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Opt-In vs. Opt-Out: Impact Implications for Full Service Territory

Program 182: Understanding Electric Utility Customers
Electric Service Plan/Behavioral Program Evidence Review Webcast

Bernie Neenan, Jen Robinson, Ellen Petrill, EPRI

Theresa Flaim, ERE, LLC

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2014 Research Results – Electric Service Plan/Behavioral Program Evidence

- The purpose of the Electric Service Plan/Behavioral Program Evidence Review project is to synthesize the growing body of research undertaken to establish the impacts of electric service plans and behavioral programs, specifically pricing structures, feedback, and enabling technologies.
- Begun in 2011, the project has delivered reports that serve as a comprehensive reference program designers can use to evaluate how well these programs and elements might work in their markets with their customers.
- To effectively communicate the readiness research results, EPRI is conducting a series of webcasts focused on important design elements as identified by P182 Members. In 2014, that focus is on three topics:

1. Opt-in vs. Opt-out: Impact Implications for Full Service Territory
2. Peak-time Rebates vs. Critical Peak Pricing: Which is Better?
3. Customer (Program Participant) Acquisition and Retention Costs

Objectives of This Webcast

- **Summarize what we know about how the recruitment approach can affect the success of offering optional energy service plans (ESPs)**
  - Opt-in – where customers choose to participate
  - Opt-out – where customers choose not to participate in a default program
- **Measures of success can include:**
  - The number of customers who participate in the ESP
  - The load impacts of the program
  - The relative costs and benefits of the different recruitment approaches

Outline of Presentation

I. The Context

II. Economic Theory & the Rationality Assumption

III. What Does the Choice Literature Tell Us About How Customers Make Decisions?

IV. Evidence from Selected Field Trials

V. Choice Architecture: Issues to Consider

VI. Discussion

Context: The Three Ps of Customer Response to Electric Service Plans (Pricing, Feedback, or Control Technology Programs)

Participation: If we offer an electric service plan (ESP), who will participate and for how long?

Performance: Once in the ESP, how will customers respond, and will their response persist over time?

Persistence: Will customers who participate in an ESP continue over time?

What are the benefits of improving our understanding of customers' choices?

- **Improve customer participation by**
  - Offering programs that will appeal to more customers
  - Designing better marketing and support materials that will appeal to customers who can and intend to respond to the inducements the ESP offers
- **Improve customer response to programs**, which will help reduce supply costs and environmental emissions
- **Improve customer satisfaction overall**
  - Higher customer satisfaction ratings can improve utility financial ratings, which affect the cost of capital
  - More satisfied customers can help improve public and regulatory relations

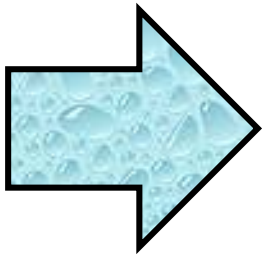
II. Economic Theory and the Assumption of Rationality

Economic Rationality

- Economists define rationality as the consumer (or business) making decisions to further its own interests
- Built on three fundamental behavioral premises
  - Insatiability – more is always preferred to less
  - Declining marginal utility – at some point, more adds less to total utility (satisfaction, well-being)
  - Transitivity – If A is preferred to B, and B is preferred to C, then A is preferred to C
- Together these axioms provide a foundation for utility theory of well-defined preferences from which product demand can be derived. The fundamental relationship between price and quantity:
  - Product demand is downward sloping, all other things equal
  - Demand is continuous in price and quantity (ensures declining marginal utility)
  - Price elasticity serves as a convenient and robust way to characterize price response

What if these assumptions about utility aren't correct?

- Status quo bias – any movement from the current position (baseline) is perceived as a loss
- Utility function is not continuous, but kinked* at the point of status quo
- Hence, marginal changes assuming a continuous function will be erroneous
- Conventional demand modeling will predict changes in demand based on relative prices that is not realized

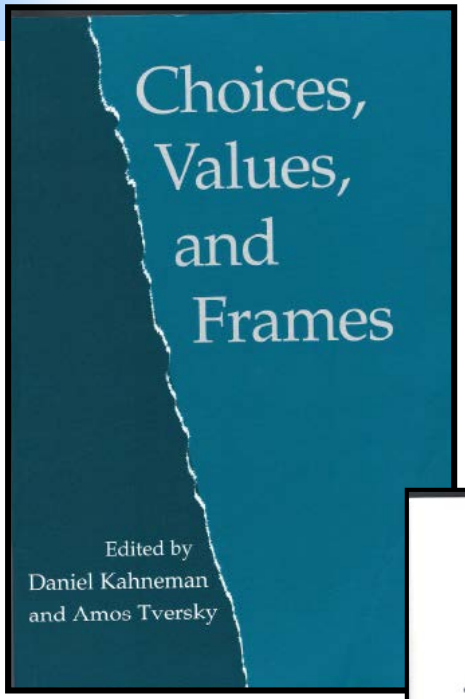


- Consumers overestimate the cost of outages and might require large rate discounts for accepting only slightly lower service reliability
- Consumers might devalue a CPP offer that was asymmetrically revenue neutral (i.e., there are opportunities to gain but participants can't lose)

