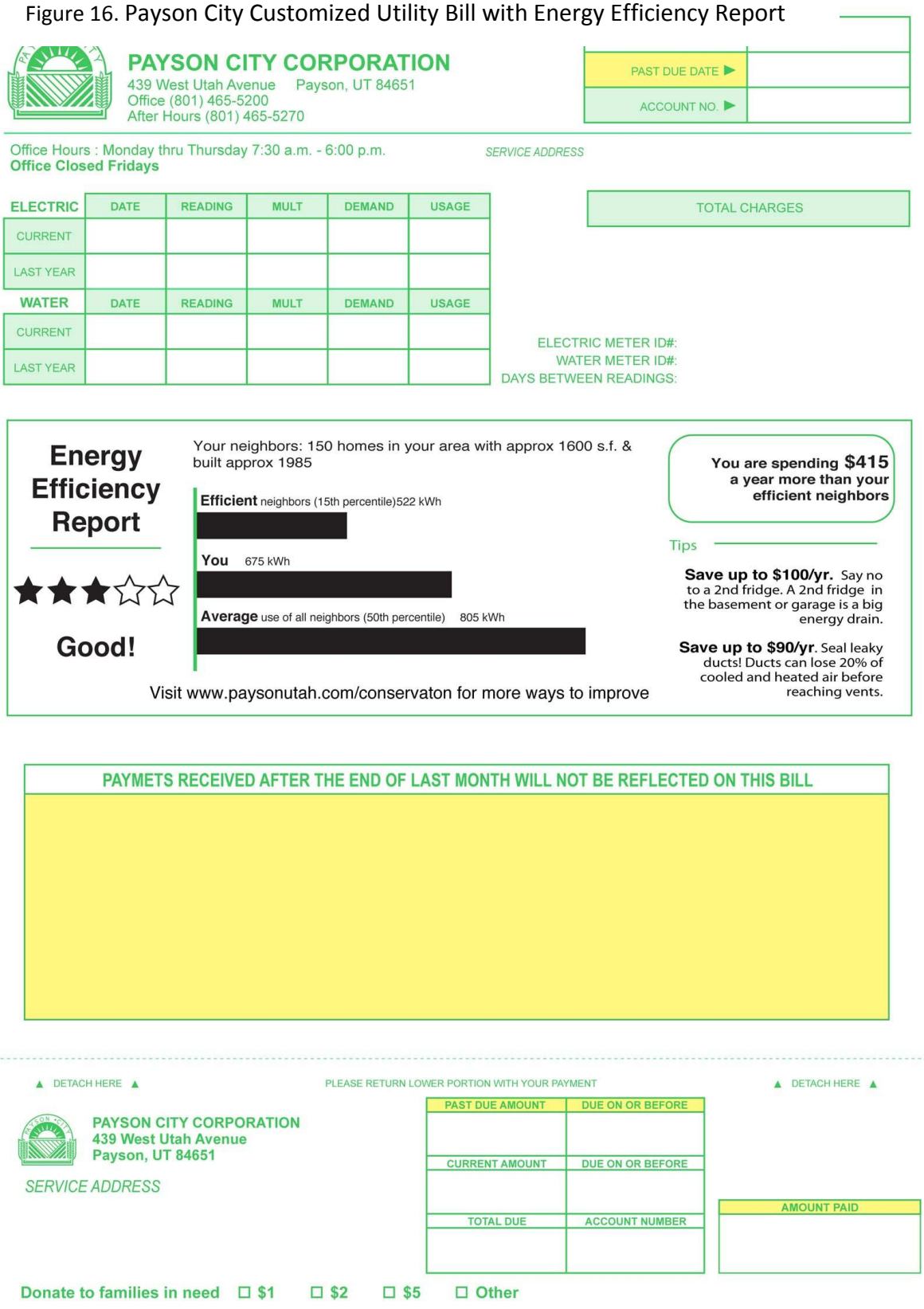


Figure 15. Payson City Web APP

Figure 16. Payson City Customized Utility Bill with Energy Efficiency Report



PAYSON CITY CORPORATION
439 West Utah Avenue Payson, UT 84651
Office (801) 465-5200
After Hours (801) 465-5270

PAST DUE DATE ▶
ACCOUNT NO. ▶

Office Hours : Monday thru Thursday 7:30 a.m. - 6:00 p.m.
Office Closed Fridays

SERVICE ADDRESS

TOTAL CHARGES

ELECTRIC	DATE	READING	MULT	DEMAND	USAGE
CURRENT					
LAST YEAR					
WATER	**DATE**	**READING**	**MULT**	**DEMAND**	**USAGE**
CURRENT					
LAST YEAR					

ELECTRIC METER ID#:
WATER METER ID#:
DAYS BETWEEN READINGS:

Energy Efficiency Report

★★★☆☆

Good!

