SMARTENERGY > INNOVATION
EFFICIENCY
CHOICE
SAVINGS
MANAGEMENT

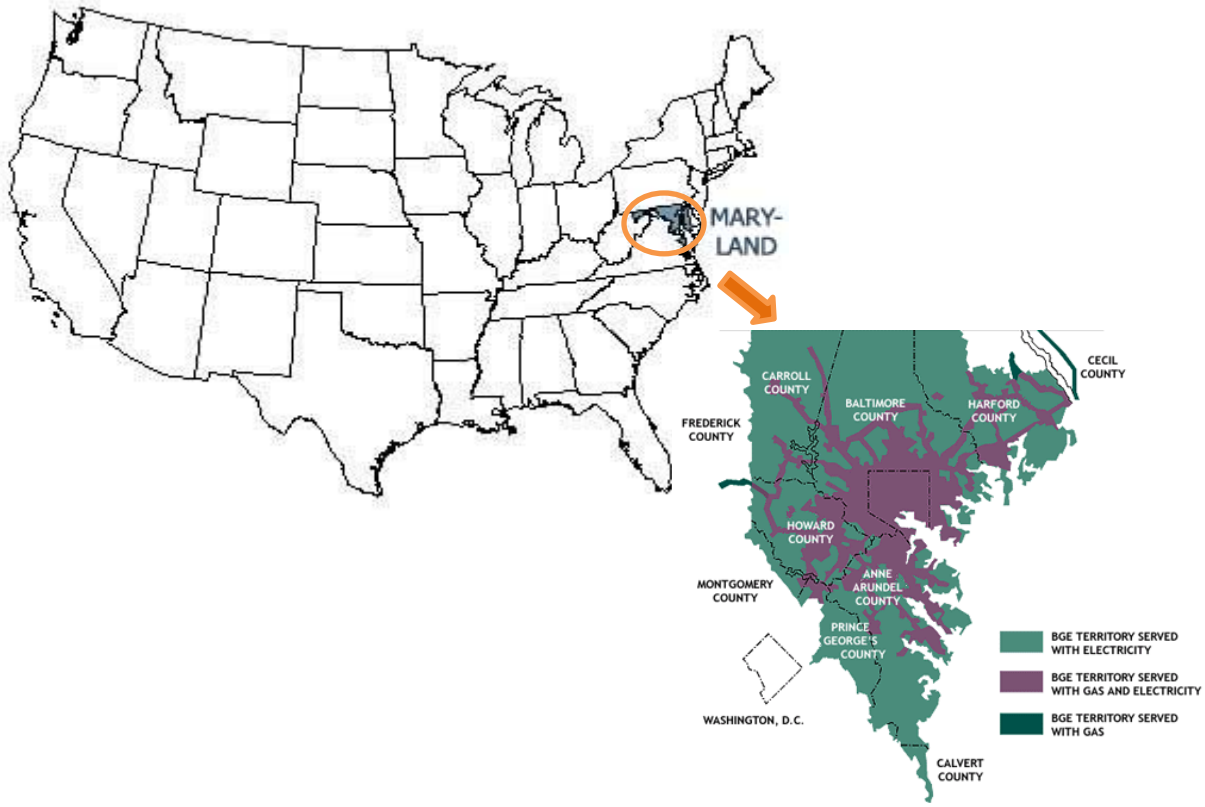
BGE's Residential Smart Energy Rewards (SER) Program at NY REV: The Role of Time-Variant Pricing Forum

BGE

Wayne Harbaugh
March 31, 2015

Baltimore Gas and Electric

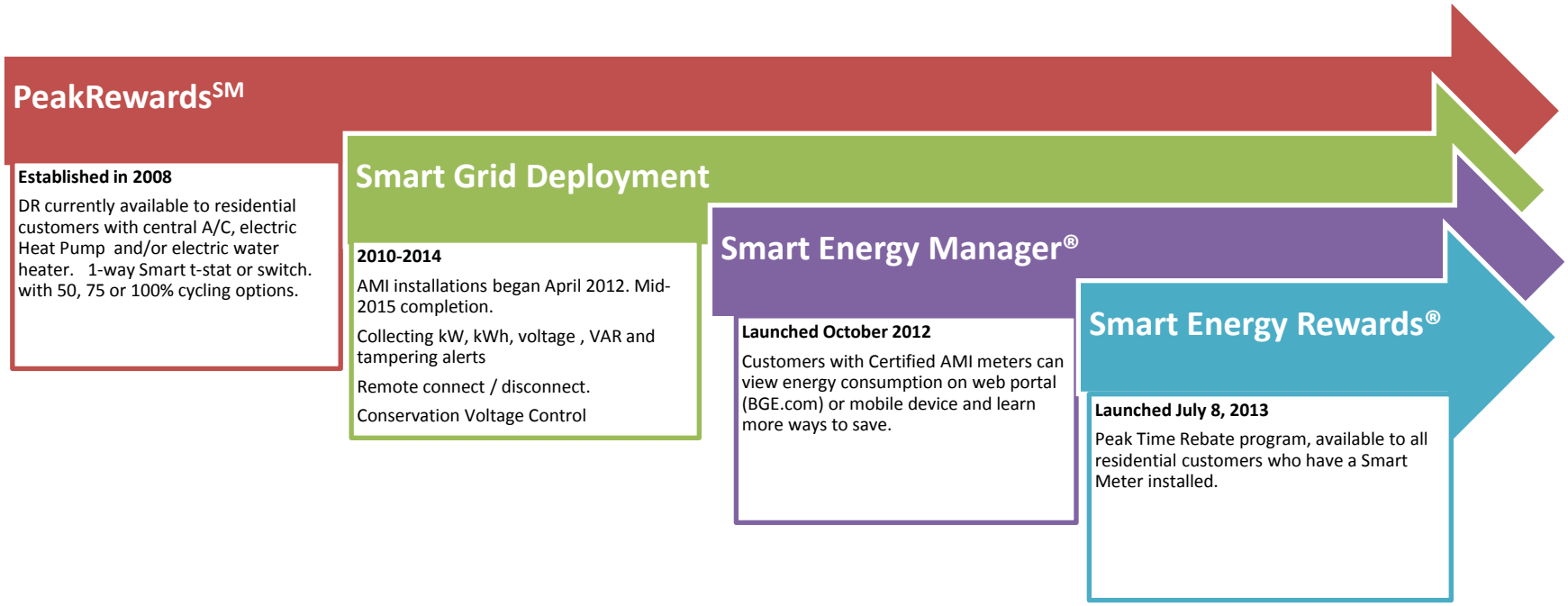
- Maryland's largest utility
- 200 years
- 1st gas utility
- 1.2 million electric
- 650,000 gas
- 31 million MWh
- 7,200 MW
- 3,400 Employees
- Exelon



Key Challenges and Opportunities for BGE

- Customers demanding better service reliability
- EmpowerMD Goals – 15% reduction in electric use / customer and in peak demand by 2015 (vs 2007 baseline)
- Growing levels of intermittent, renewable energy on the grid
- Emergence of *Smart Appliances*
- Emergence of plug-in electric vehicles
- Significant investments needed in new and replacement infrastructure

BGE's Demand Response Programs and Smart Grid Programs



BGE Smart Energy Rewards®

2 Notify Customers

All residential customers notified via preferred channel (e-mail, phone, SMS, web) within 3 hours

3 Calculate Baselines

Overnight calculate up to 1.1M baselines in Oracle MDM

1 Call Event

Based on market conditions

0 Customer Education

Prior to summer season

Behavioral Feedback and Reinforcement

4 Customers Take Action!

7 Credit Bills

6 Provide Feedback

- Savings Summaries provided via preferred channels (e-mail, phone, SMS, web) within 2 days
- Paper versions provided to maximize engagement

5 Calculate Rebates

kWh Reduction **X** $1.25

- Day before event
- Day of event
- Day after event
- Up to 30 Days after event

The Launch of BGE Smart Energy Rewards®

How it Works: 3 Simple Steps

1 WE'LL NOTIFY YOU

The day before an Energy Savings Day you'll receive an alert by phone, email or text.

2 REDUCE YOUR USE

On Energy Savings Days, use less electricity than usual between 1 pm and 7 pm.

3 EARN REWARDS

BGE Smart Energy Rewards credits will automatically appear on your next bill.