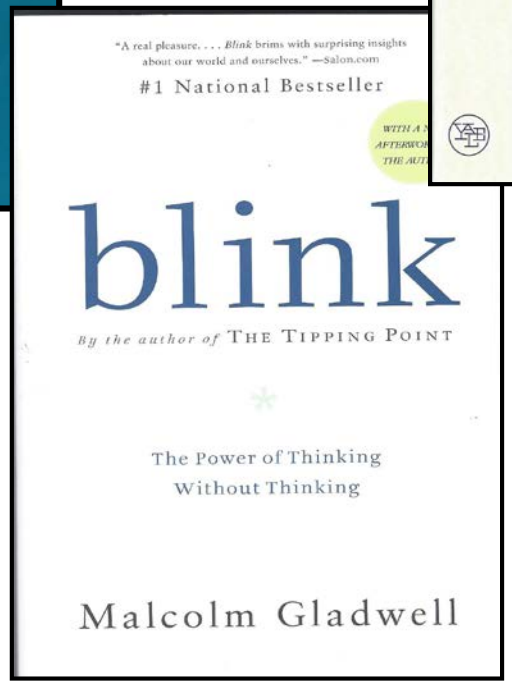
*A kinked function has a discontinuity in the function

III. What Does the Literature Tell Us?

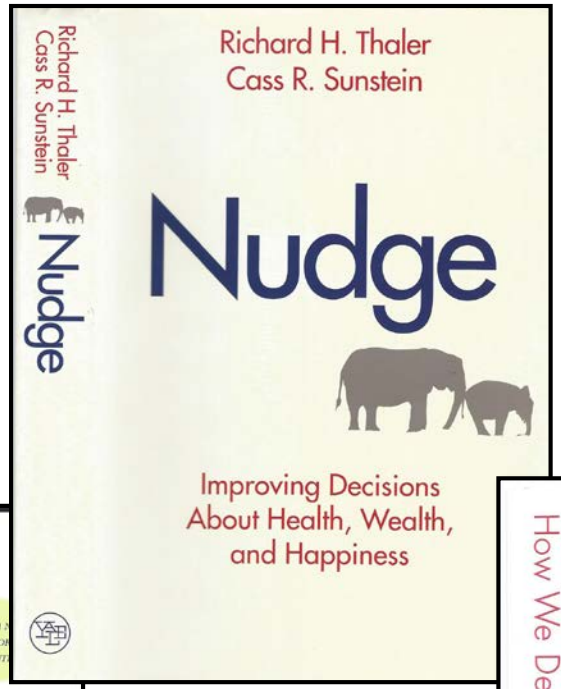
Selected books on how people make decisions



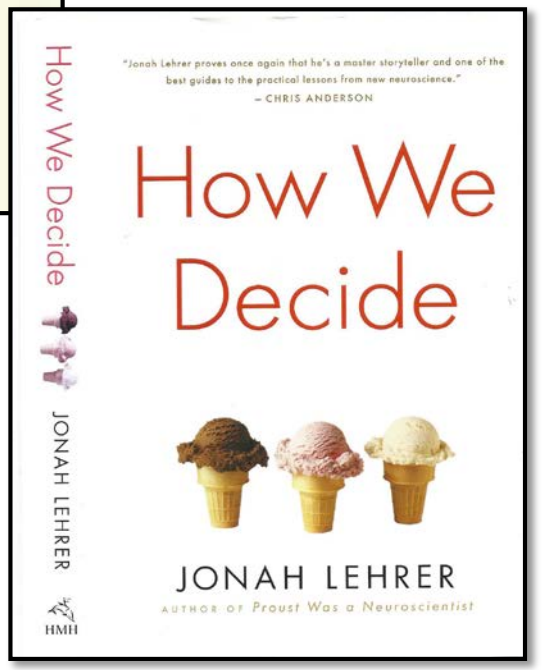
Pub: 2000



Pub: 2005



Pub: 2008



Pub: 2009

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Literature addresses two different types of decisions

1. Decisions that must be made in split seconds, ***when time for deliberate analysis simply isn't available***
   a. An airline pilot trying to stop a plane from crashing
   b. Quarterbacks trying to figure out within fractions of seconds who to throw the ball to
   c. Auctions and ticket scalping

2. Decisions that could be improved by the use of ***conscious, deliberate thought*** (and which typically have sufficient time to allow for it.) Examples:
   a. Buying a house or car
   b. Where to live or go to college
   c. Who to marry, or whether to have children
   d. How to invest in a 401k program
   e. Whether to participate in an electric service plan -- pricing, feedback or control technology program

1. Decisions that must be made in split seconds

- **"blink, The Power of Thinking without Thinking"***
  - "when should we trust our instincts and when should we apply conscious deliberate thought?"
  - Concepts of "thin slicing – the ability of our unconscious to find patterns in situations and behavior based on very little slices of experience" (p. 23)
  - "It involves people making very sophisticated decisions on the spur of the moment, without the benefit of any kind of script or plot."
  - Also has a downside – when what we see (the color of someone's skin, sex, gender or age) does not aid in understanding. It can affect decisions adversely, due to preconditioned bias.
- **"How We Decide"****
  - Argues that human beings are not always rational
  - Too many situations do not allow time for deliberate, conscious thought.