Your neighbors: 150 homes in your area with approx 1600 s.f. & built approx 1985

Efficient neighbors (15th percentile)522 kWh

You 675 kWh

Average use of all neighbors (50th percentile) 805 kWh

Visit www.paysonutah.com/conservaton for more ways to improve

You are spending $415 a year more than your efficient neighbors

Tips

Save up to $100/yr. Say no to a 2nd fridge. A 2nd fridge in the basement or garage is a big energy drain.

Save up to $90/yr. Seal leaky ducts! Ducts can lose 20% of cooled and heated air before reaching vents.

PAYMETS RECEIVED AFTER THE END OF LAST MONTH WILL NOT BE REFLECTED ON THIS BILL

▲ DETACH HERE ▲

PLEASE RETURN LOWER PORTION WITH YOUR PAYMENT

▲ DETACH HERE ▲

PAYSON CITY CORPORATION
439 West Utah Avenue
Payson, UT 84651

SERVICE ADDRESS

PAST DUE AMOUNT	DUE ON OR BEFORE
CURRENT AMOUNT	DUE ON OR BEFORE
TOTAL DUE	ACCOUNT NUMBER

AMOUNT PAID

Donate to families in need ☐ $1 ☐ $2 ☐ $5 ☐ Other

Cape Light Compact Residential Smart Energy Monitoring Pilot

Overview

Cape Light Compact initiated its Residential Energy Monitoring Pilot with Grounded Power (now Tendril) in 2009. The initial pilot used an web-based dashboard, with in-home displays added later. The in-home display added in Phase 2 provides customers with real time information about electricity use and costs; and an interactive web-site that contains a suite of features, such as sign up for energy savings actions, setting a goal, etc.

Goals

Cape Light Compact (CLC) is a municipal aggregator serving 21 towns on Cape Cod and Martha's Vineyard. CLC has regulatory support to apply 1% of its revenues to R&D. Specific goals for the pilot include

- Evaluate energy use feedback as a strategy to reduce electricity consumption
- Gain insight into behavioral aspects of energy use
- Inform future smart grid projects

Main Design Features

The original pilot used an web-based dashboard. The website includes

- Recipients' current and historical energy use
- Comparison to similar neighbors
- Energy saving/cost saving/carbon saving tips
- Social networking aspect, 10% personal goal

The larger Phase 2 effort provides customers with advanced versions of both the in-home displays and the website. Three devices are installed in the home, a meter bridge that enables the customer's meter to talk to the gateway, a gateway that gathers the data and sends it over the internet, and the in-home display. Unlike the original pilot, phase 2 product installation does not require an electrician. The website uses the Tendril Energize energy application suite to encourage customer behavior change.

Program Delivery

The original pilot included three key program design and implementation staff. There were 100 customer participants. Customer interest was high with more than enough participant sign ups from fairly limited marketing activity. CLC experienced significant customer interaction in the original pilot and said participants took special handholding. Questions needed to be

anticipated and sorted based on appropriate responder, the contractor or the utility. Phase 2 started in June and includes at total of 380 participating customers.

For phase 2, CLC is partnering with a vendor (Tendril) providing turn-key services that minimize utility staff involvement. In the original pilot CLC scheduled and coordinated product installs and answered customer questions. In phase 2 the vendor team handles all of that. So even though phase 2 is a larger effort the CLC staff impact is less, just a few hours per week, while the vendor team is approximately 2 FTE, including a program manager, data management and analytical support. Besides general program oversight, CLC responsibilities include getting participant data to Tendril and referring any customer inquiries that come directly into the utility to the vendor team (the program is set up for primary contact directly with the vendor).

Program Costs/Energy Savings

Hardware costs for phase 2 are averaging $292 per participant, including the meter bridge, gateway and in-home display. Product installation, software (Tendril Energize) and vendor services average an additional $152 per customer, for a total first year program cost of under $500 per participant. Annual software licensing renewal is $36 per participant. The other costs are considered one-time costs. The initial pilot resulted in 9.3% average energy savings per participant, with 75% of participants reducing their energy consumption. Approximately a third of the participants reduced their usage by 4 or more kWh per day (compared to control group). Phase 2 evaluation will be completed in August 2012.