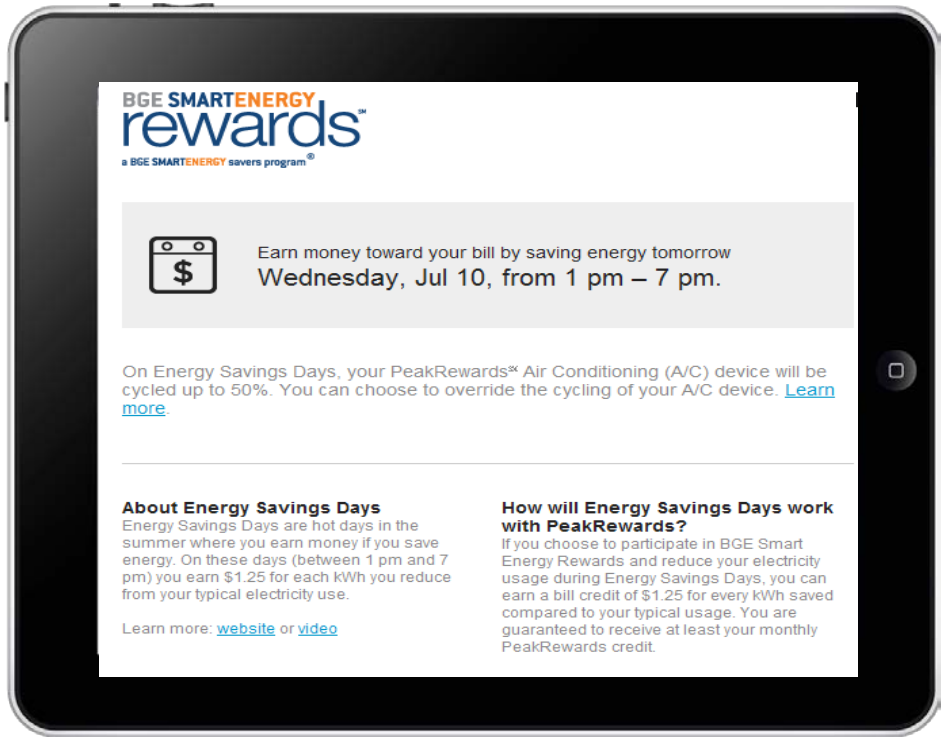
Savings Tips

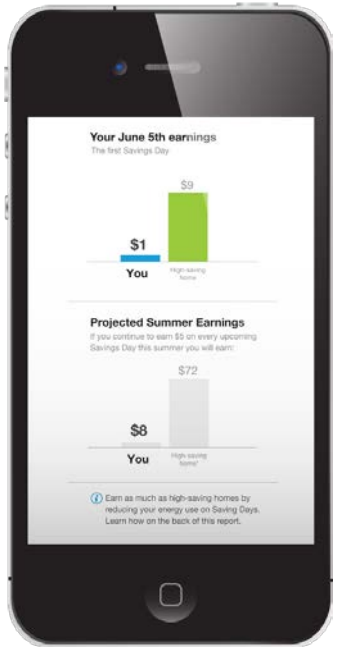
TV Spot & Web Video

Segmented/Multi-Phased Customer Education

Providing Customers a Choice

Customer Notifications Delivered to Customer's Preferred Channel and Customized by Customer Segment





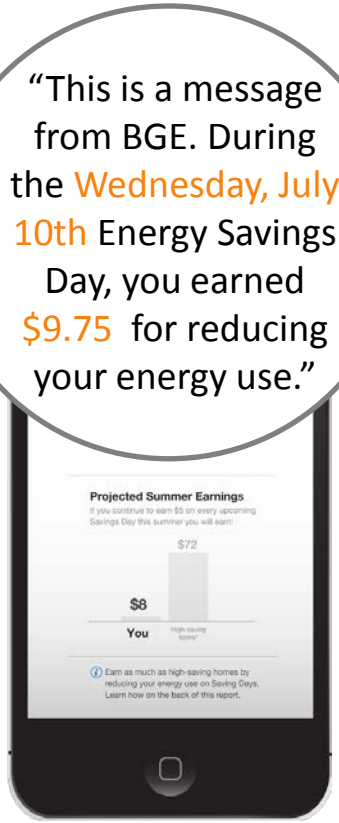
Email Phone SMS Paper

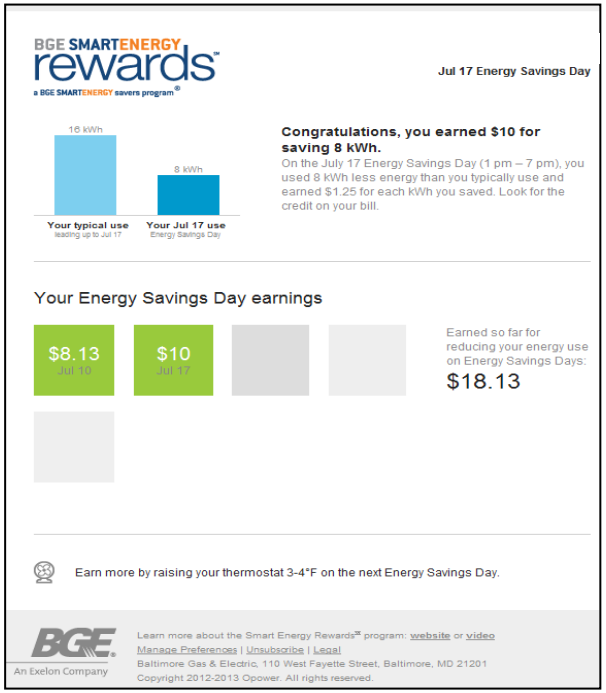
BGE SMARTENERGY rewards®
a BGE SMARTENERGY savers program®

BGE®

Immediate Customer Feedback with Personalized Post Event Notifications

"This is a message from BGE. During the Wednesday, July 10th Energy Savings Day, you earned $9.75 for reducing your energy use."





BGE Smart Energy Rewards®(SER) Results

2013:

- Four Energy Savings Days on 7/10,7/17,7/18 and 9/11
- 315,000 residential customers eligible
- 75% to 93% of customers earned a rebate
- Customer rebates generally about $8.00 to $11.00 / event
- LIHEAP non- PeakRewards – 6.73 kWh per event savings
- Non-LIHEAP & non – PeakRewards – 7.34 kWh per event savings

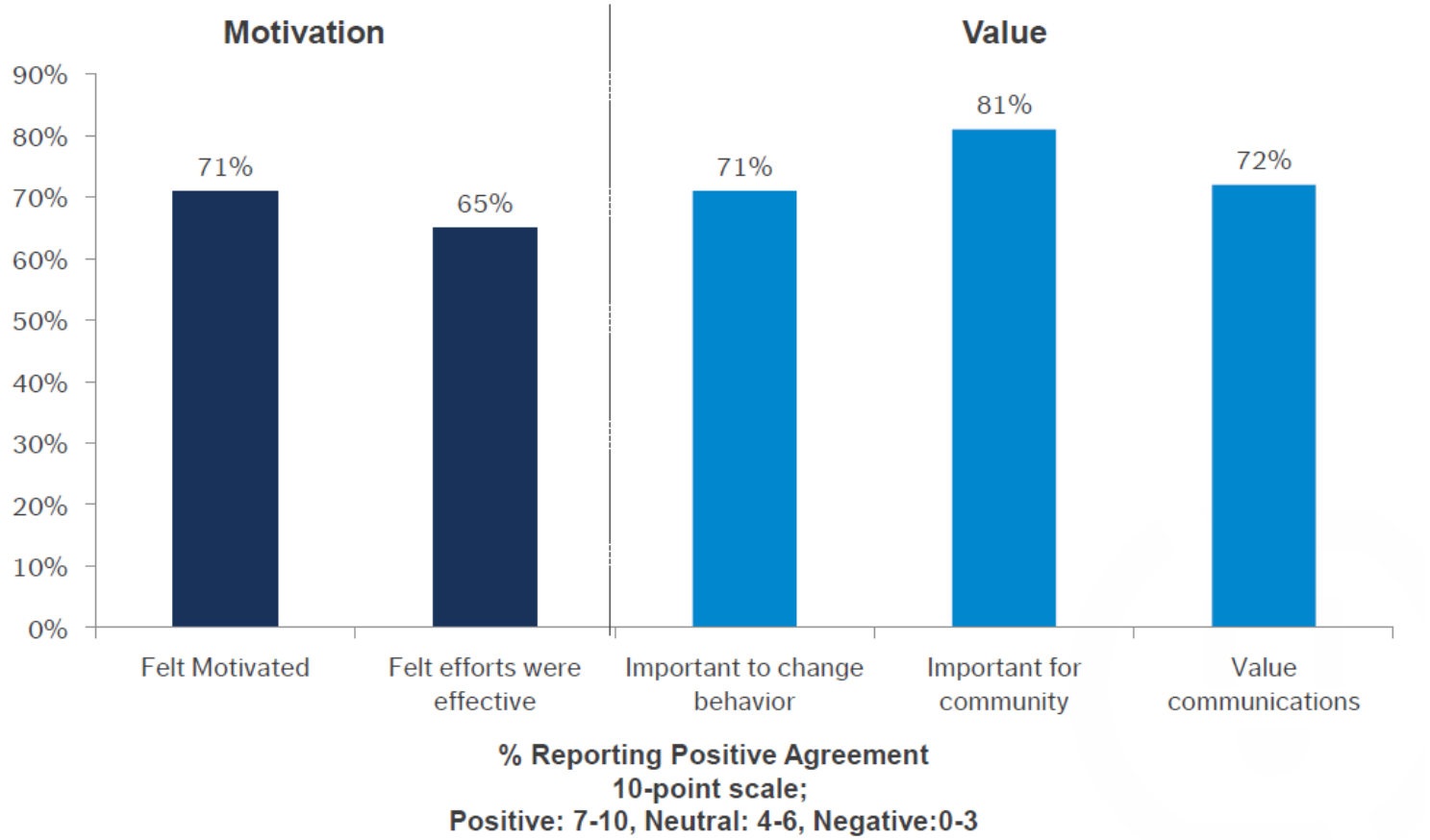
2014 (The summer that failed to show) :