*Malcolm Gladwell, *blink, The Power of Thinking without Thinking*, Little, Brown and Company, New York, New York, 2005.

**Jonathan Lehrer, *How We Decide*, Houghton Mifflin Harcourt, Boston, MA, 2009.

2. Decisions that involve conscious, deliberate thought (1)

- **Nudge***
  - Most economics textbooks assume that humans are perfectly rational
  - Real people rarely fit this model
  - Real people would benefit from having certain nudges, framing choices that would encourage better decisions for themselves. Examples:
    - Setting default values for investments in a 401k plan
    - Display food in school cafeterias to encourage better food choices
    - Ways to increase enrollment on organ donor programs
  - The authors advocate for paternalistic libertarianism – nudging only when consequences are fraught, but always allowing people to make the ultimate decision

*Richard H. Thaler and Cass R. Sunstein, *Nudge, Improving Decisions About Health, Wealth and Happiness*, Yale University Press, New Haven and London, 2008

2. Decisions that involve conscious, deliberate thought (2)

- **Choices, Values and Frames**
  - Explores the reasons why the conventional notions of rational choice don't always apply
  - Describes research that has been done to identify why behavior varies under different circumstances, and suggests modifications to rational choice models
  - Describes risk aversion and decision making under uncertainty
  - Loss aversion: losing something is weighted more than getting the same thing
    - Example: the owner of a bottle of wine would not sell it for $200, but was unwilling to buy another one for $100

Daniel Kahneman and Amos Tversky, Editors, *Choices, Values and Frames,* Russell Sage Foundation, Cambridge University Press, New York, 2000 (10th printing 2009).

Insights from the Literature

- **Losses loom larger than gains**
  - Many customers are risk averse
  - They undertake a mental accounting when making choices that highly value the status quo when other outcomes are uncertain
  - Policies like first-year bill protection can decrease risk and increase enrollment
  - Feedback and/or technology can provide more customer control
- **How we frame choices affects decisions**
  - People have a strong tendency to choose the status quo
  - Making the preferred alternative the default option will increase participation

Prospect Theory – Four-fold Pattern of Risk Attitudes

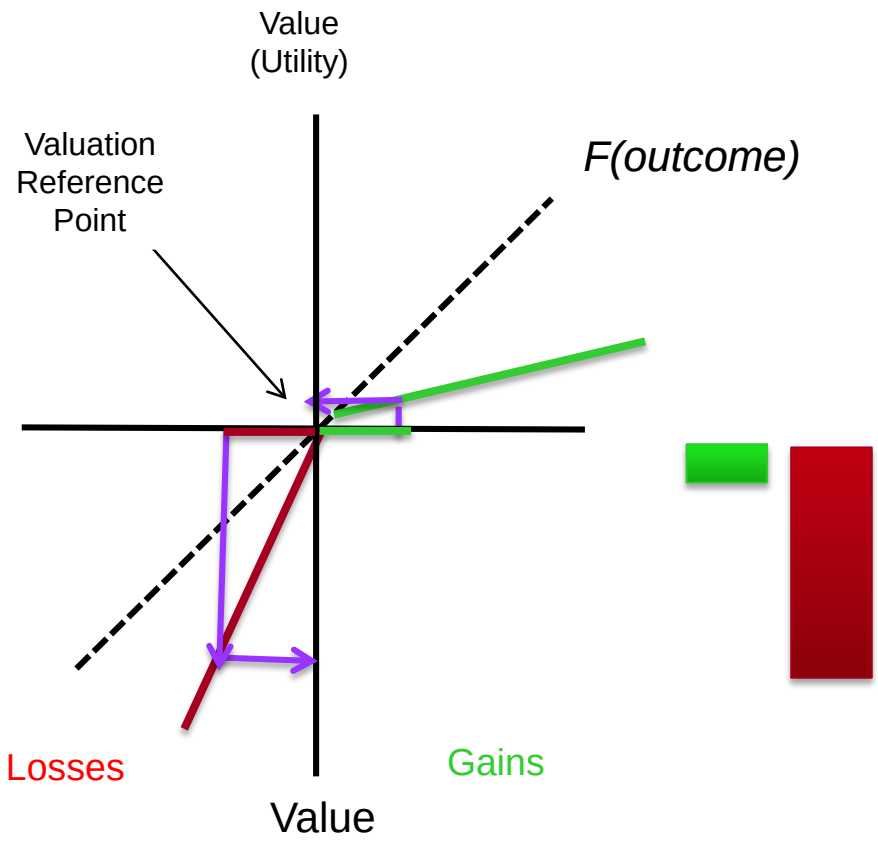
Overweighting of Small Probabilities. Non-linear shape of the value function can be generalized as four types of outcomes