Evaluation Approach

CLC selected PA Consulting Group to conduct a process and impact evaluation for the initial pilot. Evaluation activities included in-depth interviews, telephone surveys, a comprehensive energy use analysis, and a literature review. The impact evaluation included an analysis of monthly energy consumption (kWh) across both time (compared to previous year) and with two control groups (one random and one that expressed interest in the pilot).

Lessons Learned

- Cape Light Compact is convinced there are savings available from providing customers with feedback on their energy consumption.
- Be clear about your utility's goals to inform the program design and product/services. Providing customers with basic feedback is one thing, achieving significant reductions in usage is another.
- Think through required staff support before initiating the program. CLC moved to more of a turn-key approach for phase 2 to minimize utility staff impacts.

- Identify important questions to ask vendors/service providers. What are they providing beyond the product(s)? What are the data requirements? (frequency, format, etc.)
- Tell customers what the pilot is and what it isn't, get their informed consent before participating.
- Technical challenges with completing installation and connectivity of the energy monitors can impact or delay implementation.
- Awareness of energy use by participants increases. They have self-diagnosed spikes due to heat being left on, refrigerator cycling issue, etc. People informing each other about energy saving actions they can take is important.
- Correlation is low between self-reported habits and tasks to save energy and actual energy savings, the strongest predictor of savings to-date is interaction with the energy monitor (website).

Future Plans

This is a different approach to promoting energy efficiency with use of new technology. It is enhancing utility customer interaction and participants learn more about CLC and its energy efficiency programs, resulting in greater customer awareness and program cross-selling opportunities. The persistence (or lifetime) of the energy savings is the key to program cost-effectiveness, which CLC will learn more about through the phase 2 evaluation (which includes original pilot participants). If the persistence is there, CLC may offer program services to more customers. Adjustments can be made to the program, including customer fees charged for the service, to help assure it is cost-effective.

Contacts

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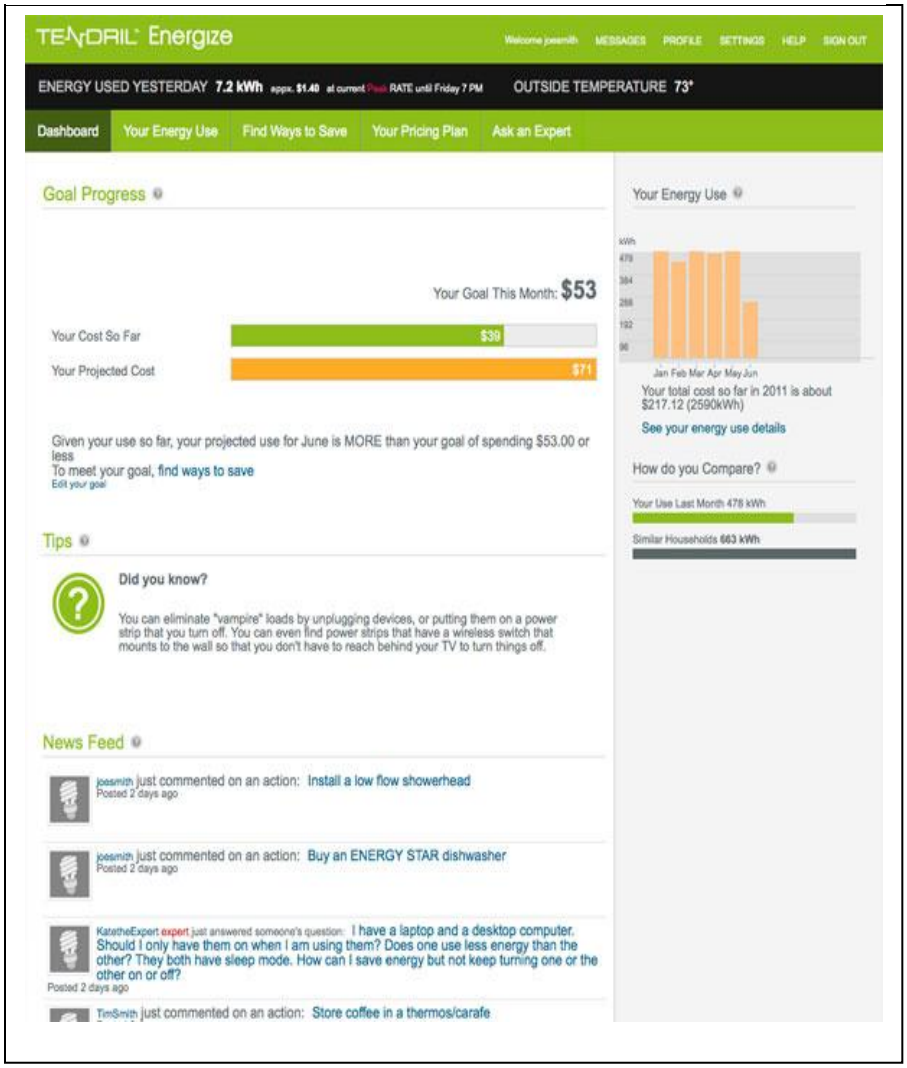
Figure 17. Cape Light Compact Energy Monitoring Portal