- Two Energy Savings Days on 7/23 & 9/5
- 867,000 residential customers eligible
- 76% average participation
- $6.55 average rebate
- LIHEAP non –PeakRewards – 4.82 kWh savings per event
- Non-LIHEAP non – PeakRewards – 5.26 kWh savings per event

BGE SMARTENERGY rewards®
a BGE SMARTENERGY savers program®

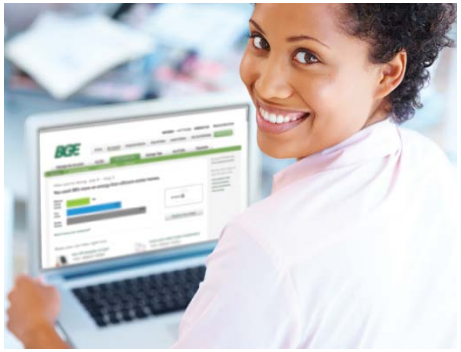
Customers Are Motivated and See the Value

Two-thirds to three-quarters of survey respondents feel motivated by and value the SER program communications.



Q.24: Statement Agreements, 5-pt. scale

BGE Smart Energy Manager® (SEM) Behavioral Energy Efficiency Program

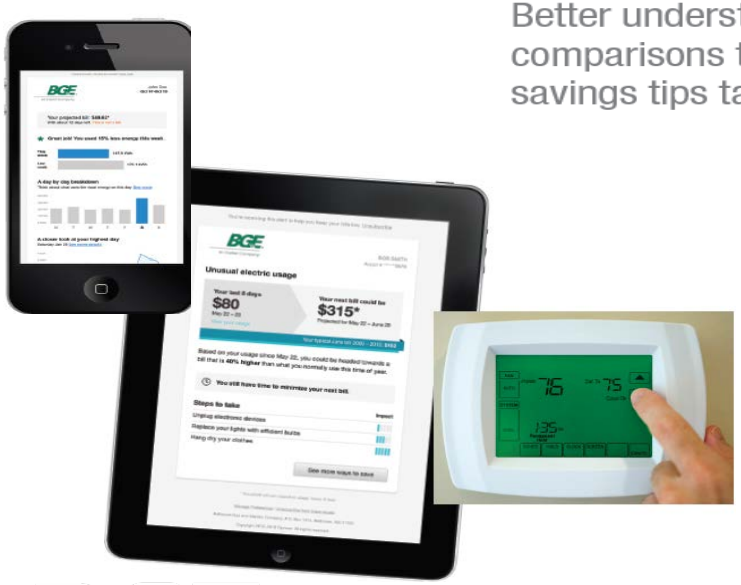


Interactive Online Tools

Compare past bills, track your use over time, find money-saving tips,and more.

Home Energy Reports

Better understand your use through comparisons to similar homes and savings tips tailored to your home.



Email, Voice, and Text Alerts

Receive alerts if you're trending toward a bill that is higher than what you typically receive so you can adjust your energy usage.

What's Next:

PeakRewards two-way thermostat Pilot

peak rewards
a BGE SMARTENERGY savers program®

Objectives:

- Ensure the two-way thermostats chosen for the pilot can be integrated with existing BGE systems to deliver demand response capabilities for residential customers
- Determine if there are additional peak demand reductions under SER
- Determine if there are additional energy efficiency savings
- Determine if there is increased customer satisfaction with a smart thermostat

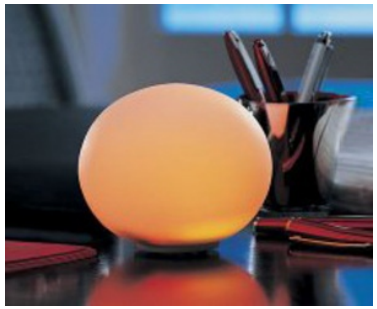
Customer Segment	Customer Count/Thermostat
New Participants	1,000 customers w/Honeywell 9000
Upgrade Current Participants	500 customers w/Honeywell 9000 1,000 customers w/ecobee Smart Si
BYOT	100 customers w/ecobee Smart Si

BGE®

2008 – 2011 SER Pilot Overview

BGE Planned Smart Energy Pricing Based on Feedback

- BGE decided to offer Peak Time Rebates as well as Dynamic Peak Pricing (DPP a.k.a. CPP) beginning in June 2008
  - 1,021 randomly selected customers from the entire BGE service territory; about 90% of customers contacted agreed to participate
  - Day ahead notification of a peak event
  - Test groups included
    - Price incentive only
    - Price incentive with in-home display (Orb)
    - Price incentive with direct load control and Orb
  - Advanced meters were provided to collect 15-minute interval data

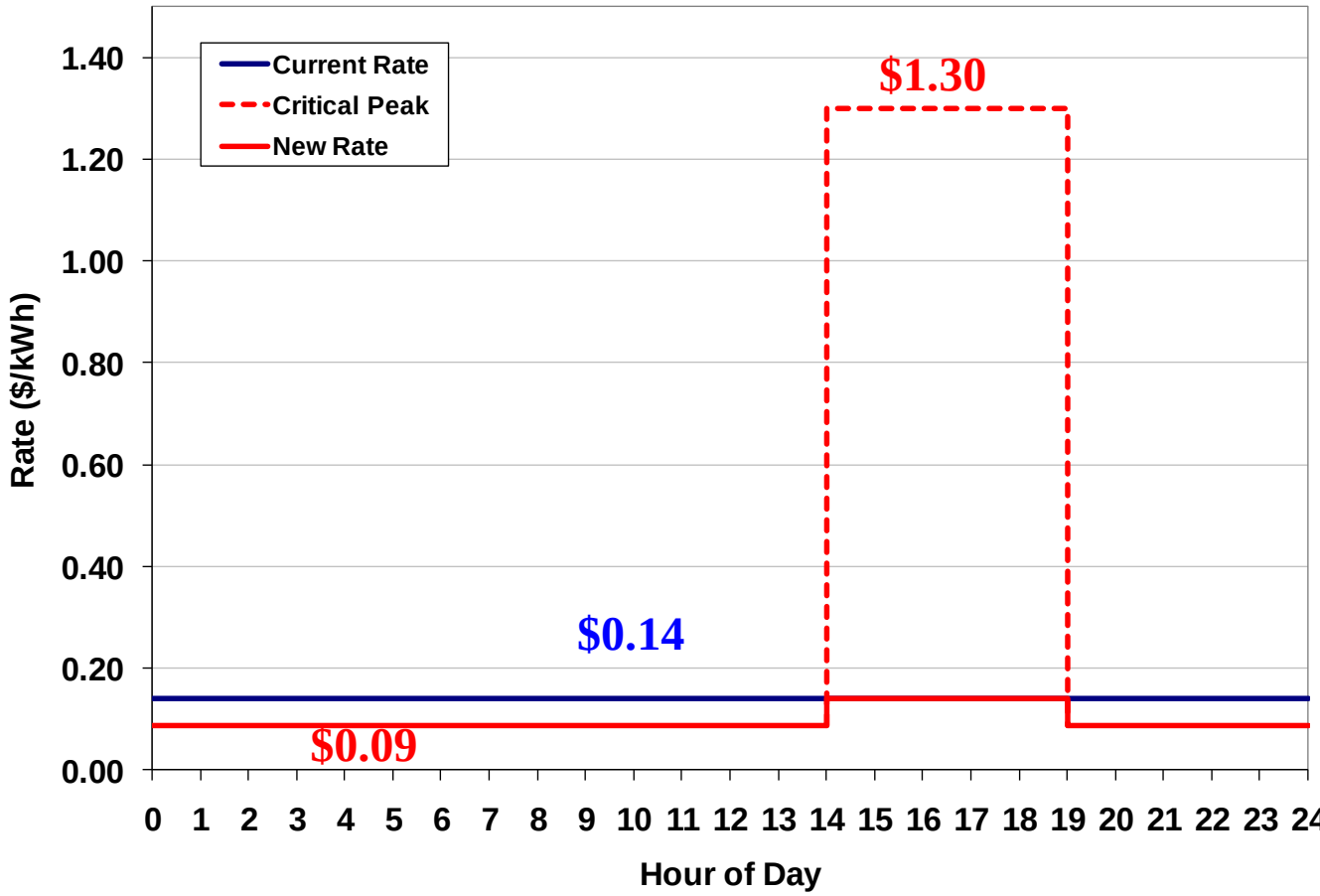


Smart Energy Pricing Pilot Design 2008

Group	Total	PTR Low Rebate	PTR High Rebate	Dynamic Peak Pricing	Control Group
Without Enabling Technology	675	125	125	125	300
With Orb Technology	250	125	125	0	0
With Orb and AC Switch Technologies	375	125	125	125	0
Total	1300	375	375	250	300