Example	Gains	Losses
High probability (Certainty Effect)	95% chance to win $10,000. Fear of disappointment. **RISK AVERSE**. Accept unfavorable settlement. A	95% chance to lose $10,000. Hope to avoid loss. **RISK SEEKING**. Reject favorable settlement. B
Low Probability (Possibility Effect)	5% chance to win $10,000. Hope of large gain. **RISK SEEKING**. Reject favorable settlement. C	5% chance to lose $10,000. Fear of large loss. **RISK AVERSE**. Accept unfavorable settlement. D

Prospect Theory

- Kahneman and Tversky's heuristic theory of consumption behavior ***under uncertainty***
- Under uncertain outcomes, but where the outcomes are known
  - Consumer's utility is not linear (continuously differentiable)
  - Value is defined in terms of gains and losses (rather than total utility)
- This might influence choices for dynamic ESPs
  - Even if the distribution of prices is known and expected to be below the tariff rate
  - Customers might turn down a real time pricing rate
  - But would they might accept a CPP that is revenue neutral to the base rate

Kinked Value Function Distorts Losses Relative to Gains



Linear Value Curve

At any point in the value function *F(outcome)*, the value of a gain or loss of any size is the same

Kinked Value Curve

Gains from the reference point are not symmetric. For the same gain or loss, the loss is more heavily weighed. This is a non-rational or cognitive characterization of preferences

IV. Evidence from Selected Field Trials

Selected Field Trials: References

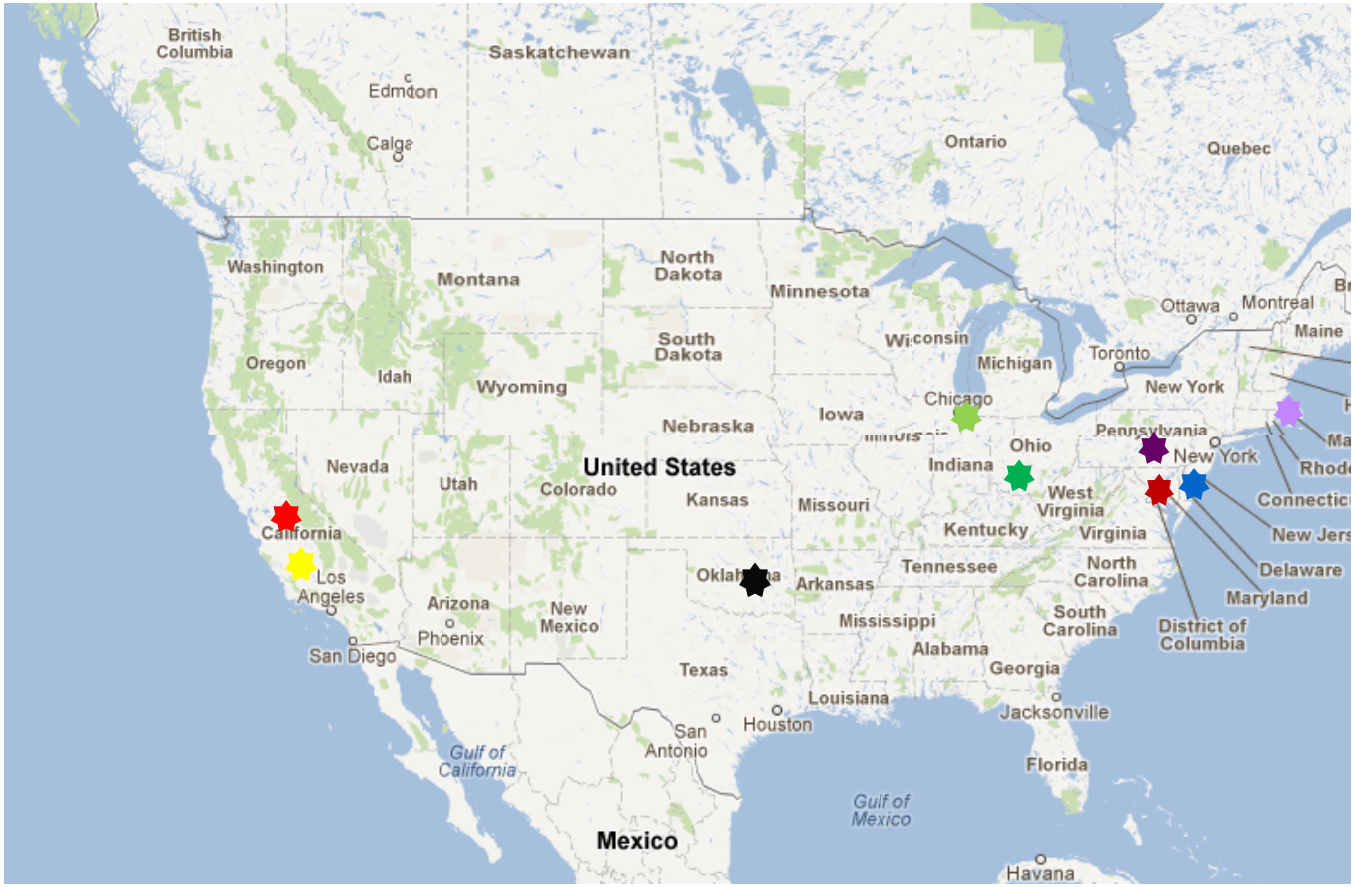
Trials Reviewed By EPRI (1023562 and 1025856)