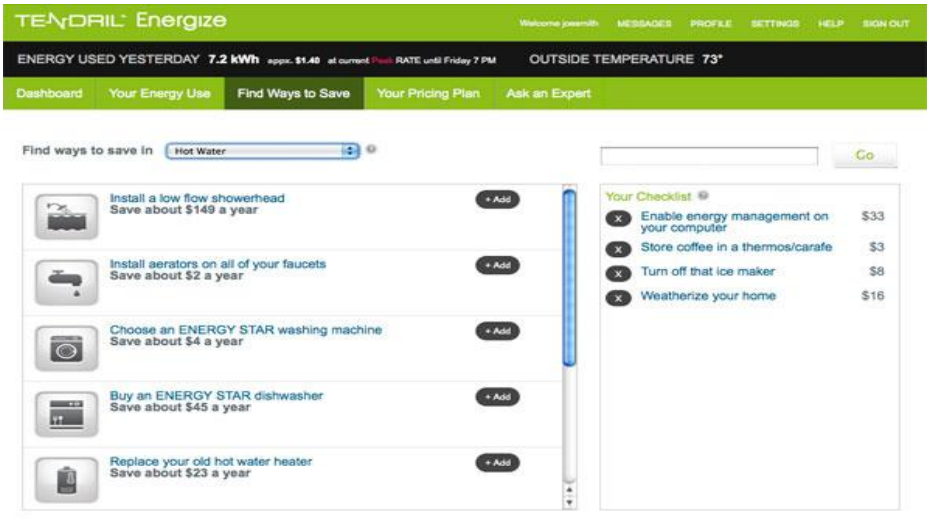


Figure 17. Cape Light Compact Energy Monitoring Portal Tips

Residential Behavior Based Energy Efficiency Programs Interview Questions

1. *Program Goals*
    a. Customer engagement/satisfaction?
    b. BBEE energy savings?
    c. Uptake in other EE program (EE technology) offerings?
    d. Other?

2. *Regulatory or Board Support*
    a. How was initial regulatory or board support obtained?
    b. What do you see as the key to maintaining support in the future?

3. *Main Program Design Elements/Features*
    a. *Energy consumption feedback?* Products? [on-line, in-home, mail?] Please describe [info presented, how displayed? frequency?]
    b. *Further customer engagement?* Strategies and tactics?

    Marketing & communications?

    Messages, stimulate customer dialogue? Use of traditional marketing channels, newer social media options and devices?

    Customer tips & assistance?

    Effective actions to take? [tailored to targeted customers?] Integration with other EE offerings? Any assistance in taking BBEE action?

    Customer goal setting?

    Energy reduction challenge and commitments? [personal goal/commitment, any community goals?]

    Rewards and recognition?

    Prizes? Financial rewards? [fixed reward amount, random rewards]

    Recognition? [for what, how?]

    Other?

    Any other customer engagement strategies and tactics?

4. *Delivery or Implementation Approach*
    a. Marketing and customer sign-up?

    Scope? [all customers or specific targets?]

    Opt-in or opt-out?

    Marketing approach? [direct contact, collateral, etc.]

Contractor or utility initiated?

b. Product/service offering?

Product/service installation? [any customer/data requirements?]

On-going customer service? [updates?, customer interaction?]

c. Staff expertise/support?

Areas of expertise needed? [IT, marketing/customer service, operations, etc.]

Use of contract resources? [for what? why? how identified? who selected?]

5. *Program Costs*
   a. Program design costs?
   b. Start-up costs?
   c. On-going operational costs? [Internal and contract, economies of scale?]
   d. Evaluation costs? [Process and impact evaluations]

6. *Program Evaluation*

   Program Results or Outcomes Achieved To-Date?
   a. Participation rates? (opt-in or opt-out?)
   b. Customer feedback/satisfaction?
   c. Energy savings? Persistence?

   How are/were energy savings results evaluated?
   d. Pre & post usage comparison?
   e. Control group (randomized)?
   f. Surveys? Focus groups?

   Main lessons learned to-date? [Pros and cons]

7. *Does your organization have plans to continue BBEE program activity in the future? If not, why not? If so, how? Any additional thoughts or advice to others interested in BBEE?*