BGE's SEP Pilot: 1,300 accounts, a statistically significant sample

Dynamic Peak Pricing (DPP aka CPP) Weekdays (excluding Holidays)



Pilot Pricing
All – in Rate*

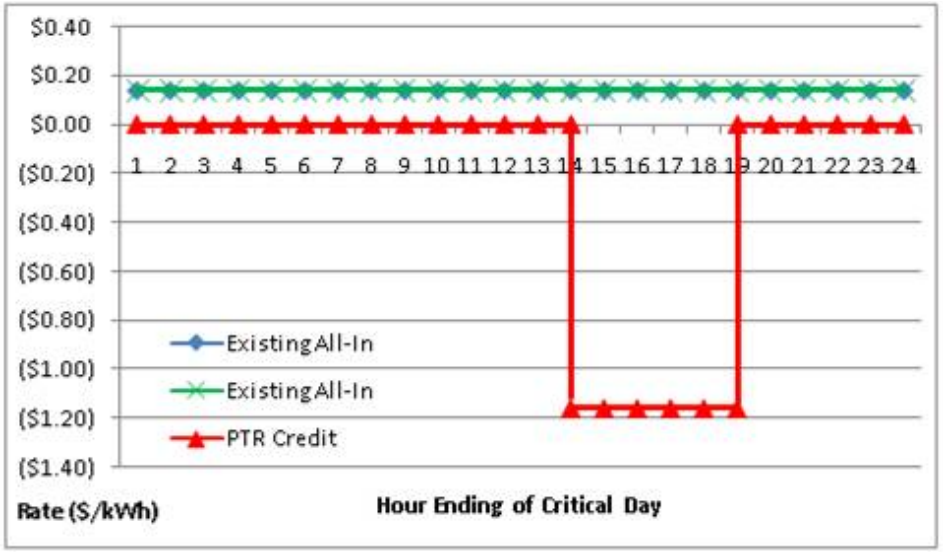
Critical Peak **$1.30425**

$0.14425

Off-Peak
$0.09425

*** Includes generation, transmission and delivery**

Peak Time Rebate: Weekdays (excluding Holidays)



- ***A Mirror Image of the DPP Rate***
  - Schedule R summer rates are $0.14 / kWh for all summer hours
  - Up to 12 critical peak days will be called by 6 p.m. the prior day
  - Customers who use less during the critical period (2 – 7 p.m.) on any critical peak day will receive a rebate. Two levels being tested:
    - $1.75/kWh (2008)
    - $1.16/kWh (2008)

Deployment: Customer Communication Is Key

To renew your enrollment for the 2010 pilot, call the Smart Energy Pricing Team at **1.866.570.7470** Monday – Friday 8 a.m. to 6 p.m. or Saturday 8 a.m. to 4 p.m. or email us at **smartenergypricing@bge.com**. The Smart Energy Pricing Pilot has a limited number of spaces available for participants. To improve your chances for enrollment, please call or email by **March 19, 2010**.

We thank you for your earlier participation and look forward to helping you save money and energy during the 2010 pilot.

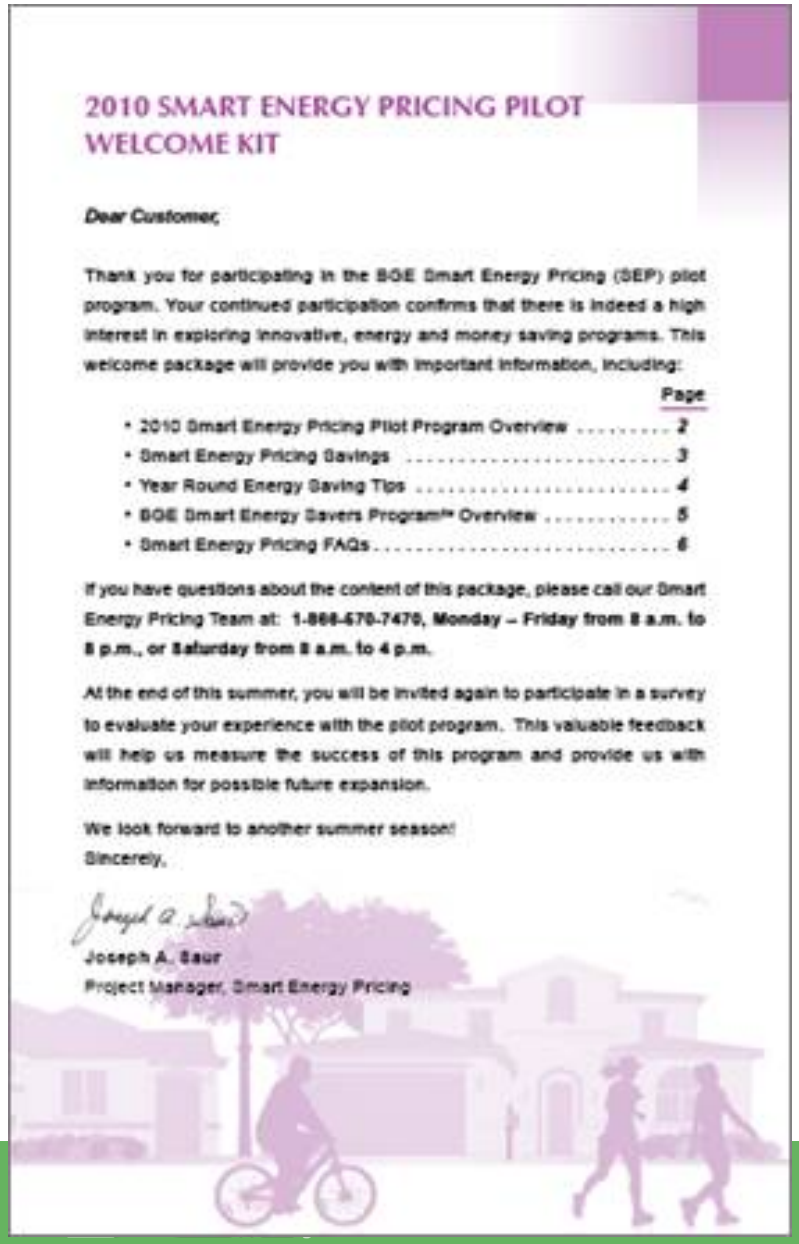
Sincerely,

Joseph A. Saur
Smart Energy Pricing, Project Manager

FIRST CLASS
PRESORT
U.S. POSTAGE
PAID
BALTIMORE MD
PERMIT NO. 250

We Sent Customized Welcome Packages

Each treatment group received different materials describing the pricing and technologies for that group



2010 SMART ENERGY PRICING PILOT
WELCOME KIT

Dear Customer,

Thank you for participating in the BGE Smart Energy Pricing (SEP) pilot program. Your continued participation confirms that there is indeed a high interest in exploring innovative, energy and money saving programs. This welcome package will provide you with important information, including:

If you have questions about the content of this package, please call our Smart Energy Pricing Team at: **1-866-570-7470, Monday – Friday from 8 a.m. to 8 p.m., or Saturday from 8 a.m. to 4 p.m.**

At the end of this summer, you will be invited again to participate in a survey to evaluate your experience with the pilot program. This valuable feedback will help us measure the success of this program and provide us with information for possible future expansion.