- (Baltimore Gas and Electric (BG&E) *Smart Energy Pricing Pilot* (Baltimore, MD; summer 2008)
- *California Statewide Pricing Pilot* (CA-SPP) (Statewide; July 2003-Dec. 2004)
- Connecticut Light & Power (CL&P) *Plan-It Wise Energy Pilot* (Connecticut; June 1 - Aug. 31 2009)
- *ComEd Customer Application Program* (CAP) (Chicago, IL; June 2010-May 2011)
- Oklahoma Gas & Electric (OG&E) Positive Energy Together® pilot (Norman, OK; June 1-Sept. 30 2010)
- Public Service Electric and Gas (PSE&G) myPower Pricing (New Jersey; summer 2006-summer 2007)

DOE Smart Grid Investment Grant (SGIG) Consumer Behavior Studies

- FirstEnergy's Consumer Behavior Study: Preliminary Evaluation for the Summer 2012
- Marblehead Municipal Light Department, ENERGYSENSE CPP Pilot, Final Evaluation Report (Summers 2011, 2012)
- Sacramento Municipal Utility District (SMUD) Smart Pricing Option Pilot, Interim Load Impact Evaluation (June 2012-Sept. 2013)

Selected Field Trials By Location



- Sacramento, CA
- California SPP
- CL&P
- ComEd CAP
- FirstEnergy
- PSE&G
- Marblehead
- OG&E
- BG&E

Major Design Features of the Selected Field Trials

Studies Reviewed in EPRI Feb. 2012 Technical Update (1023562 and 1025856)							DOE SGIG Consumer Behavior Study Pilots		
Pilot Features	BG&E Smart Energy Pricing Pilot	CA Statewide Pricing Pilot (Residential)	CL&P Plan-It Wise Energy Pilot	ComED Customer Application (CAP) Program	OG&E Positive Energy Together®	PSE&G myPower Pricing	First Energy Illuminating Company	Marblehead (MA)	Sacramento Municipal Utility District (SMUD)
Experimental Design									
Randomized Control Design	●	●	●	●	●	●	●	●	●
Customer Recruitment									
Opt-in	●	●	●		●	●	●	●	●
Opt-out				●					●
Type of Pricing									
Time of Use (TOU)		●	●	●	●	●			●
Critical Peak Pricing	●	●	●	●	●	●		●	●
Peak Time Rebate (PTR)	●			●			●		
Variable Peak Pricing (VPP)					●				
Feedback									
In-Home Display, Type 5				●	●		●		
Control Technology									
PCTs - customer controlled		●	●	●	●	●	●		●
PCTs - utility controlled							●		●
Load Controls	●	●	●					●	

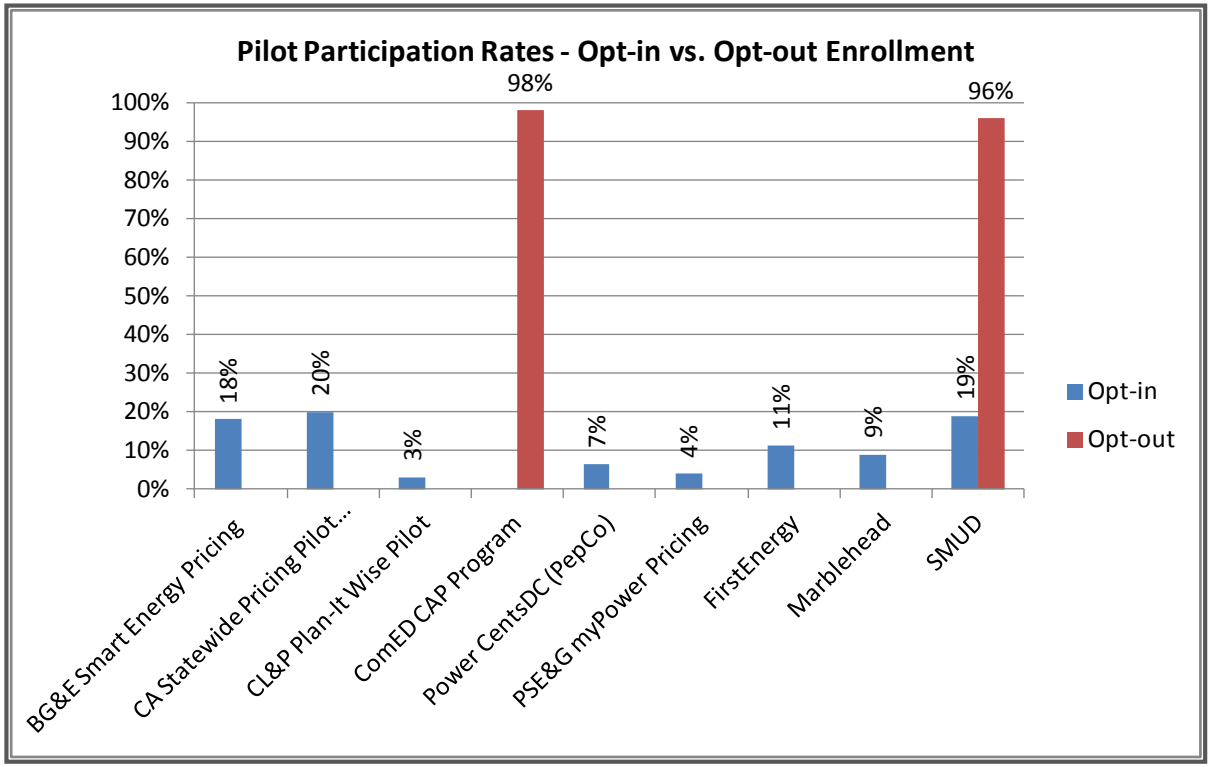
Overview of Utility Markets in the Field Trials

1. The field trials cover both regulated and deregulated retail electricity markets.
2. Both public and investor-owned utilities are included
3. Customer choices include:
   a. The current rate (flat or inclining block rate (IBR))
   b. An alternative rate, typically time-differentiated
4. For the opt-in trials, the default option is the existing service
5. Two trials are opt-out: the default rate is the time-differentiated rate

In most trials, the flat rate is the default rate, and customers must "opt-in" to the time differentiated rate

	BG&E Smart Energy Pricing	CA Statewide Pricing Pilot (Residential)	CL&P Plan-It Wise Pilot	ComED CAP Program	Power CentsDC (PepCo)	PSE&G myPower Pricing	FirstEnergy	Marblehead	SMUD
Opt-in	18%	20%	3%		7%	4%	11%	9%	19%
Opt-out				98%					96%

- Only two utilities tested an opt-out recruitment approach
- Total enrollment was ***5 to 10 times higher*** than for opt-in pilots.
- The two opt-out programs were large by design and in terms of dedicated resources.



ComEd CAP Program Results*

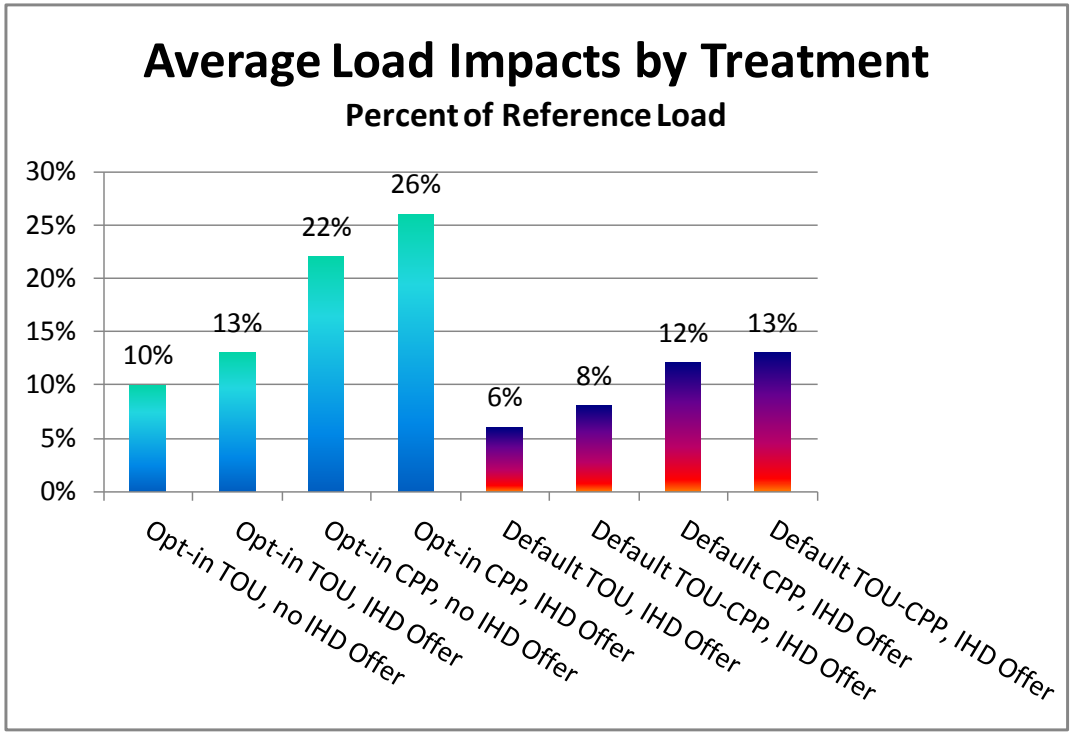
- High enrollment rates (98%) (i.e. only 2% opt-out rate)
- No treatment-level load reductions (compared to the control group)
- However, a subset of treatment subjects (ranging from 4.8 to 10.2% of the total participant load) responded to events with load reductions ranging from -5.6 to -21.8%, consistent with response rates seen in opt-in treatments