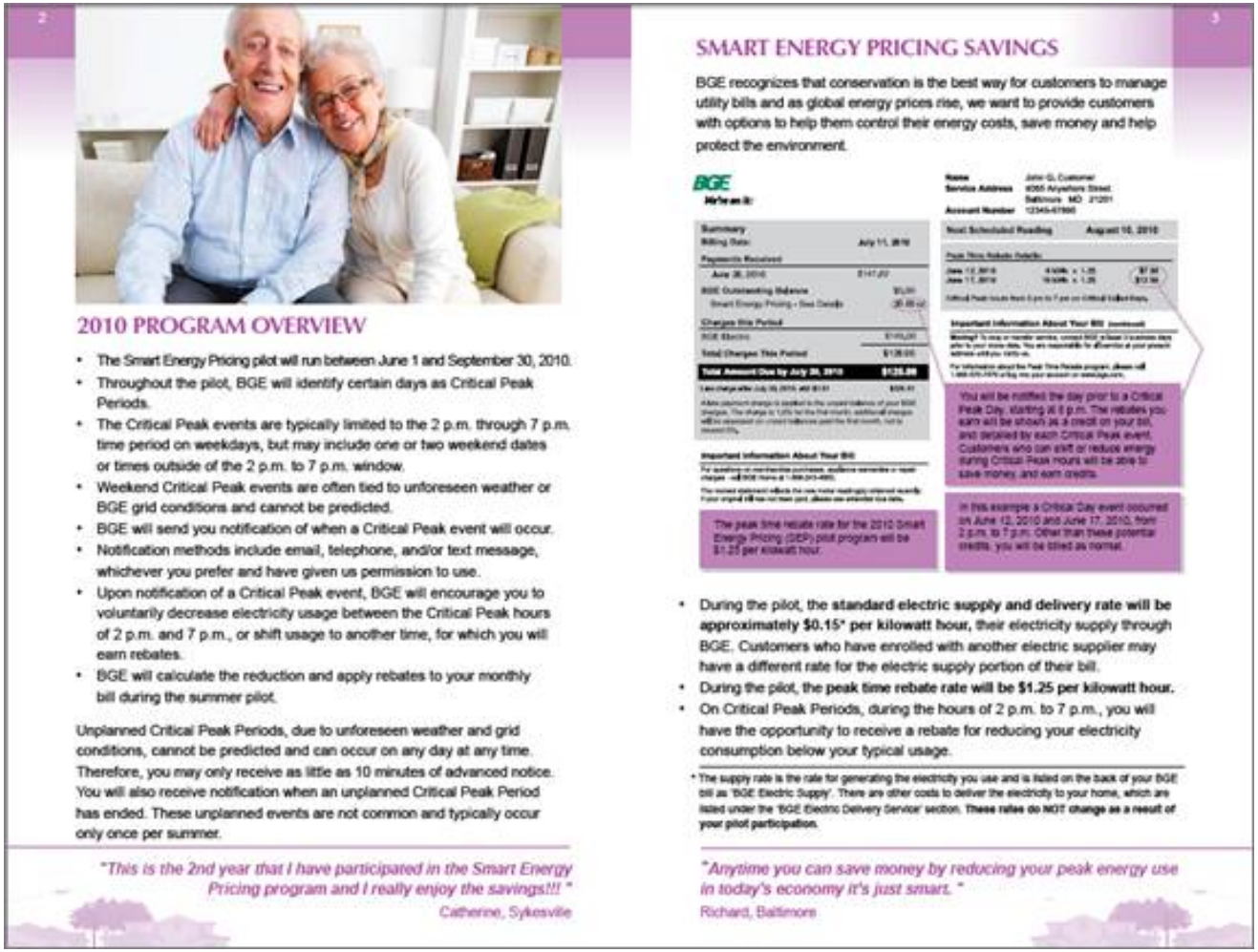
We look forward to another summer season!
Sincerely,

Joseph A. Saur
Project Manager, Smart Energy Pricing

We Thanked Our Customers and Provided Tips for Saving

We provided contact information for our Call Center and supplemented the Call Center with our Hotline

We Provided Sample BGE Bills Showing Rebates



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2010 PROGRAM OVERVIEW

- The Smart Energy Pricing pilot will run between June 1 and September 30, 2010.
- Throughout the pilot, BGE will identify certain days as Critical Peak Periods.
- The Critical Peak events are typically limited to the 2 p.m. through 7 p.m. time period on weekdays, but may include one or two weekend dates or times outside of the 2 p.m. to 7 p.m. window.
- Weekend Critical Peak events are often tied to unforeseen weather or BGE grid conditions and cannot be predicted.
- BGE will send you notification of when a Critical Peak event will occur.
- Notification methods include email, telephone, and/or text message, whichever you prefer and have given us permission to use.
- Upon notification of a Critical Peak event, BGE will encourage you to voluntarily decrease electricity usage between the Critical Peak hours of 2 p.m. and 7 p.m., or shift usage to another time, for which you will earn rebates.
- BGE will calculate the reduction and apply rebates to your monthly bill during the summer pilot.

Unplanned Critical Peak Periods, due to unforeseen weather and grid conditions, cannot be predicted and can occur on any day at any time. Therefore, you may only receive as little as 10 minutes of advanced notice. You will also receive notification when an unplanned Critical Peak Period has ended. These unplanned events are not common and typically occur only once per summer.

"This is the 2nd year that I have participated in the Smart Energy Pricing program and I really enjoy the savings!!!"
Catherine, Sykesville

3

SMART ENERGY PRICING SAVINGS

BGE recognizes that conservation is the best way for customers to manage utility bills and as global energy prices rise, we want to provide customers with options to help them control their energy costs, save money and help protect the environment.

- During the pilot, the **standard electric supply and delivery rate will be approximately $0.15* per kilowatt hour,** their electricity supply through BGE. Customers who have enrolled with another electric supplier may have a different rate for the electric supply portion of their bill.
- During the pilot, **the peak time rebate rate will be $1.25 per kilowatt hour.**
- On Critical Peak Periods, during the hours of 2 p.m. to 7 p.m., you will have the opportunity to receive a rebate for reducing your electricity consumption below your typical usage.

* The supply rate is the rate for generating the electricity you use and is listed on the back of your BGE bill as 'BGE Electric Supply'. There are other costs to deliver the electricity to your home, which are listed under the 'BGE Electric Delivery Service' section. **These rates do NOT change as a result of your pilot participation.**

"Anytime you can save money by reducing your peak energy use in today's economy it's just smart."
Richard, Baltimore

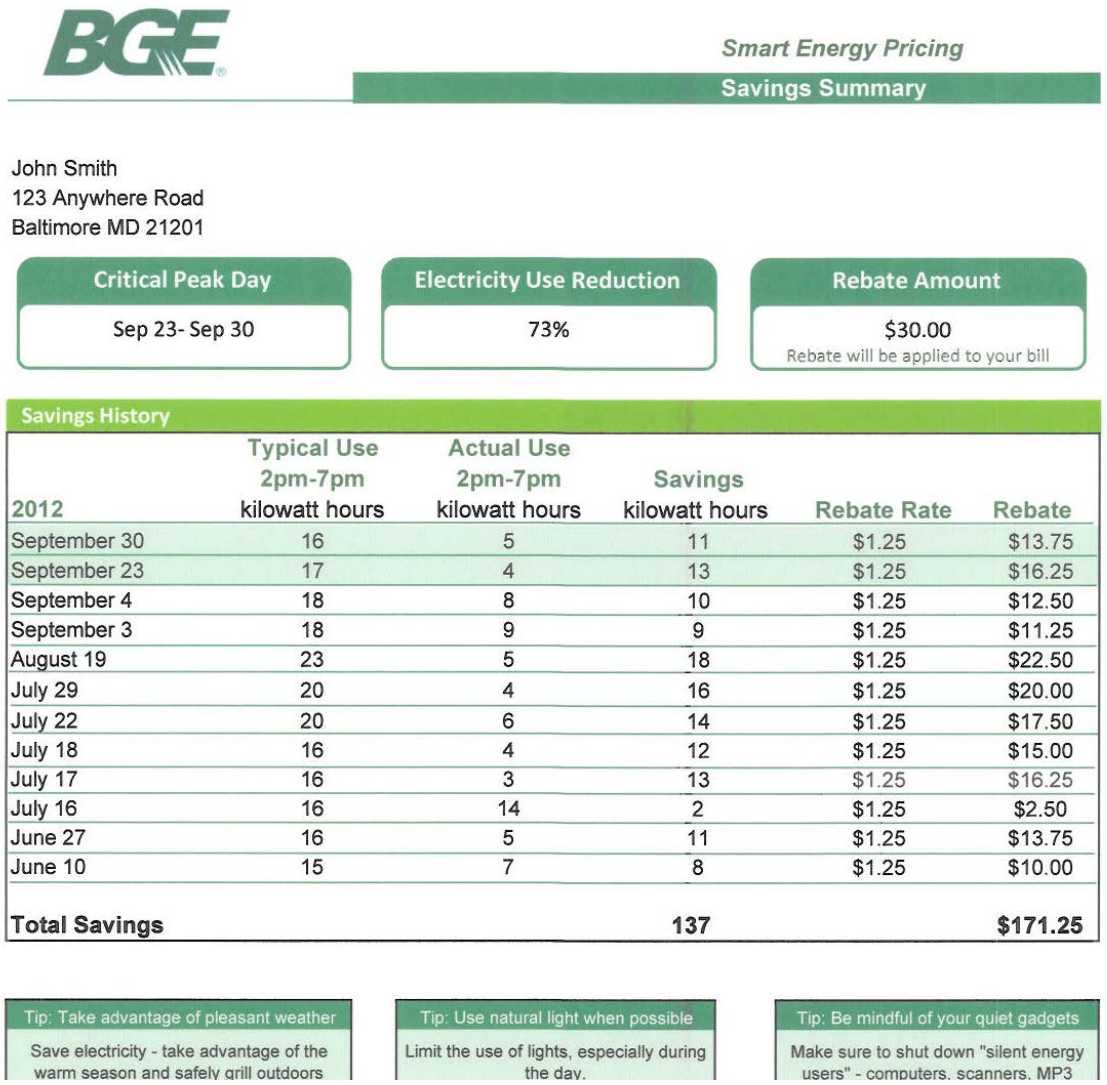
"This is the 2nd year that I have participated in the Smart Energy Pricing program and I really enjoy the savings!!!

Verbatim from Catherine, Sykesville

Peak Time Rebate Savings Reports Were Sent Soon after Each Event

Timely feedback on **meaningful savings** is essential to a successful PTR program.

Pilot customers received reports in distinctive envelopes that did not resemble a BGE bill. This reinforced the value of the program with positive feedback, and provided additional tips for saving.



BGE

Smart Energy Pricing

Savings Summary

John Smith
123 Anywhere Road
Baltimore MD 21201

Critical Peak Day	Electricity Use Reduction	Rebate Amount
Sep 23- Sep 30	73%	$30.00 Rebate will be applied to your bill

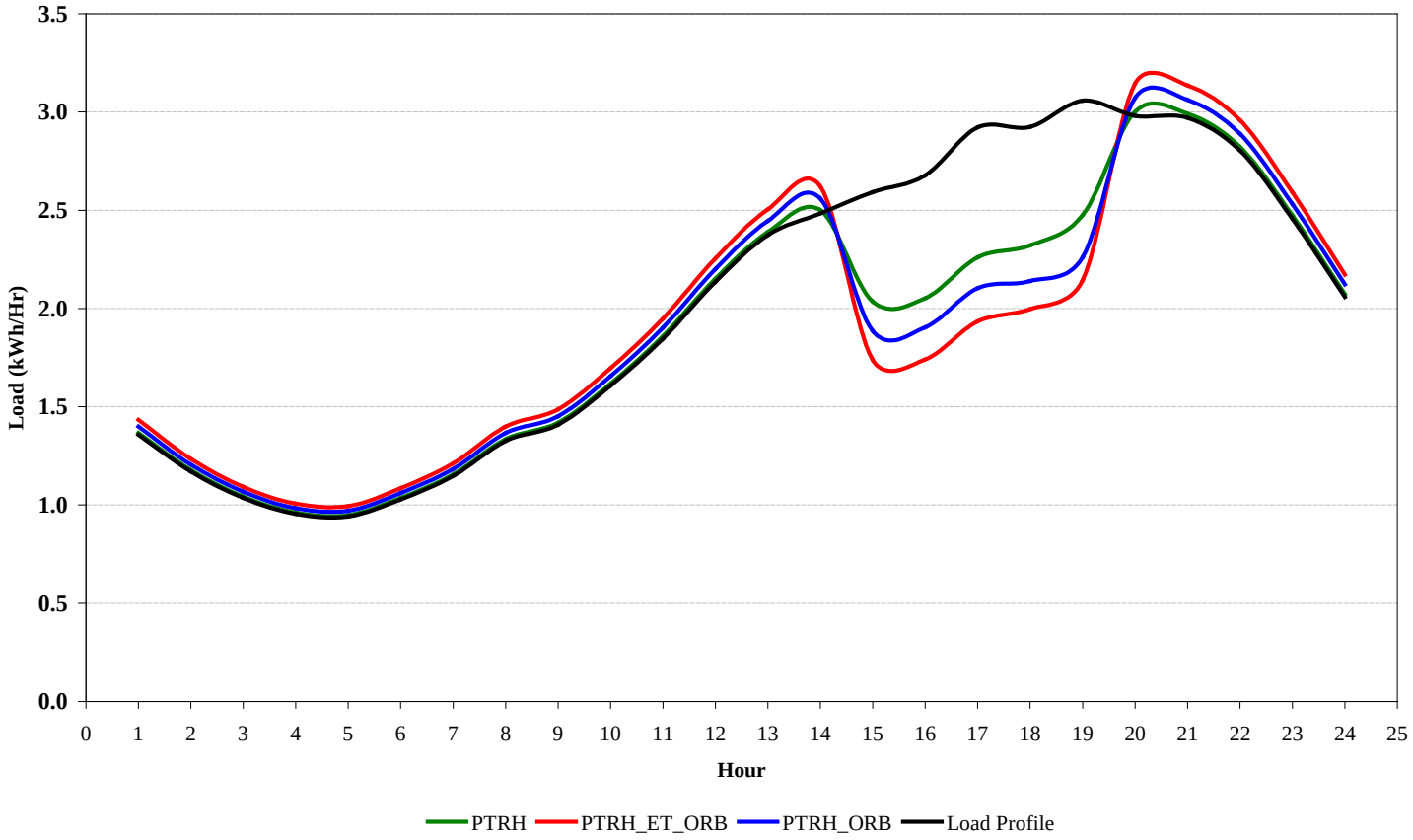
Savings History

2012	Typical Use 2pm-7pm kilowatt hours	Actual Use 2pm-7pm kilowatt hours	Savings kilowatt hours	Rebate Rate	Rebate
September 30	16	5	11	$1.25	$13.75
September 23	17	4	13	$1.25	$16.25
September 4	18	8	10	$1.25	$12.50
September 3	18	9	9	$1.25	$11.25
August 19	23	5	18	$1.25	$22.50
July 29	20	4	16	$1.25	$20.00
July 22	20	6	14	$1.25	$17.50
July 18	16	4	12	$1.25	$15.00
July 17	16	3	13	$1.25	$16.25
July 16	16	14	2	$1.25	$2.50
June 27	16	5	11	$1.25	$13.75
June 10	15	7	8	$1.25	$10.00
Total Savings			**137**		**$171.25**

Tip: Take advantage of pleasant weather	Tip: Use natural light when possible	Tip: Be mindful of your quiet gadgets
Save electricity - take advantage of the warm season and safely grill outdoors	Limit the use of lights, especially during the day.	Make sure to shut down "silent energy users" - computers, scanners, MP3

How did BGE Customers Respond to Smart Energy Pricing?

Demand reductions due to price signals and technology



Actual load shapes for Smart Energy Pricing Pilot on July 17, 2008

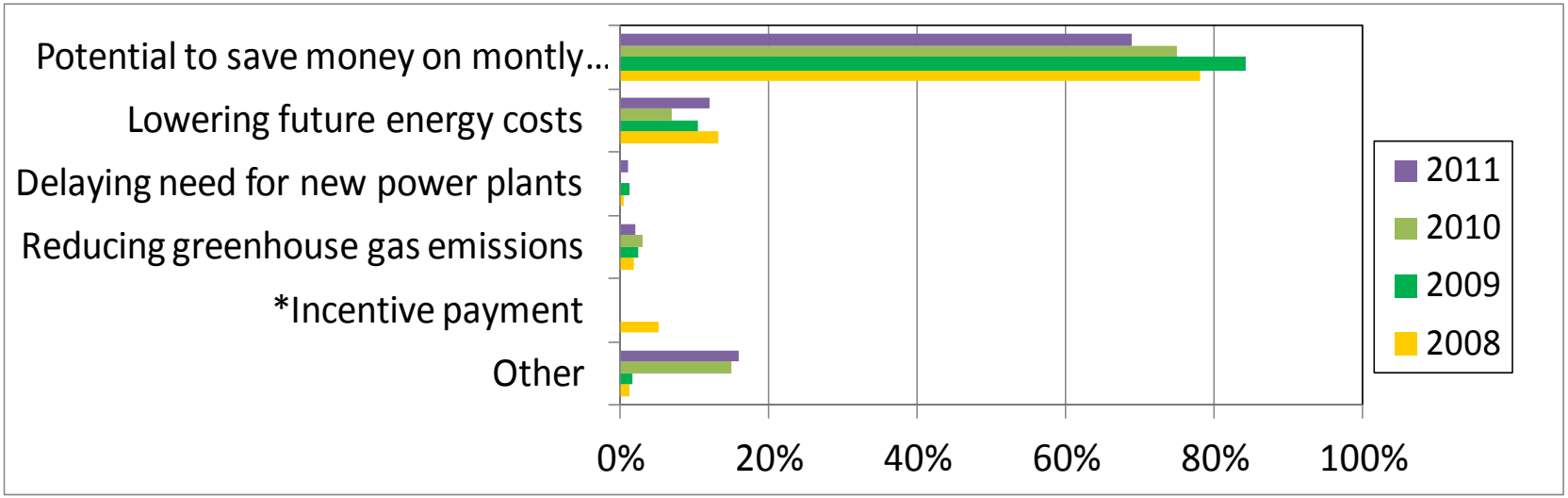
How Did BGE Customer Respond to Smart Energy Pricing?

http://www.youtube.com/watch?v=nMiwvFzdDhc

Reasons to Participate in Smart Energy Pricing

- The *potential to save money on monthly utility bills* continues to be the primary motivation behind customers' participation in the Smart Energy Pricing Pilot, with selection of this response at 78% in 2008, 84% in 2009 and 75% in 2010.