Rate Structure	Event-Responder Share of Load (%)	Average Estimated Load Impact for Responders During Event Hours (%)	Implied Total Load Impact (%)
Critical Peak Pricing	10.2	-21.8	-2.2
DA-Real Time Pricing	8.1	-14.4	-1.2
Flat Rate	4.8	-7.2	-0.3
Inclining Block Rate	5.0	-5.6	-0.3
Peak Time Rebate	8.1	-14.7	-1.2
Time of Use	8.0	-11.3	-0.9

*EPRI 1023562, p. 3-13.

SMUD's Preliminary Results

- Average peak load reductions for customers in opt-in treatments was roughly 2X larger than for customers on the opt-out treatments



- But if participation rates are 5 time larger for opt-out treatments, won't they still produce greater overall savings, even if their overall load impacts are only half those of the opt-in treatments? Maybe. (See next slide)

SMUD's illustration of potential large scale impacts based on preliminary results*

Assume SMUD offered the same CPP rate with an in-home display (IHD) to 100,000 customers on an opt-in basis and 100,000 on an opt-out basis. The expected load impacts, assuming the same participation rates and load impacts observed in the pilot, would be:

Recruitment approach:	Opt-in CPP	Opt-out CPP
No. of customers offered the rate:	100,000	100,000
Total expected event load reduction	12.6 MW	30.7MW

Because of the greater expected number of participants in the opt-out case, the expected load impacts would be nearly 2.5 times larger than the load impacts under an opt-in approach.

*See Stephen S. George, Michael Perry, Elizabeth Hartmann, Christine Hartmann, *SMUD Smart Pricing Option Pilot, Interim Load Impact Evaluation*, Prepared for the Sacramento Municipal Utility District, Freeman, Sullivan & Co., San Francisco, CA, September 19, 2013, p. 67.

The cause of the differences in load impacts in the two opt-out field trials is not clear (1)

- **Similarities**:
  - Both studies were rigorous field trials
  - Both spent substantial resources on market research in designing their pilot programs and key interest groups were actively involved in the design process
- **Difference**: the SMUD report is an interim report which only reports load impacts. ComEd CAP report is a final report and includes the results of detailed demand modeling (including price elasticities)
  - Price elasticities (which will be analyzed for SMUD's final report) control for price levels and are likely to reduce the differences in impacts between the two studies.
  - In comparing impacts across studies, EPRI* found that load impacts varied by a factor of 10. Price elasticities varied only by a factor of 2.

*See EPRI 1025856, Nov. 2012, p. 6-5, and Theresa Flaim, Bernie Neenan and Jen Robinson, "Pilot Paralysis: Why Dynamic Pricing Remains Over-Hyped and Underachieved," *Electricity Journal*, May 2013, Vol. 26, Issue 4, p. 18.

The cause of the differences in load impacts in the two opt-out field trials is not clear (2)

- ***Relative*** prices drive load response and the IBR rate structure complicates the calculation of relative prices, and perhaps customers' perception of savings
  - SMUD's prices* are based on an underlying inclining block rate structure. Usage in each billing period are charged a higher rate for kWh in excess of 700 kWh, as shown below:

Rate Structure	Critical Peak	On-Peak	Off-peak	
			<700 kWh	>700 kWh
Standard Pricing	NA	NA	10¢/kWh	28¢/kWh
TOU	NA	27¢/kWh	8¢/kWh	25¢/kWh
CPP	75¢/kWh	NA	9¢/kWh	26¢/kWh
TOU-CPP	75¢/kWh	27¢/kWh	7¢/kWh	21¢/kWh

- If a customer shifts load from peak to off-peak under the TOU structure, they save **19¢/kWh** if their consumption is below 700 kWh, but only **2¢/kWh** if cumulative consumption is above 700 kWh.

*Prices shown are for Standard Pricing. Energy Assistance Pricing Rates are lower. See Steve George *et al., op. cit.,* p. 11.

V. Choice Architecture: Issues to Consider

The goals should determine the types of programs to offer

- Promote competition?
- Promote economic efficiency?
- Provide customers with options for managing their energy use and costs?
- Meet regulatory requirements/mandates?
- Achieve specific resource goals?
  - Postpone the need for new capacity?
  - Reduce resource costs?

The framing of choices affects customer decisions. How should we use that knowledge?

- Thaler and Sunstein* argue that “nudging” people to make a particular choice can be quite helpful when:
  - Decisions are “fraught” (consequences to customers are large)
  - Nudgers (utilities) have knowledge about who is most likely to benefit
  - Differences in individual preferences are either not important or can be easily estimated
- Alternatively, if Nudgers are incompetent and if the risk of self-dealing is high, Nudgers could do more harm than good.
- **Do the consequences of choosing or not choosing an ESP meet the criteria that justify nudging?**

Thaler and Sunstein, op. cit., p. 247-248

Framing of choices (2)

- Some people clearly have a tendency to choose the status quo (called status quo bias or inertia)
  - Relatively low acceptance rates in many recent pilots indicates a preference for the status quo
  - However, market research suggests that many customers do have preferences for alternatives to conventional rates
- One way to increase participation would be to consider making the preferred alternative the default option
- But would this mean that an opt-out approach will be the best overall, given the costs of implementing the program?
- With so few opt-out trials, we don't have a complete picture of performance and participation. And the assessment must be multi-dimensional.

Opt-in vs. Opt-out – A preliminary assessment of the conventional wisdom

See next three slides for further explanation of scoring

Performance Metric	Opt-in	Opt-Out
Participation (program enrollment)		
Customer Satisfaction w/Program	↑	↓
Total Customer Enrollment	↓	↑
Marketing/Recruitment Costs	↓	↑
Program Implementation Costs	↑	↓
Performance (load response)		
Load Response per Participant	↑	↓
Load Response – Total Program	??	??

↑ = option is generally perceived to be better by this measure of performance

↓ = option is generally perceived to be worse by this measure of performance

Notes on the Scoring (1)

- The conceptual scoring on the previous slide is meant to be a conversation starter, not a definitive assessment. The rationale for the individual scores is outlined on the next few slides
- Whether an Opt-in or Opt-out approach is best for your utility's circumstances will depend on your goals, as well as an assessment of the overall response (and the cost of attaining it)
- Some of the individual criteria are conflicting, as illustrated conceptually in the graphic in the preceding slide.
- Try using this scoring system, but gather responses and the reasons for them from customers, regulators, and all parts of the company and look for areas of agreement, as well as areas of disagreement. Both will contribute to making good decisions about program implementation

Notes on the Scoring (2)

- **Customer satisfaction higher for Opt-in** – If customers only participate if they volunteer, the logic is that only those who want to participate will do so (thus, customer complaints about being switched involuntarily would not occur). It does not guarantee, of course, that they will be happy after they are on the program.

  Note that Opt-out (or default) service is not the same thing as mandatory service, where customers are switched to another service without any recourse. The concept here is that a particular rate would be defined as the default rate (to which customers are assigned if they do not choose otherwise). But that they would have alternatives to the default rate.

- **Total enrollment is higher for Opt-out –** because of inertia (customers who are inclined to do nothing will be enrolled on the option). Therefore, opt-out is given a higher score on this metric.

Notes on the Scoring (3)

- **Marketing/recruitment costs – higher for opt-in?**
  - Costs will be highly specific to the types of approaches used, and potential requirements for educating people upfront, as well as ongoing support
  - They are scored as being higher for opt-in because customers have to be persuaded to participate, often with multiple offers and reminders, perhaps with telephone follow-up
  - But, the two large opt-out programs spent substantial sums to ensure low opt-out rates. Will an opt-out approach ultimately be cheaper?

Notes on the Scoring (4)

- **Program implementation costs are shown as higher for opt-out**
  - Implementation costs potentially include meters and customer-specific investments. They could also include investments in a meter data management system and a new (or enhanced) billing system
  - They are shown to be lower (therefore better for opt-in) assuming that advanced metering infrastructure (AMI) and smart meters, for example, are not going to be installed for other reasons.
  - But if AMI is ubiquitous or will be installed for other reasons (such as distribution operations savings), and if the utility is planning to install a new billing system anyway, then incremental costs in this category might not be that large a factor.

Conclusions and Observations (5)

- **Load response per participant** is consistently higher in opt-in programs than for opt-out. In addition, will it be cost-effective to try to deal with large numbers of non-responders?
- **Load response for the total program** – the jury is still out. We still only have two field trials to compare
- **Let the customers speak (and listen) –** How customers will respond to the approach is key – is a dip in overall satisfaction worth the gains?

Contact Us

Bernie Neenan

Technical Executive

bneenan@epri.com, (865) 218-8133

Jen Robinson

Technical Leader/Project Manager

jrobinson@epri.com, (865) 218-8068

Ellen Petrill

Senior Program Manager

epetrill@epri.com, (650) 855-8939

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