Q 1. What was the most important reason for your participation in the 2009 Smart Energy Pricing Pilot? (Select one option)

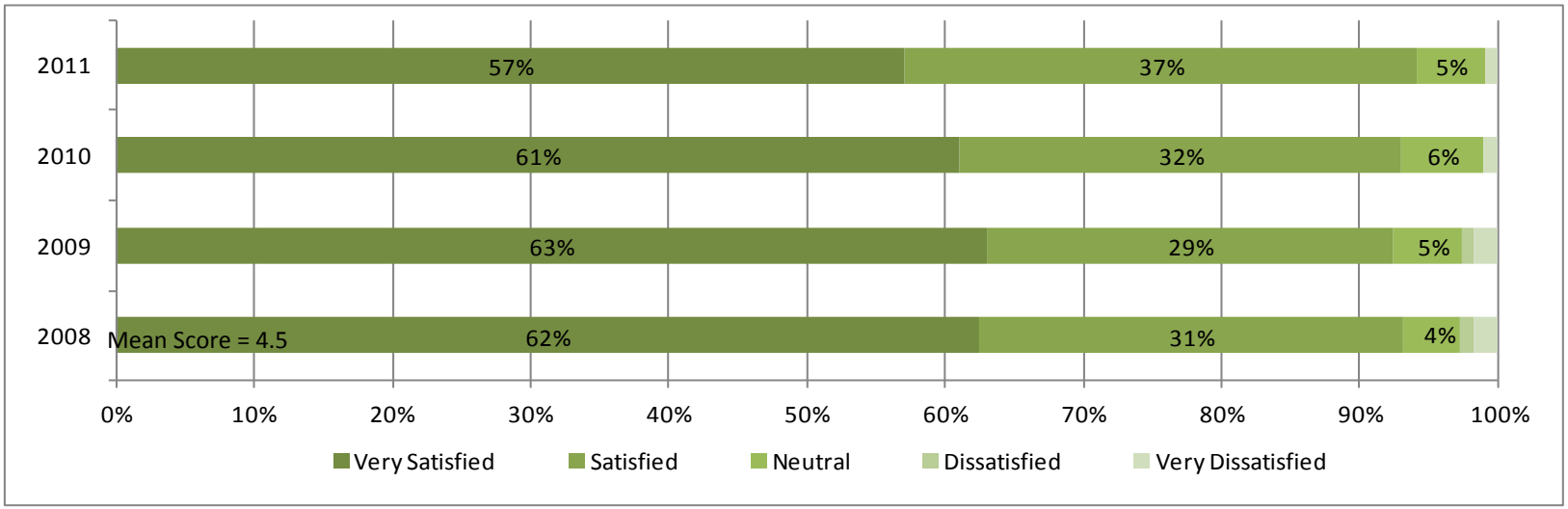


Program Satisfaction

- Satisfaction with the SEP Pilot Program remains consistently high, with over 50% of the participants claiming to be ‘Very Satisfied’ with the pilot program, and nine out of ten participants stating they are at least ‘Satisfied’. Only 1 – 3% were dissatisfied.

Q 2a). On a scale of 1 to 5, where 1 is "Very Dissatisfied" and 5 is "Very Satisfied", please rate your overall experience with the Smart Energy Pricing pilot program.

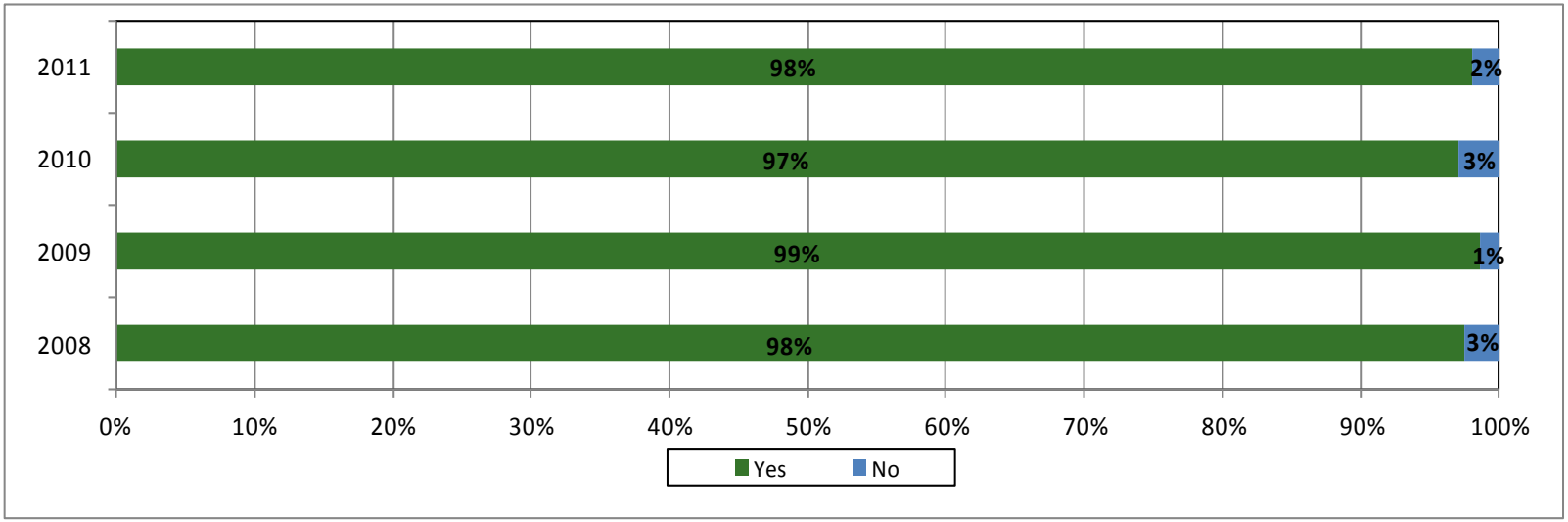
Mean Score = 4.5



Interest in Future Participation

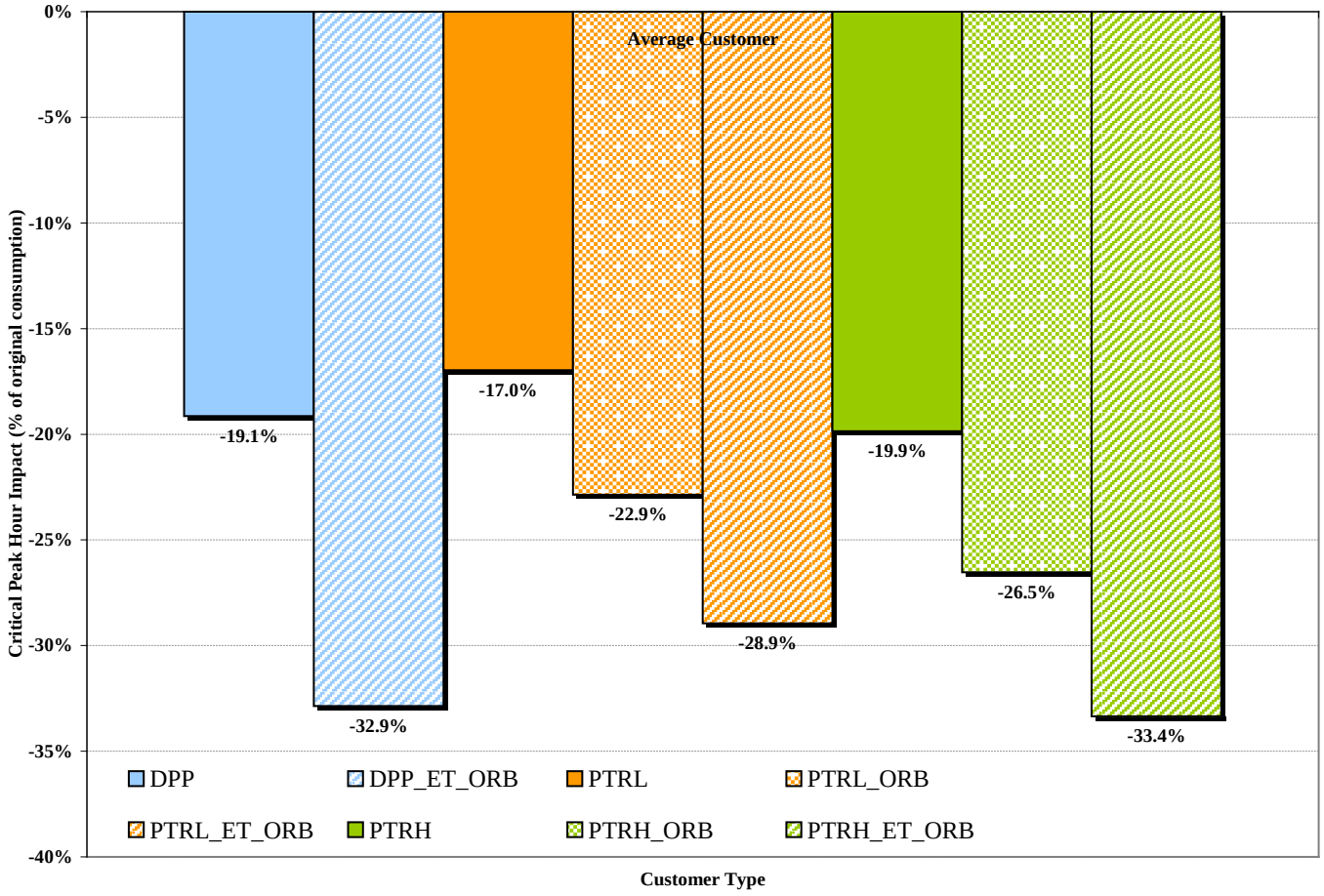
- Participants in each year's SEP Pilot Program were overwhelmingly interested in returning to a similar pricing structure the following summer between 97 and 99%.

Q 4. The Smart Energy Pricing Pilot program has ended and all participants who received special rebate credit opportunities have returned to the normal billing structure. Would you be interested in returning to similar billing program structure as you experienced during the 2009 summer pilot program for the summer of 2010? (Select one option)



2008 Demand Response Impact Summary

Comparison of the demand response impact across all SEP treatments (50 hours)



Summer 2008 Pilot
Summary of *The Brattle Group* Analysis

Program	Number of Participants	Peak Demand Savings***			Energy Savings for SEP Critical Events**		
		Control Group	Participant Peak Reduction		Control Group Average Usage	Average Participant Reduction	
		kW	%	kW	kWh/hour	%	kWh/hour
PTR Low - $1.16 / kWh							
No Technology	126	3.19	22.3%	0.71	2.70	17.8%	0.48
Orb Technology	141	3.19	26.9%	0.86	2.70	23.0%	0.62
Orb and Switch Technologies	113	3.19	31.9%	1.02	2.70	28.5%	0.77
PTR - $1.75 / kWh							
No Technology	127	3.19	26.0%	0.83	2.70	20.9%	0.56
Orb Technology	137	3.19	31.2%	1.00	2.70	26.8%	0.72
Orb and Switch Technologies	118	3.19	36.8%	1.17	2.70	32.9%	0.89
Dynamic Peak Pricing							
No Technology	148	3.19	25.4%	0.81	2.70	20.1%	0.54
Orb and Switch Technologies	111	3.19	36.5%	1.16	2.70	32.5%	0.88

***** 'SEP Critical Events' are defined as the 10 hottest critical events during the 2008 summer from HE 15:00 to HE 19:00***

****** 'Peak Demand Savings' are defined as hour ending 17:00, for WTHI of 83.1 degrees***

WTHI = [current day's THI](10/14)+ [previous day's THI] * (3/14)+ [two day's ago THI] * (1/14)*

$THI_t = 17.5 + .55*DryBulb_t + .2*WetBulb_t$

Summary of 2009-2011 Load Impacts

Program	Peak Demand Savings***			Energy Savings for SEP Critical Events**		
	Control Group	Participant Peak Reduction		Control Group Average Usage	Average Participant Reduction	
	kW	%	kW	kWh/hour	%	kWh/hour
2009 PTR - $1.5 / kWh						
No Technology	3.12	28.7%	0.90	2.41	22.6%	0.54
Orb Technology	3.12	34.1%	1.06	2.41	26.9%	0.65
Orb and Switch/T-Stat Technologies	3.12	38.4%	1.20	2.41	31.0%	0.75
2010 PTR - $1.25 / kWh						
No Technology	2.93	27.0%	0.79	2.70	25.1%	0.68
Switch/T-Stat Technologies	2.93	34.3%	1.00	2.70	32.9%	0.89
2011 PTR - $1.25 / kWh						
No Technology	2.92	20.8%	0.61	2.54	24.1%	0.61
Switch/T-Stat Technologies	2.92	26.7%	0.78	2.54	32.5%	0.83

***** 'SEP Critical Events' are defined as the 10 hottest critical events during the 2009-2011 summer from HE 15:00 to HE 19:00***

****** 'Peak Demand Savings' are defined as hour ending 17:00, for WTHI of 83.4 degrees***

WTHI = [current day's THI](10/14)+ [previous day's THI] * (3/14)+ [two day's ago THI] * (1/14)*

$THI_t = 17.5 + .55*DryBulb_t + .2*WetBulb_t$

In Conclusion

DYNAMIC PRICING WORKS

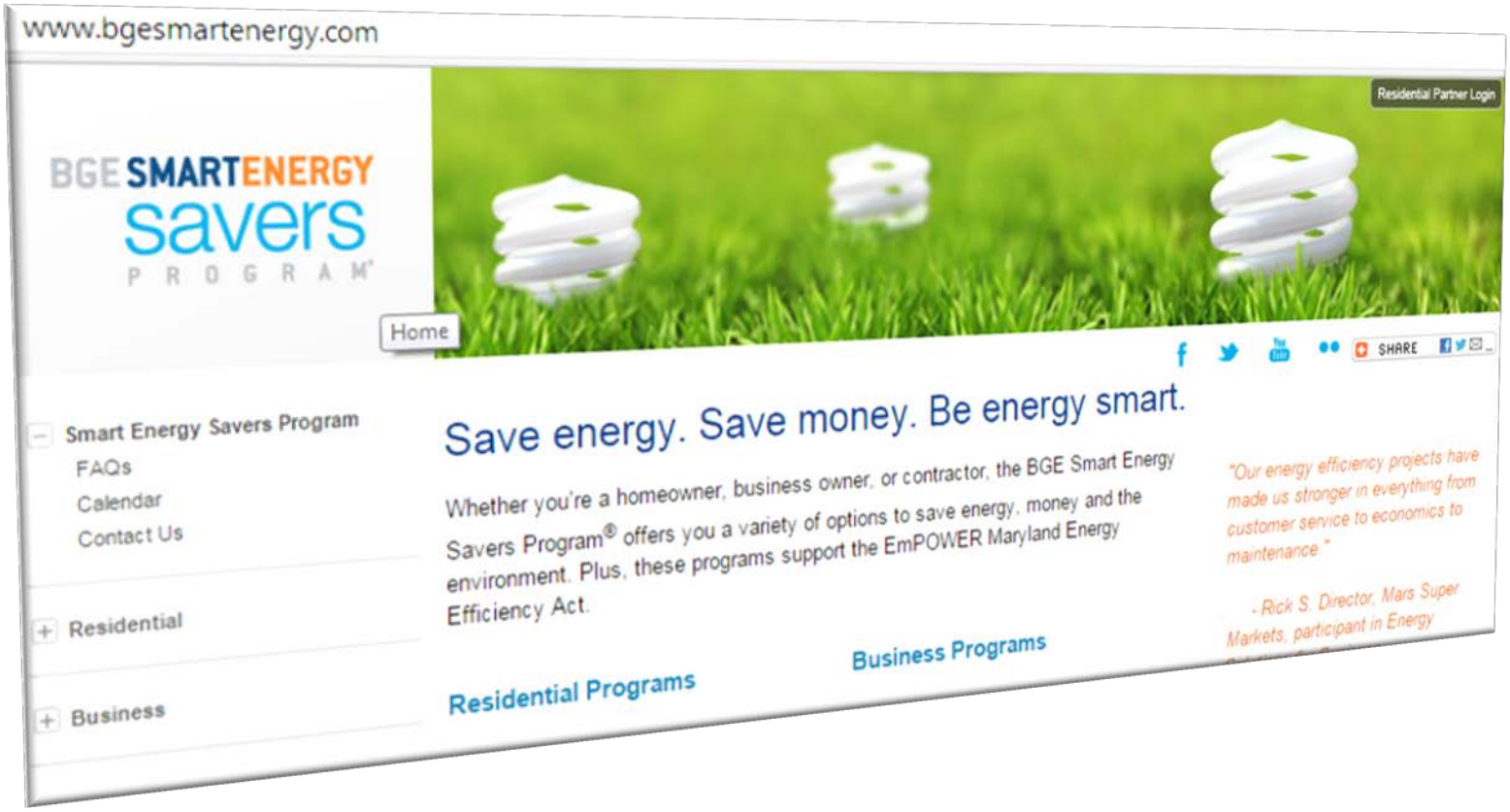
IF *IT IS IMPLEMENTED THOUGHTFULLY BY*

- Understanding participants' understanding of energy
- Developing simple program design
- Engaging and educating participants
- Providing robust pricing signals

THEN

- Providing timely feedback, showing value to participants
- Obtaining feedback from participants

Questions?



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